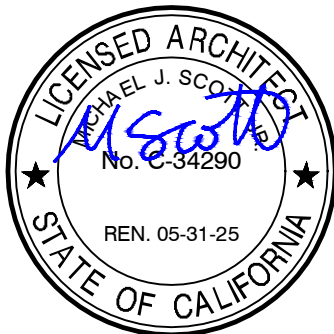


DATE: July 31, 2024
MAI NO.: 24001
DSA APPL. NO.: 02-122658
DSA FILE NO.: 10-28
PTN: 62125-41

PROJECT MANUAL FOR:

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL

COALINGA-HURON UNIFIED SCHOOL DISTRICT
COALINGA, KINGS COUNTY, CALIFORNIA



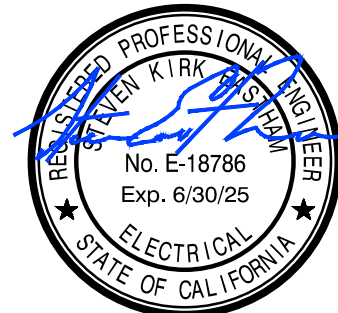
Michael J. Scott **C-34290**
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MANGINI ASSOCIATES INC.
4320 W. Mineral King Avenue, Visalia, CA 93291
PHONE: (559) 627-0530 FAX: (559) 627-1926



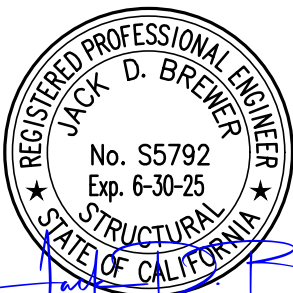
Ryan W. Carlson **M-34846**
MECHANICAL ENGINEER

LAWRENCE ENGINEERING GROUP
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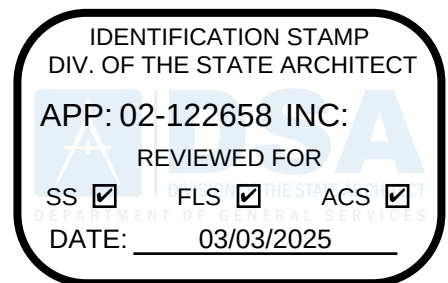
Jack D. Brewer **S-5792**
STRUCTURAL ENGINEER

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7112 N. Fresno Street, Suite 311, Fresno, CA 93720
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SET NUMBER _____

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SECTION 00 1110 - INVITATION TO BID

1. **NOTICE TO CONTRACTORS:** The **Coalinga-Huron Unified School District**, acting by and through its Governing Board, hereinafter referred to as the Owner, will receive sealed bids for the award of contracts for the construction of the **New Classroom Wing at Sunset Elementary School, 985 Sunset Ave., Coalinga, CA 93210.**
2. **SUBMITTAL OF BIDS:**
 - .1 **Sealed Bids:** Sealed envelopes containing bids with subcontractor's list and other required attachments will be accepted by Coalinga-Huron Unified School District at its offices located at 657 Sunset Street, Coalinga, California 93210 on **April 30, 2025** before **2:00:00 pm PST** on the clock designated by the Owner or its representative as the bid clock.
 - .2 **Completed DIR Information:** Within 24 hours of the opening of the bids, the apparent low bidder shall submit completed DIR information on the Subcontractor List to the Coalinga-Huron Unified School District at its offices located at 657 Sunset Street, Coalinga, California 93210.
 - .3 **DVBE Information:** Within 24 hours of the opening of the bids, the apparent low bidder shall submit the Prime Bidder Good Faith Effort Worksheet and Prime Bidder Certification of Disabled Veteran Business Enterprise Participation forms to the Coalinga-Huron Unified School District at its offices located at 657 Sunset Street, Coalinga, California 93210.
3. **OPENING OF BIDS:** Bids will be opened and read aloud after **2:00:00 pm PST, April 30, 2025.**
4. **MANDATORY PRE-BID CONFERENCE:** A pre-bid conference has been scheduled for **April 10, 2025, at 10:00 am**, at the project site, Sunset Elementary School, 985 Sunset Ave, Coalinga, California, 93210, and will include the opportunity to inspect the site and may include dissemination of additional information in response to questions or otherwise. All bidders will be deemed to have notice of all conditions and information which bidders could have obtained by attending the pre-bid conference, including but not limited to any conditions in, at, and about the site, the building or buildings, if any, and any work that may have been done thereon. Bids will not be accepted from bidders who did not attend the pre-bid conference.
5. **DESCRIPTION OF WORK:** The Work includes a New Classroom Wing building at the Sunset Elementary School campus, slab on grade classroom building and a single story wood frame, parent loading, parking, and on & off-site development.
6. **BASIS FOR BIDS:** Bids shall be on a lump sum basis.
7. **TIME OF COMPLETION:** The Work shall be completed within **365 calendar days** from the date of the Owner's Notice to Proceed.
8. **EXAMINATION AND PROCUREMENT OF CONTRACT DOCUMENTS:** Contract Documents have been prepared by Mangini Associates Inc. Documents may be examined and obtained at the Architect's office, 4320 West Mineral King Avenue, Visalia, CA 93291, (559) 627-0530, Monday through Thursday between 8 am and 5 pm and Friday between 8 am and 12 pm or at Dodge Data & Analytics, ConstructConnect, Tulare-Kings County Builders Exchange (Visalia), the Central California Builders Exchange (Fresno), Kern County Builders Exchange (Bakersfield), Builders Exchange of Stockton. The architect's contact for questions or RFI's is **Edgar Sanchez edgar@mangini.us**.

Digital plan sets are available in .pdf format by contacting Bridgette Young at bridgette@mangini.us.

Only bonafide **general contract bidders** may secure hard copies of the proposed Contract Documents from the Architect on the following basis:

- .1 Limited to 2 sets of specifications and drawings, upon payment of **\$270.00** deposit per set payable to Mangini Associates Inc., completely refundable if sets are returned to the Architect in good condition within 7 calendar days after bid opening.
 - .2 A non-refundable charge of **\$20.00**, made by separate check, will be required for all sets requiring shipping and handling.
 - .3 Additional complete sets may be purchased from the Architect at the price of 1.15 times the Architect's cost of reproduction and delivery.
 - .4 Specifications and drawings will also be issued to various Builders Exchanges for subcontractors' use or subcontractors may purchase complete sets from the Architect at the price of 1.15 times the Architect's cost of reproduction and delivery. **Purchased sets are non-refundable.**
 - .5 No partial sets or individual sheets will be issued or sold.
 - .6 Only plan holders and the listed exchanges will be notified of Addenda.
9. **SUBSTITUTIONS:** Pursuant to California Public Contract Code Section 3400, contractors and material suppliers shall submit requests to the Architect, not less than 10 days prior to bid (if material is to be included on final addendum), all data substantiating a request for substitution of materials. In order to be considered, substitutions of materials or equipment must comply with the requirements of specification Section 01 2500, including providing comparative data and samples.
10. **BID SECURITY:** Submit bid security with proposal, made payable to Owner, in amount of 10% of the Bid, in the form of certified check, bid bond, cashier's check or cash. Bid security will be retained until Agreement is signed and required bonds furnished. If any bidder refuses to sign the Agreement Form within 7 days after Award, the Owner will retain his bid security as liquidated damages. To enable compliance with California Code of Civil Procedure Section 995.311, each contractor shall provide, prior to Contract Award, a print-out of information from the Department of Insurance website <http://www.insurance.ca.gov/> confirming the surety is an admitted surety insurer.
11. **QUALIFICATION OF BIDDER:** The Owner will not consider or accept any bids from contractors or subcontractors who are not licensed to do business in the State of California, in accordance with the California Public Contract Code of the State of California, providing for the licensing of contractors. In accordance with Section 3300 of said Code, the Contractor shall have a **Class B license** and shall maintain that license in good standing through Project completion and all applicable warranty periods.
12. **AWARD:** The Owner reserves the right to reject any and all bids and/or waive any informality in any bid received and/or determine in its discretion the responsibility of any bidder, and which bid is most advantageous to the Owner. Unless otherwise required by law, no bidder may withdraw his bid for a period of **60 days** after the date set for the opening thereof, or any authorized postponement thereof. The Owner reserves the right to take more than 60 days to make a decision regarding the rejection of bids or the award of the Contract.
13. **PREVAILING WAGES:** The Project is a public work and under California Labor Code Section 1770 et seq., the Director of the California Department of Industrial Relations ("DIR") has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which the work is to be performed, for each craft, classification or type of worker needed to execute this Contract. Copies of the rates are on file at the Owner's principal office. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement.
14. **DIR REGISTRATION:** The Owner will not accept any bid or enter into any contract without proof of the bidder's current registration to perform public work under Labor Code Section 1725.5. Bidders shall not accept any subbid or enter into any subcontract without proof of the subcontractor's current registration to perform public work under Labor Code Section 1725.5.
15. **LABOR COMPLIANCE:** Contractor and all subcontractors shall comply with Labor Code Section 1776. In accordance with Labor Code section 1771.4(a)(1), the Project is subject to compliance monitoring and enforcement by the DIR. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor

Commissioner on a monthly basis, unless directed by the Owner to furnish such records more often, and in the format prescribed by the Labor Commissioner.

16. **RETENTION FUND:** The successful bidder will be allowed to substitute securities or establish an escrow in lieu of retainage, pursuant to Public Contract Code Section 22300, and as described in the Agreement Between Owner and Contractor and General Conditions.
17. **REQUIRED CERTIFICATIONS:** Bids must be accompanied by the following forms, fully executed by each Bidder:
- .1 Non-Collusion Affidavit
 - .2 Contractor's Certificate Regarding Workers Compensation
 - .3 Fingerprinting Notice and Acknowledgment
 - .4 Sufficient Funds Declaration
 - .5 Acknowledgment regarding Drug Free Workplace
 - .6 Acknowledgment regarding Alcoholic Beverage and Tobacco-Free Campus Policy
 - .7 Acknowledgment regarding No Contracting with Sanctioned Entities
 - .8 Roof Project Certification
 - .9 Prime Bidder Good Faith Effort Worksheet and Prime Bidder Certification of Disabled Veteran Business Enterprise Participation.
18. **DSA OVERSIGHT PROCESS:** The Contractor shall comply with the applicable requirements of the Division of State Architect ("DSA") Construction Oversight Process ("DSA Oversight Process"), including but not limited to (a) notifying the Project Inspector upon commencement and completion of each aspect of the work as required under DSA Form 156; (b) coordinating the Work with the Project Inspector's inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the Owner, Owner's Architect, any Construction Manager, any laboratories, and the Project Inspector to meet the DSA Oversight Process requirements without delay or added costs to the Project.
19. **DVBE REQUIREMENTS:** The Owner will require the successful Bidder to achieve the minimum goal of 3% DVBE (Disabled Veteran Business Enterprises) established in the bidding documents or to provide acceptable evidence of good faith efforts to do so.
20. **PRE-QUALIFIED BIDDER LIST:** Pursuant to Public Contract Code Section 20111.6, subsections (b) through (m), all general contractors and mechanical, electrical and plumbing subcontractors in license classifications A, B, C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 and C-46 who intend to bid on the project must be pre-qualified. No bid will be accepted for such projects from subcontractors in the listed license categories that are not on the Owner's Qualified Bidder List. Prequalification application packages are available on the District's website under the "Maintenance" tab. Prequalification applications must be submitted to the Owner through the Quality Bidders platform (no exceptions) by **5:00pm, April 18, 2025**. The Owner will publish a list of qualified bidders on or before **April 23, 2025**.

Dates March 26, 2025
Advertised: April 2, 2025

BY ORDER OF THE BOARD OF TRUSTEES OF
COALINGA-HURON UNIFIED SCHOOL DISTRICT

Tom Crawford, Clerk of the Board

END OF SECTION 00 1110

SECTION 00 2110 - INSTRUCTIONS TO BIDDERS

PART 1 - CONTRACT DOCUMENTS

- 1.1 Securing Documents:** Secure copies of the Contract Documents at the office of the Architect upon the conditions set out in the Section 00 1110 - Invitation To Bid.
- 1.2 Examination of Documents and Site:** Before submitting bid, carefully examine the Contract Documents and visit the site of the Project. Observe existing conditions and limitations under which the Work is to be performed and include in bid a sum to cover cost of all items necessary to perform the Work. Contractor will not be entitled to extra payment due to existing conditions, if such conditions could have been observed upon the required site visit and examination of Documents.
- 1.3 Interpretation of Contract Documents Prior to Bidding:** In general, the Drawings show dimensions, position, and kind of construction, and the Specifications qualities and methods. Any work called for on the Drawings and not mentioned in the Specifications, or vice versa shall be furnished as though fully set forth in both. Work not particularly detailed, marked or specified shall be the same as similar parts that are detailed, marked or specified.
- .1** It is the intent of the plans and specifications that the Contractor shall turn over to the Owner a complete job. Any work not specifically called for or specified, but necessary to comply with the intent of quality and completeness shall be performed as part of the contract.
 - .2** If any person contemplating submitting a bid for the construction of the Work is in doubt as to the true meaning of any part of the Contract Documents or finds discrepancies in or omissions from any part of the Contract Documents, he may submit to the Architect a written request for an interpretation thereof not later than 7 days before bids will be opened. **A Pre-Bid Request for Information form is included at the end of this Section.**
 - .3** Address all communications regarding this work to the Project Architect as shown on the cover page of the Project Manual.
 - .4** The person submitting the request will be responsible for its prompt delivery.
 - .5 Any binding interpretation or correction of the Contract Documents will be made only by written Addendum** and will be mailed or delivered to each Bidder on record. The Owner will not be responsible for any other explanations or interpretation of the Contract Documents.
- 1.4 Substitutions:** Contractors, subcontractors and/or material suppliers shall comply with the requirements set forth in Specification Section 01 2500 - Substitution Requirements. All requests for material substitutions shall be submitted with all required substantiating data, comparisons to the material specified, including samples and colors as needed to determine their acceptance. Failure to provide the required documentation is justification for rejection.
- .1** Substitution Requests shall be submitted a minimum of 10 days prior to the bid (if material is to be included on the final addendum);
 - .2** or not more than 35 days after the award of the contract.
 - .3** Substitution Requests received greater than 35 days after the award shall be rejected.
- 1.5 Addenda:** Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Contract Documents by additions, deletions, clarifications, or corrections.

PART 2 - BASIS FOR BIDS:

- 2.1 Lump Sum Bid:** All bids shall be on a lump sum basis. Each bidder shall breakdown the lump sum into the items required on the bid form, if any.
- 2.2 Taxes:** Taxes shall be included in the bid prices. The Owner will pay only the State sales and use taxes. Federal excise taxes are not applicable to school districts.

- 2.3 Alternates:** All alternates shall be bid by inserting the amount to be added or deducted in the appropriate space on the bid form. Alternates are described in Section 00 2410 - Scopes of Bids and on the drawings. Alternates are additive or deductive to the total lump sum bid. If no change in the base bid is required, enter "No Change."

PART 3 - BIDDING PROCEDURES

3.1 Bid Form: In order to receive consideration, make all bids in accordance with the following:

- .1 Make bids on the form provided with all blanks filled in. Do not change form wording nor add words.
- .2 All amounts shall be in words as well as in figures. Any discrepancy between the words and figures shall be resolved using the amount stated in words.
- .3 The Bid Form shall be filled out in ink or be typewritten.
- .4 A bid which is incomplete, incorrect or non-conforming, may be disregarded, in the sole discretion of the Board of Trustees.
- .5 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 Owner's rejection of the bid as not being responsive to the Invitation to Bid. Bids expressing exceptions or qualifications on Technical Specifications shall be disregarded as non-responsive.
- .6 The bid submitted shall not contain erasures, interlineations, or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the persons signing the bid. Oral or telephonic modifications of any bid submitted will not be considered.
- .7 Each bid shall be delivered in a separate opaque sealed envelope bearing on the outside, the name of the bidder, the bidder's address, and the name of the Project. Each envelope shall include all the documents required by these Instructions.
- .8 Bids may not be modified after the designated time for bid opening. Bidders may withdraw and resubmit bids at any time prior to bid opening. No bid may be withdrawn after the bid opening.
- .9 Late bids will be returned to Bidder unopened.
- .10 Address bids to Owner and deliver to Owner on or before time set in Invitation to Bid. Enclose bid in sealed envelope bearing title of the Project and name of Bidder.
- .11 It is the Bidder's responsibility to be certain his bid is received in time at the proper place.

3.2 Execution of Forms:

- .1 Each bid must give the full business address of the bidder and must be signed by the bidder with his or her usual signature in longhand.
- .2 Bids by partnerships must furnish the full names of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters.
- .3 Bids by corporations must be signed with the legal name of the corporation, followed by the signature and designation of the president, secretary, or other person authorized to bind the corporation in this matter. The name of each person signing shall also be typed or satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished.
- .4 A bidder's failure to properly sign required forms may result in rejection of the bid.
- .5 All bids must include the bidder's contractor's license number, classification, and expiration date.

3.3 Bidder Submittal Envelope: All responsive bidders shall provide the following items within the Bid Submittal Envelope:

- .1 Bid Form
- .2 Bidder's Bond
- .3 Subcontractor List
- .4 Non-Collusion Affidavit
- .5 Contractor's Certificate Regarding Workers Compensation
- .6 Fingerprinting Notice and Acknowledgment

- .7 Sufficient Funds Declaration
- .8 Acknowledgment regarding Drug Free Workplace
- .9 Acknowledgment regarding Alcoholic Beverage and Tobacco-Free Campus Policy
- .10 Acknowledgment regarding No Contracting with Sanctioned Entities
- .11 Roof Project Certification
- .12 Prime Bidder Good Faith Effort Worksheet and Prime Bidder Certification of Disabled Veteran Business Enterprise Participation.

3.4 Withdrawal of Bid: Bidder may withdraw his bid at any time prior to the scheduled time for opening. No Bidder may withdraw his bid for a period of **60 days** after the time and date of opening. All bids shall be subject to acceptance by Owner during this period.

3.5 Subcontractor List / DIR Information:

- .1 **Subcontractor List:** Pursuant to the provisions of Section 4100 to 4113, inclusive, of the Public Contract Code of the State of California, every Bidder shall set forth the name and location of the place of business of each subcontractor who will perform work or labor in or about the construction of the Work or improvement in an amount in excess of 1/2 of one percent of the Bidder's total Base Bid. If the Bidder fails to specify a subcontractor for any portion of the work in excess of 1/2 of one percent of the Bidder's total Base Bid, the Bidder agrees to perform that portion of the Work.
- .2 **DIR Information:** Pursuant to Labor Code section 1725.5, within 24 hours of the receipt of bids, every Bidder shall set forth the name, location of the place of business, contractor's license number, and DIR registration number of all subcontractors listed on the Subcontractor List submitted with the Bid. The Contractor and any proposed subcontractors shall not be qualified to submit a bid or to be listed in a bid proposal for the Project unless currently registered and qualified under Labor Code Section 1725.5 to perform public work.

PART 4 - BONDS, AGREEMENT, AND INSURANCE

4.1 Bid Security: Each bidder is required to submit with each bid, a cashier's check upon a solvent bank, or a Bid Bond in an amount equal to 10% of the Bid made payable to Owner. This bid security shall be given as a guarantee that the bidder will enter into the Agreement if awarded to him and **shall be declared forfeited as liquidated damages if he refuses to enter into said Agreement** upon request to do so by Owner. If the bidder fails or refuses to timely enter into the contract, the Owner reserves the right to declare the bid bond forfeited and to pursue all other remedies in law or equity relating to such breach including, but not limited to, seeking recovery of damages for breach of contract. Bid security will be returned to all unsuccessful bidders, and to each successful bidder upon the Owner's receipt of a satisfactory Performance Bond, Payment Bond, Policy of Insurance, Worker's Compensation Insurance Certificate, executed Agreement and any other document required by the Contract Documents prior to the execution of the Agreement by the Owner. Bid Bonds shall be executed on the form included in these specifications or a facsimile thereof. Any and all bonds required, whether Bid Bonds, Faithful Performance, Payment, or other bonds, shall be issued by a California admitted surety insurer.

4.2 Bid Security and Bond Requirements: Each successful bidder shall file with Owner, a Performance Bond and a Payment Bond, each in the amount of 100% of the Contract Sum. All bonds required, whether Bid Bonds, Performance, Payment, or other Bonds, shall be issued by a California admitted surety insurer. The Bid Bond, Performance Bond, and Payment Bond must be issued by the same admitted surety insurer. The payment and performance bonds required by these specifications will neither be accepted nor approved by the Owner unless the bonds are underwritten by an admitted surety. The Owner further reserves the right to satisfy itself as to the acceptability of the surety and the form of bond. The apparent low bidder must submit together with the payment and performance bonds the following documents:

- .1 The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws, or other instrument authorizing the person who executed the bond to do so.
- .2 A certified copy of the certificate of authority of the insurer issued by the California Insurance Commissioner.

- .3 A financial statement of the assets and liabilities of the insurer to the end of the quarter calendar year prior to 30 days next preceding the date of the execution of the bond, in the form of an officers' certificate as defined in Corporations Code Section 173.
 - .4 If the surety insurer is not found to be an "admitted surety insurer" the bid shall be determined non-responsive and shall be rejected. If the surety insurer's assets do not exceed its liabilities in an amount equal to or in excess of the amount of the bond, subject to Section 12090 of the Insurance Code; or if the bidder fails to provide the specified documents; the bid may be determined non-responsive and may be rejected.
- 4.3 Form of Agreement:** The bidder selected by the Owner shall be required to execute an Agreement in form and substance substantially identical to that included in this bidding package. The Agreement and other documents are subject to the approval of the Owner and its legal counsel. The successful bidder shall, within 7 days of notice of award of the contract, sign and deliver to the Owner the executed Agreement along with the bonds and certificates of insurance required by the contract documents. In the event the bidder to whom an award is made fails or refuses to execute the Agreement within 7 calendar days from the date of receiving notification that the contract has been awarded to the bidder, the Owner may declare the bidder's bid deposit or bond forfeited as damages caused by the failure of the bidder to enter into the contract, and may award the work to the next lowest responsible bidder, or may reject all bids and call for new bids.
- 4.4 Worker's Compensation Insurance:** Bidder shall submit with his bid the Contractor's Certificate Regarding Worker's Compensation in the form provided by the Construction Documents. Contractor shall maintain for the duration of his work on this Project statutory Worker's Compensation Insurance.
- 4.5 Contractor's Insurance Coverage:** Contractor shall maintain for the duration of the work required under the Agreement, all Insurance in the forms and minimum amounts shown in the Construction Agreement.
- .1 Before an Agreement is executed by the Owner, the Contractor shall obtain all insurance policies required hereunder, including the "GENERAL LIABILITY - ADDITIONAL INSURED ENDORSEMENT"; shall obtain Owner's approval of insurance; and shall file policies of such insurance with Owner. Approval of the insurance shall not relieve or decrease the liability of Contractor.
 - .2 Policies of insurance shall contain transcripts from the policies authenticated by proper office of the insurer, evidencing in particular those insured, the amount of the insurance and the location of and the operations to which the insurance applies. The insurance required must be written by a company licensed in California.
 - .3 Contractor shall not cause any insurance policy to be canceled or permitted to lapse. Each insurance policy shall contain a clause stating that the policy shall not at any time during the construction period be canceled or reduced, restricted or limited until 30 days after written notice to the Owner and Architect by registered mail, return receipt requested.

PART 5 - CONSIDERATION OF BIDS

- 5.1 Award of Contract:** The Contract shall be awarded to the lowest responsible and responsive bidder as interpreted by the Owner under California law and as specified herein. Rejection of any or all bids, to contract work with whomever and in whatever manner, to abandon work entirely, and/or to waive any informality in receiving of bids is reserved as the right of the Owner. Before the Contract is awarded, the Owner may at its sole discretion, require from the proposed Contractor further evidence of the reasonable qualifications of such contractor to faithfully, capably, and reasonably perform such proposed Contract and may consider such evidence before making its decision on the award of such proposed Contract.
- 5.2 Basis of Award:** The lowest bid will be determined in the following manner:
- .1 On the amount of the base bid only.

- 5.3 Execution of Agreement:** The required form of Agreement is included in the Contract Documents. The awarded bidder shall execute Agreement within seven (7) days after mailing, faxing or delivery of the Notice of Award of Contract. Owner reserves the right, without any liability, to cancel the award of any bid for any reason at any time before the full execution of the Agreement between Owner and Contractor.

PART 6 - ADDITIONAL PROVISIONS

- 6.1 Contractor License Required:** The Owner will not consider or accept any bids from contractors or subcontractors who are not licensed to do business in the State of California, in accordance with the Public Contract Code of the State of California, providing the licensing of contractors. Joint venture bidders shall possess a joint venture license. In accordance with Section 3300 of said Code, the Contractor shall be a **Class B license**.
- 6.2 Construction Documents for Construction:** A reasonable number of plans and specifications for construction, as stated in 2.2.5 of the General Conditions, shall be **10 sets** furnished to the successful Contractor without charge. Additional sets will be furnished, upon request from the Contractor, at the Architect's cost of reproduction and delivery. All plans and specifications are the property of the Owner and are to be carefully used and returned to the Owner at the completion or cessation of the work or termination of the contract, and are not to be used on other work.
- 6.3 Liquidated Damages:** Time is of the essence in the performance of this contract, and all work called for herein and all requirements shall be completed before the expiration of the date established in the Owner's Notice to Proceed. Failure to complete the Project, or applicable phases of the Project, within the date(s) and in the manner provided for by the Contract Documents, shall subject the Contractor to liquidated damages for each calendar day by which such completion is delayed beyond the applicable Date for Completion. For purposes of liquidated damages, the concept of substantial completion shall not constitute completion and is not part of the Contract Documents. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Project were not completed by the applicable Date for Completion are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages that the Owner would suffer if completion is delayed include, but are not limited to, loss of the use of the Project, disruption of activities, costs of administration, supervision and the incalculable inconvenience and loss suffered by the public.
- .1 Step One Liquidated Damages:** Accordingly, the Parties agree that the following dollar figure shall be the amount of damages which the Owner shall directly incur upon failure of the Contractor to complete the Project, or applicable parts thereof, within the time specified, \$1,000.00 for each calendar day by which completion of the Project, or applicable parts thereof, is delayed beyond the Date for Completion as adjusted by change orders. If the Contractor becomes liable under this Section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold all retained percentages of payments and/or progress payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this Article has been finally determined. If the retained percentages and withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Section, then the Contractor and its sureties shall continue to remain liable to the Owner for such liabilities until all such liabilities are satisfied in full. If the Owner accepts any work or makes any payment under this Agreement after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of completion and liquidated damages.
- .2 Step Two Liquidated Damages:** Failure to close out the Project, or applicable phases of the Project, shall subject the Contractor to Step Two Liquidated Damages for each calendar day by which such completion is delayed beyond 65 days of the Notice of Completion. Damages that the Owner would suffer if project close out is delayed include, but are not limited to, disruption of activities, costs of administration, supervision and professional fees. Accordingly, the Parties agree that the following dollar figure shall be the amount of damages which the Owner shall directly incur upon failure of the Contractor to complete the Project, or applicable parts thereof, within the time specified, \$250.00 for each calendar day by which completion of the Project, or applicable parts thereof, is delayed beyond the Date for Notice of Completion. If the Contractor

becomes liable under this Section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold all retained percentages of payments and/or progress payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this Article has been finally determined.

- 6.4 Denial of Right to Bid:** Contractors or subcontractors who have violated state law governing public works shall be denied the right to bid on this public work contract as set forth in California Labor Code Section 1777.7. In accordance with Public Contract Code Section 6109, with respect to subcontractors which are ineligible to perform work on public works projects pursuant to Labor Code Section 17771.1 or 1777.7:
- .1 The Contractor shall not allow any such subcontractor to work on this project.
 - .2 The Contractor shall repay to the Owner any money paid to any such subcontractor allowed to work on this project.
 - .3 The Contractor shall pay the wages of the workers of any such subcontractor allowed to work on this project.
- 6.5 DIR Registration:** The Contractor and any proposed subcontractors shall not be qualified to submit a bid or to be listed in a bid proposal for the Project unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code.
- 6.6 Pre-qualification of Contractor and Certain Subcontractors:** Owner has determined that the Project is subject to the requirements of Public Contract Code section 20111.6. Accordingly, the Owner has required that Contractor and all electrical, mechanical, and plumbing subcontractors to be utilized on the Project complete and submit to the Owner a standardized pre-qualification questionnaire and financial statement. The questionnaire and financial statement has been verified under oath by the pre-qualification applicants in the manner in which civil pleadings in civil actions are verified. The questionnaires and financial statements are not public records and are not open to public inspection.

The Owner has adopted and applied a uniform system of rating the pre-qualification applicants on the basis of the completed questionnaires and financial statements. The questionnaire and financial statement, and the uniform system of rating applicants cover, at a minimum, the issues covered by the standardized questionnaire and model guidelines for rating bidders developed by the DIR pursuant to Public Contract Code section 20101(a).

If the Project includes electrical, mechanical, or plumbing components that will be performed by electrical, mechanical, or plumbing contractors, then a list of pre-qualified general contractors and electrical, mechanical, and plumbing subcontractors has been or will be made available by the Owner to all bidders at least five business days prior to the dates fixed for the receiving and opening of bids on the Project.

A bid will not be accepted from any person or other entity that is required to submit a completed questionnaire and financial statement for pre-qualification or from any person or other entity that uses a subcontractor that is required to submit a completed questionnaire and financial statement for pre-qualification, but has not done so at least 10 business days prior to the date fixed for the receiving and opening of bids on the Project or has not been pre-qualified for at least five business days prior to that date.

For purposes of this Article, electrical, mechanical, and plumbing subcontractors are contractors licensed pursuant to Section 7058 of the California Business and Professions Code, specifically contractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and C-46 licenses, pursuant to regulations of the Contractors' State License Board.

END OF SECTION 00 2110

PRE-BID REQUEST FOR INFORMATION

TO: Mangini Associates Inc.

Attn: _____

DATE: _____

CONTRACTOR'S RFI NO.: _____

ARCHITECT'S RFI NO.: _____

PROJECT: _____

PROJECT NO.: _____

DSA APPL. NO.: _____

Subject: _____

Plan/Spec. Ref: _____

Question: _____

Suggestion: _____

Attachments: _____

By: _____

Company: _____

Title: _____

Phone: _____

Fax: _____

Email: _____

Response: _____

☐ Included in Addendum No.:☐ Not Included in Future Addendum

By: _____

Title: _____

MANGINI ASSOCIATES INC.

CC: _____

SECTION 00 2410 - SCOPES OF BIDS

- 1. GENERAL:** This Section is intended as clarification of the bids required in Section 00 4110 - Bid Form. Should bidders not understand the requirements of the bid, it is their responsibility to contact the Architect within seven calendar days prior to the bid opening to obtain a clarification of such items. The address and telephone numbers of the Architect and each of the Consultants are on the cover sheet for your convenience.
- 2. BIDS REQUIRED:** Bids for this project shall include all labor, materials, tax, freight, permits, fees, etc., required to complete the project as specified and indicated in the Drawings and Specifications, including the General and Supplemental Conditions to the Contract.
 - A. BASE BID WORK:** All work required to satisfactorily complete the work indicated in the Drawings and Project Manual approved by the Division of the State Architect, excluding the Alternate Bids.

END OF SECTION 00 2410

SECTION 00 3100 - AVAILABLE PROJECT INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes information available to the bidders and the use of such information.

1.2 SOILS INVESTIGATION REPORT

- A. A soils investigation report has been prepared for the site by Krazan & Associates Inc., KA Report No. 052-24041, dated June 14, 2024.
1. The soils investigation report may be inspected at the office of the Architect.
 2. Copies may be obtained upon request.
- B. Use of Data:
1. This report was obtained only for the Architect's guidance in the design of this Project and is not a part of the Contract Documents.
 2. The report is available to bidders, for information only, so that bidders have full disclosure of all information available to the Owner and Architect with respect to subsurface conditions at the Site. The report is not a warranty of subsurface conditions. Information is site specific as related to the boring locations noted.
 3. Bidders should visit the site and acquaint themselves with existing conditions.
 4. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such investigations may be performed only under time schedules and arrangements approved in advance by the Architect and the Owner.
- C. Cautions to Contractor:
1. The report of subsurface conditions represents only those points where soil borings and other investigations were made in locations indicated in the report. The report does not reflect specific variations that may occur between these data collection points.
 2. Information indicated relative to soil moisture content and water table elevations represent conditions which existed at the time of the testing only and are subject to daily and/or seasonal variations. The Contractor shall not use this information as a fixed basis for bidding as the Contractor is expected to anticipate fluctuations in these areas and anticipate adjustments in his procedures to accommodate such.
- D. A geotechnical engineer will be retained by the Owner to observe performance of work in connection with excavating, trenching, filling, backfilling, and grading, and to perform compaction and moisture tests.

1.3 OWNER'S RECORD DRAWINGS

- A. The Owner is in possession of record drawings of existing site improvements and buildings. These drawings may be inspected at the office of the Owner.
- B. Use of Owner's Record Drawings:
1. These drawings, along with visual observations, were used for the Architect's guidance in the design of this Project, and are not a contract document.
 2. These drawings are available to bidders, for information only, so that bidders have full disclosure of all information available to the Owner and Architect with respect to existing improvements at the Site. These drawings are not a warranty of subsurface or hidden conditions.
 3. Bidders should visit the site and acquaint themselves with existing conditions.
 4. Prior to bidding, bidders may make their own investigations to satisfy themselves as to existing

conditions, but such investigations may be performed only under time schedules and arrangements approved in advance by the Architect and the Owner.

- C. Cautions to Contractor: These drawings represent only those conditions existing at the time the drawings were prepared and may not reflect changes or construction subsequent to preparation of the drawings.

END OF SECTION 00 3100

SECTION 00 3110 - PRELIMINARY SCHEDULES

1. **START OF WORK:** Do not start work until receipt of written notice from Architect to proceed.
2. **PROJECT SCHEDULE:**
 - .1 **Anticipated Award Date: May 14, 2025.** This date is for preliminary scheduling only; Owner does not guarantee this date.
 - .2 **Anticipated Notice to Proceed Date: May 26, 2025.** This date is for preliminary scheduling only; Owner does not guarantee this date.
 - .3 **Time for Completion:** Complete all Work within **365 calendar days**, commencing with the date established in the written notice from Owner to proceed, and ending with the date of Notice of Completion.
3. **OWNER OCCUPANCY**
 - .1 The schedule is intended as a maximum time frame and should the Contractor be able to expedite the Work, the Owner and Architect will assist in advancing within the terms of the Contract.
 - .2 The project will be in progress while students and staff are on site.

END OF SECTION 00 3110

SECTION 00 4110 - BID FORM

BID TO: Coalinga-Huron Unified School District
657 Sunset Street
Coalinga, CA 93210

BID FROM: _____

Phone: _____ Fax: _____
Email: _____

PROJECT: NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL

BASIS FOR BIDS: All work required for construction of New Classroom Wing at Sunset Elementary School, located at 985 Sunset Ave, Coalinga, California.

The undersigned, having carefully examined the location of the proposed work, the local conditions of the place where the work is to be performed, the Invitation to Bid, the Instructions to Bidders, the Drawings, the Specifications, the Agreement, the General Conditions, all addenda, and all Contract Documents for this Project, proposes and agrees to be bound by all terms and conditions of the complete contract and agrees to perform, within the time stipulated, the contract, including all of its component parts, and everything required to be performed, and to provide and furnish any and all of the labor, materials, tools, expendable equipment, and all applicable taxes, utility and transportation services necessary to perform the contract and complete in a good workmanlike manner all of the work required, including sheeting, shoring and bracing, or equivalent method for protection of life and limb in trenches and open excavation in conformance with applicable safety orders, in connection with the Project called for by them for the entire order in strict conformity with the Contract Documents.

ADDENDA: The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum # _____	Dated _____	Addendum # _____	Dated _____
Addendum # _____	Dated _____	Addendum # _____	Dated _____
Addendum # _____	Dated _____	Addendum # _____	Dated _____

BASE BID: Lump Sum price for construction of the Base Bid portions of the Project (in accordance with the Contract Documents):

_____ Dollars (\$ _____)

CASH ALLOWANCES:

- .1 A cash allowance of **\$60,000.00 for moisture control treatment**, as described in Section 01 2100 - Cash Allowances, is included in the Base Bid.
- .2 A cash allowance of **\$25,000.00 for additional work to satisfy additional power or communication utility requirements**, as described in Section 01 2100 - Cash Allowances, is included in the Base Bid.

CALIFORNIA STATEWIDE CRUDE OIL PRICE INDEX:

Compensation for price index fluctuations for copper conductors sized #2 and larger shall be adjusted based on Exhibit "A" attached to Specification Section 32 1210. The Contractor shall provide the following information to establish the baseline costs for asphalt oil:

- .1 Project asphalt oil tonnage: _____
- .2 California Statewide Crude Oil Price Index in effect on date of bid: _____

CONDITIONS

Bid Form:

- .1 Bidder agrees that he/she has checked carefully all words and figures inserted in the Bid Form and that he/she is solely responsible for errors or omissions therein.
- .2 Forms submitted with incomplete bid amounts or signature are subject to non-acceptance by Owner. Amounts shall be stated in writing and figures.
- .3 Owner reserves the right to reject any or all Bids, waive any informality in any Bid, determine in his own discretion the responsibility of any Bidder, and determine which Bid is most advantageous to Owner.

Bid Form Attachments: Bid Form shall be accompanied the following, using forms included in the Project Manual:

- .1 Bid Form
- .2 Bidder's Bond
- .3 Subcontractor List / DIR Information
- .4 Non-Collusion Affidavit
- .5 Contractor's Certificate Regarding Workers Compensation
- .6 Fingerprinting Notice and Acknowledgment
- .7 Sufficient Funds Declaration
- .8 Acknowledgment regarding Drug Free Workplace
- .9 Acknowledgment regarding Alcoholic Beverage and Tobacco-Free Campus Policy
- .10 Acknowledgment regarding No Contracting with Sanctioned Entities
- .11 CARB Compliance Declaration
- .12 Roof Project Certification
- .13 Prime Bidder Good Faith Effort Worksheet and Prime Bidder Certification of Disabled Veteran Business Enterprise Participation.

Time for Completion: Bidder agrees to complete all Work within **365 calendar days**, commencing with the date established in the written notice from Owner to proceed, and ending with the date of Substantial Completion.

Substitutions: Bidder agrees he/she has reviewed the substitution requirements of Sections 00 2110 and 01 2500 and shall comply with such requirements.

Execution of Agreement: Bidder agrees that if its bid or bids are accepted by Owner, Bidder will execute the Agreement Form provided and furnish the required Bonds and Insurance Certificates within 7 calendar days after date of written Notice of Award by Owner. The undersigned further agrees that in case of default in executing these documents within the time fixed, the proceeds of the check or bond, accompanying this bid, shall become the property of the Owner.

Withdrawal of Bid: Bidder agrees that his/her Bid may not be withdrawn for a period of **60 calendar days** after Bid Opening date.

Step One Liquidated Damages: Should the Contractor fail to complete this contract, and/or each phase of the work provided therein within the time fixed for such completion, pursuant to Government Code Section 53069.85, said Contractor shall forfeit and pay (or the Owner may deduct the amount thereof from any money due or to become due to the Contractor) the sum of **One Thousand Dollars (\$1,000.00)** per calendar day as Step One Liquidated Damages. In accordance with the provisions of Government Code Section 4215, the Contractor shall not be assessed liquidated damages where delay is caused by failure of the Owner or the owner of the utility to provide for the removal or relocation of utility facilities, but only if such facilities are not identified in the plans and specifications.

Step Two Liquidated Damages: Should the Contractor fail to complete and closeout this contract within 65 days of the Notice of Completion, pursuant to Government Code Section 53069.85, said Contractor shall forfeit and pay (or the Owner may deduct the amount thereof from any money due or to become due to the Contractor) the sum of **Two Hundred and Fifty Dollars (\$250.00)** per calendar day as Step Two Liquidated Damages, in addition to amounts which may be assessed for Step One liquidated damages.

Bidder's Representation as to Bids: Bidder certifies that his/her Bid is genuine and is not sham or collusive, or made in the interest or in behalf of any Bidder not herein named, and that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a sham bid, or any other possible bidder to refrain from bidding, and that Bidder has not in any manner sought by collusion to secure for himself an advantage over any other Bidder.

Contractor's License: Contractors and subcontractors are required by law to be licensed and regulated by the Contractors' State License Board, which has jurisdiction to investigate complaints against contractors if a complaint is filed within 4 years of the date of the alleged violation. A complaint regarding alleged act or omission pertaining to structural defects must be filed within 10 years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, 3132 Bradshaw Road, Sacramento, California. Mailing address: P.O. Box 26000, Sacramento, California 95826.

Worker's Compensation: The bidder hereby certifies that it is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and will comply with such provisions before commencing the performance of the work of this contract.

Authorized Signature: Bidder states that the signature below is of a person authorized to bind the Bidder to this Bid and the Agreement.

Wage Rates: The Bidder agrees to comply with the prevailing wage laws as set forth in Labor Code sections 1770-1780 unless an applicable federal labor law imposes a higher wage or stricter requirement, in which case the higher wage or stricter requirement will apply. The Contractor agrees to be responsible for the compliance by all subcontractors with Labor Code Section 1776. Pursuant to Labor Code Section 1770, the Bidder shall, as a penalty to the Owner, forfeit not more than \$50 for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the director for the work or craft in which the worker is employed. The amount of this penalty shall be determined by the California State Labor Commissioner and shall be based on consideration of the Contractor's mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor in meeting his or her prevailing wage obligations, or the Contractor's willful failure to pay the correct rates of prevailing wages. In accordance with the Public Contract Code Section 6109, with respect to subcontractors which are ineligible to perform work on public works projects pursuant to Labor Code Section 1777.1 or 1777.7:

- .1 The Bidder shall not allow any such subcontractor to work of this project.
 - .2 The Bidder shall repay to the Owner any money paid to any such subcontractor allowed to work on this project.
 - .3 The Bidder shall pay the wages of the workers of any such subcontractor allowed to work on this project.
- Copies of the prevailing rate of per diem wages are on file at the principal office of the Owner, and are available to any interested party upon request, pursuant to Labor Code Section 1773 and Section 1773.2. **The Bidder shall comply with provisions of the Labor Code Section 1775 regarding penalties for failure to pay prevailing wages.**

DIR Registration: The Contractor and any proposed subcontractors shall not be qualified to submit a bid or to be listed in a bid proposal for the Project unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code.

Labor Compliance Program: Contractor and all subcontractors shall comply with Labor Code section 1776. In accordance with Labor Code section 1771.4(a)(1), the Project is subject to compliance monitoring and enforcement by the DIR. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner on a monthly basis, unless directed by the Owner to furnish such records more often, and in the format prescribed by the Labor Commissioner.

Qualified Bidder List: Pursuant to Public Contract Code section 20111.6, all general contractors and mechanical, electrical and plumbing subcontractors in license classifications A, B, C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C- 42, C- 43 and C- 46 who intend to bid on the project must be pre-qualified. No bid will be accepted for such projects from subcontractors in the listed license categories that are not on the Owner's Qualified Bidder List.

DVBE Requirements: The Owner will require the successful Bidder to achieve the minimum goal of 3% DVBE (Disabled Veteran Business Enterprises) established in the bidding documents or to provide acceptable evidence of good faith efforts to do so.

If the bidder is a corporation, the undersigned hereby represents and warrants that the corporation is duly incorporated and is in good standing in the State of _____ and that _____ (Name), whose title is _____, is authorized to act for and bind the corporation.

The undersigned declares under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____

Bidder Name (type or print)

Authorized Signator (type of print)

Signature

Organization (individual, partnership, or corporation)

Address

Contractor's License Number

Class

Contractor's License Expiration Date

SUBCONTRACTOR LIST / DIR INFORMATION

Public Contract Code Section 4100 / Labor Code Section 1725.5

Contractor: _____

Subcontractor List: Subcontracting under this Agreement shall be governed by the California "Subletting and Subcontracting Fair Practices Act" (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California and any amendments thereof). In accordance with the provisions of Public Contract Code Section 4104, each bidder shall list below the name and location of place of business for each subcontractor licensed by the State of California who, under subcontract to the prime contractor, will perform a portion of the contract work in an amount in excess of one-half (1/2) of one percent (1%) of the total contract price. In each such instance the nature of the work to be sublet shall be described.

If a prime contractor fails to specify a subcontractor or if a prime contractor specifies more than one subcontractor for the same portion of work to be performed under the contract in excess of one-half (1/2) of one percent (1%) of the prime contractor's total bid, Contractor shall be deemed to have agreed that Contractor alone shall perform that portion.

No prime contractor whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontractor to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half (1/2) of one percent (1%) of the prime contractor's total bid as to which 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 (1/2) of one percent (1%) of the prime contractor's total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, 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.

DIR Information: Pursuant to Labor Code section 1725.5, Within 24 hours of the receipt of bids, the apparent low bidder shall provide the contractor's license number, and DIR registration number of all subcontractors listed on the Subcontractor List submitted with the Bid. The Contractor and any proposed subcontractors shall not be qualified to submit a bid or to be listed in a bid proposal for the Project unless currently registered and qualified under Labor Code Section 1725.5 to perform public work.

An inadvertent error in listing a subcontractor who is not registered under Labor Code Section 1725.5 shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that either: the subcontractor is registered prior to the bid opening; or the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5(a)(2)(E), if applicable, within 24 hours after the bid opening; or the subcontractor is replaced by another registered subcontractor under Public Contract Code Section 4107. Failure of a listed subcontractor to be registered shall be grounds under Public Contract Code Section 4107 for the Contractor, with the Owner's consent, to substitute a registered subcontractor for the unregistered subcontractor.

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/2024
2022 CBC

[illegible]

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/2024
2022 CBC

[illegible]

Submit with Bid - Contractor: _____			Submit within 24 Hours of Bid	
Portion of Work	Subcontractor Name	Subcontractor Location	License Number	DIR Registration Number

NON-COLLUSION AFFIDAVIT
Public Contract Code Section 7106

To: _____

Project: _____

The undersigned declares:

I am the _____ [Title] of _____ [Company],
the party making a bid proposal (bid) on the above-referenced Project. 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 _____, 2023, at _____ [City], California.

Date

Printed Name

Signature

CONTRACTOR'S CERTIFICATE REGARDING WORKER'S COMPENSATION
Labor Code Section 3700

California Labor Code Section 3700, in relevant part, provides that:

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

(a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer or as one employer in a group of employers. Said certificate may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees, ... “

I am aware of the provisions of the 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 provisions before commencing the performance of the work of this contract. I shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation.

Proper Name of Company

Printed Name

Signature

In accordance with Article 5 [commencing at Section 1860], Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under this contract.

FINGERPRINTING NOTICE AND ACKNOWLEDGMENT
Education Code Section 45125.2

Business entities entering into contracts with the Owner for the construction, reconstruction, rehabilitation or repair of a facility may comply with Education Code section 45125.2, in which case it would not have to comply with Section 45125.1. If such an entity is not compliant with Section 45125.2, then it must comply with Section 45125.1. Such entities are responsible for ensuring full compliance with the law and should therefore review all applicable statutes and regulations. Therefore, the following information is provided simply to assist you with compliance with the law:

1. The Owner has determined that your employee(s), or you as a sole proprietor, will have more than limited contact with students, therefore the law requires that you must use one or more of the following methods to ensure the safety of pupils (Education Code §45125.2(a)):
 - a. Install a physical barrier at the work site to limit contact with pupils.
 - b. If you are not a sole proprietorship, have one of your employees, whom the Department of Justice has ascertained has not been convicted of a violent or serious felony (see **Attachment A** to this Notice and Acknowledgement), continually monitor and supervise all of your employees. For the Department of Justice to so ascertain, your employee may submit fingerprints to the Department of Justice pursuant to Education Code section 45125.1(a).
 - c. Arrange, with Owner's approval, for surveillance of your employees by Owner's personnel.

Prior to commencing the Work, you shall submit the Independent Contractor Student Contact Form (see **Attachment B** to this Notice and Acknowledgement) to the Owner, which will indicate which of the above methods you will use.

2. If you are providing services in an emergency or exceptional situation, you are not required to comply with Education Code section 45125.2, above. An "emergency or exceptional" situation is one in which pupil health or safety is endangered or when repairs are needed to make a facility safe and habitable. Owner shall determine whether an emergency or exceptional situation exists. (Education Code §45125.2(d).)
3. If you use one or more of the three methods in Section 1 (above), you are not required to comply with Education Code section 45125.1. (Education Code §45125.2(b).)

I have read the foregoing and agree to comply with the requirements of this notice and Education Code sections 45125.1 and 45125.2 as applicable.

Date

Signature

Printed Name

Title

ATTACHMENT A
FINGERPRINTING NOTICE AND ACKNOWLEDGMENT

Under Education Code section 45125.1, no employee of a contractor or subcontractor who has been convicted of or has criminal proceedings pending for a violent or serious felony may come into contact with any student. A violent felony is any felony listed in subdivision (c) of Section 667.5 of the Penal Code. Those felonies are presently defined as:

- (1) Murder or voluntary manslaughter.
- (2) Mayhem.
- (3) Rape as defined in paragraph (2) or (6) of subdivision (a) of Section 261 or paragraph (1) or (4) of subdivision (a) of Section 262.
- (4) Sodomy as defined in subdivision (c) or (d) of Section 286.
- (5) Oral copulation as defined in subdivision (c) or (d) of Section 288a.
- (6) Lewd or lascivious act as defined in subdivision (a) or (b) of Section 288.
- (7) Any felony punishable by death or imprisonment in the state prison for life.
- (8) Any felony in which the defendant inflicts great bodily injury on any person other than an accomplice which has been charged and proved as provided for in Section 12022.7, 12022.8, or 12022.9 on or after July 1, 1977, or as specified prior to July 1, 1977, in Sections 213, 264, and 461, or any felony in which the defendant uses a firearm which use has been charged and proved as provided in subdivision (a) of Section 12022.3, or Section 12022.5 or 12022.55.
- (9) Any robbery.
- (10) Arson, in violation of subdivision (a) or (b) of Section 451.
- (11) Sexual penetration as defined in subdivision (a) or (j) of Section 289.
- (12) Attempted murder.
- (13) A violation of Section 12308, 12309, or 12310.
- (14) Kidnapping.
- (15) Assault with the intent to commit a specified felony, in violation of Section 220.
- (16) Continuous sexual abuse of a child, in violation of Section 288.5.
- (17) Carjacking, as defined in subdivision (a) of Section 215.
- (18) Rape, spousal rape, or sexual penetration, in concert, in violation of Section 264.1.
- (19) Extortion, as defined in Section 518, which would constitute a felony violation of Section 186.22 of the Penal Code.
- (20) Threats to victims or witnesses, as defined in Section 136.1, which would constitute a felony violation of Section 186.22 of the Penal Code.
- (21) Any burglary of the first degree, as defined in subdivision (a) of Section 460, wherein it is charged and proved that another person, other than an accomplice, was present in the residence during the commission of the burglary.
- (22) Any violation of Section 12022.53.
- (23) A violation of subdivision (b) or (c) of Section 11418.

A serious felony is any felony listed in subdivision (c) Section 1192.7 of the Penal Code. Those felonies are presently defined as:

- (1) Murder or voluntary manslaughter;
- (2) Mayhem;
- (3) Rape;
- (4) Sodomy by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person;
- (5) Oral copulation by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person;
- (6) Lewd or lascivious act on a child under the age of 14 years;
- (7) Any felony punishable by death or imprisonment in the state prison for life;
- (8) Any felony in which the defendant personally inflicts great bodily injury on any person, other than an accomplice, or any felony in which the defendant personally uses a firearm;
- (9) Attempted murder;
- (10) Assault with intent to commit rape, or robbery;
- (11) Assault with a deadly weapon or instrument on a peace officer;
- (12) Assault by a life prisoner on a non-inmate;
- (13) Assault with a deadly weapon by an inmate;

- (14) Arson;
- (15) Exploding a destructive device or any explosive with intent to injure;
- (16) Exploding a destructive device or any explosive causing bodily injury, great bodily injury, or mayhem;
- (17) Exploding a destructive device or any explosive with intent to murder;
- (18) Any burglary of the first degree;
- (19) Robbery or bank robbery;
- (20) Kidnapping;
- (21) Holding of a hostage by a person confined in a state prison;
- (22) Attempt to commit a felony punishable by death or imprisonment in the state prison for life;
- (23) Any felony in which the defendant personally used a dangerous or deadly weapon;
- (24) Selling, furnishing, administering, giving, or offering to sell, furnish, administer, or give to a minor any heroin, cocaine, phencyclidine (PCP), or any methamphetamine-related drug, as described in paragraph (2) of subdivision (d) of Section 11055 of the Health and Safety Code, or any of the precursors of methamphetamines, as described in subparagraph (A) of paragraph (1) of subdivision (f) of Section 11055 or subdivision (a) of Section 11100 of the Health and Safety Code;
- (25) Any violation of subdivision (a) of Section 289 where the act is accomplished against the victim's will by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person;
- (26) Grand theft involving a firearm;
- (27) Carjacking;
- (28) any felony offense, which would also constitute a felony violation of Section 186.22;
- (29) assault with the intent to commit mayhem, rape, sodomy, or oral copulation, in violation of Section 220;
- (30) throwing acid or flammable substances, in violation of Section 244;
- (31) assault with a deadly weapon, firearm, machine gun, assault weapon, or semiautomatic firearm or assault on a peace officer or firefighter, in violation of Section 245;
- (32) assault with a deadly weapon against a public transit employee, custodial officer, or school employee, in violation of Sections 245.2, 245.3, or 245.5;
- (33) discharge of a firearm at an inhabited dwelling, vehicle, or aircraft, in violation of Section 246;
- (34) commission of rape or sexual penetration in concert with another person, in violation of Section 264.1;
- (35) continuous sexual abuse of a child, in violation of Section 288.5;
- (36) shooting from a vehicle, in violation of subdivision (c) or (d) of Section 12034;
- (37) intimidation of victims or witnesses, in violation of Section 136.1;
- (38) criminal threats, in violation of Section 422;
- (39) any attempt to commit a crime listed in this subdivision other than an assault;
- (40) any violation of Section 12022.53;
- (41) a violation of subdivision (b) or (c) of Section 11418; and
- (42) any conspiracy to commit an offense described in this subdivision.

ATTACHMENT B
INDEPENDENT CONTRACTOR STUDENT CONTACT FORM

Contractor Name: _____
Supervisor/Foreman Name: _____
Start Date: _____
Completion Date: _____
Location of Work: _____
Hours of Work: _____
Length of Time on Grounds: _____
Number of Employees on the Job: _____

Yes No
[] [] Employees or sole proprietor will have more than limited contact with students as determined by Owner,
or if by Contractor, please explain:

If yes, the following steps will be taken to ensure student safety (check):

- [] A physical barrier will be installed at the worksite to limit contact with pupils.
- [] Employees (if not a sole proprietorship) will be continually monitored and supervised by an employee
who has not been convicted of a violent or serious felony.

Name of Supervising Employee:

Date of Department of Justice verification that supervising employee has not been convicted of a violent
or serious felony:

Name of employee who is the custodian of the Department of Justice verification information:

- [] Owner agrees: Employees or sole proprietor will be surveilled by Owner's personnel.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Date

Signature

Printed Name

Title

SUFFICIENT FUNDS DECLARATION
Labor Code Section 2810

To: _____

Project: _____

I, _____ [Bidder Name], declare that I am the _____ [Title]
of _____ [Company], the entity making a bid for the above-referenced
Project, and that the bid submitted by _____ [Company] includes sufficient
funds to permit _____ [Company] and all subcontractors to comply with
all local, state or federal labor laws or regulations during the Project, including payment of prevailing wages.

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

Date: _____, 20

Signature: _____

Print Name: _____

Print Title: _____

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 Owner 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 Owner'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 buildings owned or leased by Owner, on Owner's property and in Owner's 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	

CONTRACTOR CERTIFICATION REGARDING SANCTIONED ENTITIES & IRAN CONTRACTING ACT

("Contractor") certifies as follows:

1. Contractor is not an entity under any form of sanction imposed by the United States of America, or the State of California, and is not listed as such by the U.S. Department of State (a "Sanctioned Entity"), which list may be referenced at: <https://sanctionssearch.ofac.treas.gov/> or <https://www.treasury.gov/ofac/downloads/ssi/ssilist.pdf>.
Further, Contractor is not an Affiliate (any person or entity directly or indirectly controlling; controlled by or under common control with Contractor; owned in whole or in part by Contractor; that owns any interest in Contractor, in whole or in part; that is a current creditor or debtor to Contractor) of any Sanctioned Entity.

2. Contractor shall exercise all due diligence, including, without limitation, consulting the U.S. Department of State list of sanctioned entities, which may be referenced at <https://sanctionssearch.ofac.treas.gov/> or <https://www.treasury.gov/ofac/downloads/ssi/ssilist.pdf> to ensure Contractor is not currently party to any contract with, and shall not enter into any contractual relationship with any Sanctioned Entity during the term of any agreement by and between Contractor and Owner or in relation to any agreement by and between Contractor and Owner.

3. Pursuant to Public Contract Code 2204, Contractor affirms that the official named below certifies they are 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 the California Department of General Services 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 California Department of General Services.

_____ Date	_____ Contractor
By: _____ Signature	
_____ Title	
_____ Federal Tax Identification Number	

CARB COMPLIANCE DECLARATION

To: _____

Project: _____

CALIFORNIA AIR RESOURCES BOARD ("CARB") <https://ww2.arb.ca.gov/>

For any project awarded on or after January 1, 2024, Public Works Awarding Bodies are required to obtain valid CARB Certificates of Reported Compliance ("CRC") from all contractors and listed subcontractors before awarding the project. The Public Works Awarding Body will be required to retain CRCs for three years after the project is complete, and the CRCs are subject to CARB review upon five calendar days' notice.

The Regulations apply to all "Public Works Awarding Bodies," which phrase is broadly defined as "any public agency (state, county, city, school district, community college district, water district, sanitation district, transit district, etc.), or official thereof, in the state of California, that awards or enters into a contract for the erection, construction, alteration, repair, removal, or improvement of any public structure, building, road, or other public lands, property, or improvement of any kind."

The bidder must fully execute this document and submit it, including required attachments, with its bid for the above-captioned project. The bidder must submit the CRCs for the bidder and all of its subcontractors to this document within 7 calendar days of the bid opening.

The ARB Diesel Off-Road Online Reporting System (DOORS) reporting system is where the bidder and its subcontractors are able to obtain their CRCs: DOORS (ca.gov). There is also an additional website that provides them with more information on the regulation along with FAQs and user guides. The website for the "Off-Road Zone" is <https://ww2.arb.ca.gov/our-work/programs/truckstop-resources/road-zone>.

If any questions, please call the DOORS Hotline at 877-593-6677 or email doors@arb.ca.gov. Please note that at this time DOORS staff has limited access to documents received via mail and fax is unavailable.

Fact Sheet: Contracting Requirements | California Air Resources Board
<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements>

Fact Sheet: Renewable Diesel Fuel Requirements | California Air Resources Board
<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-renewable-diesel-fuel-requirements>

Fact Sheet: Added Vehicle Restrictions and Tier Phase-Out Requirements | California Air Resources Board
<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-added-vehicle-restrictions-and-tier-phase-out-requirements>

I, _____ [name of declarant], declare that I am the _____ [title] of _____
[name of bidding contractor], the entity making and submitting a bid for the above Project; that all CRCs required for
_____ [name of bidding contractor] and its subcontractors on the above Project are attached to this
declaration; that all of the attached CRCs are current and valid; and that the attached CRCs will allow the Owner to comply
with the applicable CARB requirements in connection with the Project.

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

Date

Contractor

By: _____
Signature

ROOF PROJECT CERTIFICATION
Public Contract Code § 3006(a)(b)

To: _____

Project: _____

I, _____ [Bidder Name and Title],
of _____ [Company], certify that I have not offered, given, or agreed
to give, received, accepted, or agreed to accept, any gift, contribution, or any financial incentive whatsoever to or from any
person in connection with the above-referenced Project contract. As used in this certification, "person" means any natural
person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Furthermore, I, _____ [Bidder Name and Title],
of _____ [Company], certify that I do not have, and throughout
the duration of the contract, I will not have, any financial relationship in connection with the performance of this contract
with any architect, engineer, roofing, consultant, materials manufacturer, distributor, or vendor that is not disclosed below.

I, _____ [Bidder Name and Title],
of _____ [Company], have the following financial relationships,
with an architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor, or other person in connection
with the following roof project contract:

[Name and address of building, contract date and number]

I certify that to the best of my knowledge, the contents of this disclosure are true, or are believed to be true.

Date: _____, 20

Signature: _____

Print Name: _____

Print Name of Employer: _____

Insert DBVE Good Faith Efforts forms here

PRIME BIDDER CERTIFICATION OF DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

To be completed by the Contractor Submitting a Lease-Leaseback Proposal.

PAGE 1 OF 2

PART I – IDENTIFICATION INFORMATION		
BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	COUNTY	APPLICATION NO.

PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount.

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

YOUR BUSINESS ENTERPRISE	AND YOU	AND YOU
A. ☐ is Disabled Veteran owned and your forces, will perform at least 3 percent of this contract	will include a copy of your DVBE letter from the Office of Small Business and DVBE Services (OSDS).	
B. ☐ is Disabled Veteran owned but is unable to perform the 3 percent of this contract with your forces	will use DVBE subcontractors/ suppliers to bring the contract participation to at least 3 percent	will include a copy of each DVBE's letter from OSDS (including yours, if applicable).
C. ☐ is not Disabled Veteran owned	will use DVBE subcontractors/ suppliers for at least 3 percent of this contract	
D. ☐ is unable to meet the required participation goals	will complete a Good Faith Effort to obtain DVBE participation	will include the Prime Bidder's Good Faith Effort Worksheet.

Note: An Office of Small Business and DVBE Services (OSDS) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through the OSDS and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed nonresponsive and may be ineligible for award of the contract.

Continued on reverse side

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

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

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

	BASE BID/PROPOSAL	ALTERNATE #1	ALTERNATE #2	ALTERNATE #3 OR BASE BID B	ALTERNATE #4 OR BASE BID C	ALTERNATE #5 (Modernization or Reconstruction Only)
A. Prime Bidder, <i>if DVBE (own participation)</i>	\$	\$	\$	\$	\$	\$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						

PRIME BIDDER GOOD FAITH EFFORT WORKSHEET

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

PAGE 1 OF 2

BIDDER'S NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	OWNER	COUNTY

GENERAL INSTRUCTIONS:

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

PART I – CONTACTS

To identify DVBE subcontractors/suppliers for participation in your bid/proposal, contact must be made with each of the following categories. It is recommended that you contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. Owner			
2. Office of Small Business and DVBE Services (OSDS). OSDS publishes a searchable list of Disabled Veteran Business Enterprises Internet address – http://www.bidsync.com/DPXBisCASB	(916) 375-4940		
3. DVBE Organizations (<i>List</i>):			
4. Write "recorded message" in this column, if applicable.			

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

Attach copies of advertisements to this form.

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

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

IF THE DVBE.....	THEN.....	AND.....		
Was selected to participate	Check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Prime Bidder Certification	Include a copy of their DVBE letter from OSBCR.		
Was not selected to participate	Check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column.		
Did not respond to your solicitation	Check the "NO RESPONSE" column			
DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED <i>This section must be completed</i>	NO RESPONSE
	YES	NO		

IMPORTANT NOTE:

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

CERTIFICATION

I, _____ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of Section 12650 et seq. of the Government Code providing for the imposition of treble damages for making false claims.

SIGNATURE OF CHIEF EXECUTIVE OFFICER

DATE

SECTION 00 5210 - FORM OF AGREEMENT

- 1. GENERAL:** Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division I - Specification Sections, apply to this Section.
- 2. AGREEMENT FORM:** The Agreement Form to be used for this project shall be the American Institute of Architects' Document A101, 2017 Edition.
- 3. EXECUTION:** The selected Bidder/Contractor shall execute the Agreement Form as noted in Section 00 4110 - Bid Form under the heading "Conditions".

END OF SECTION 00 5210

AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

(Paragraph Deleted)

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☒ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

☐ Not later than () calendar days from the date of commencement of the Work.

☐ By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item

Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.5.1 Step One Liquidated Damages: Failure to complete the Project, or applicable phases of the Project, within the date(s) and in the manner provided for by the Contract Documents, shall subject the Contractor to liquidated damages for each calendar day by which such completion is delayed beyond the applicable Date for Completion.

For purposes of liquidated damages, the concept of substantial completion shall not constitute completion and is not part of the Contract Documents. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Project were not completed by the applicable Date for Completion are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages that the Owner would suffer if

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User Notes:

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completion is delayed include, but are not limited to, loss of the use of the Project, disruption of activities, costs of administration, supervision and the incalculable inconvenience and loss suffered by the public. Accordingly, the Parties agree that the following dollar figure shall be the amount of damages which the Owner shall directly incur upon failure of the Contractor to complete the Project, or applicable parts thereof, within the time specified, **\$1,000.00 for each calendar day** by which completion of the Project, or applicable parts thereof, is delayed beyond the Date for Completion as adjusted by change orders. If the Contractor becomes liable under this Section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold all retained percentages of payments and/or progress payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this Article has been finally determined. If the retained percentages and withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Section, then the Contractor and its sureties shall continue to remain liable to the Owner for such liabilities until all such liabilities are satisfied in full. If the Owner accepts any work or makes any payment under this Agreement after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of completion and liquidated damages.

§ 4.5.2 Step Two Liquidated Damages: Should the Contractor fail to complete and closeout this contract within 65 days of the Notice of Completion, pursuant to Government Code Section 53069.85, said Contractor shall forfeit and pay (or the Owner may deduct the amount thereof from any money due or to become due to the Contractor) the sum of **Two Hundred and Fifty Dollars (\$250.00) for each calendar day** as Step Two Liquidated Damages, in addition to amounts which may be assessed for Step One liquidated damages.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the 25th day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the 25th day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than Thirty (30) days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five Percent (5 %)

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201-2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

12.00 % per annum

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201-2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker. *(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201-2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201-2017

☒ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201-2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201-2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201-2017.

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ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

§ 8.7.1 License Required: In accordance with Section 3300 of California Public Contract Code, the Contractor and all subcontractors are required by law to be licensed as regulated by the Contractors' State License Board, and shall maintain that license in good standing through Project completion and all applicable warranty periods. License classification required for this project is indicated in Specification Section 00 1110 - Instructions to Bidders.

§ 8.7.2 Indemnification and Insurance: The Contractor will defend, indemnify and hold harmless the Owner, its governing board, officers, agents, trustees, employees and others as provided in the General Conditions. By this statement the Contractor represents that it has secured the payment of Workers' Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated

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herein will continue so to comply with said provisions of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation. Contractor shall provide the insurance set forth in the General Conditions and Supplementary Conditions.

§ 8.7.3 Escrow Account in Lieu of Retention: In accordance with section 22300 of the Public Contract Code, the Owner will permit the substitution of securities for any retention monies withheld by the Owner 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 Owner, or with a state or federally chartered bank as the escrow agent, who shall then pay such retention monies to the Contractor. Upon completion of the Contract, the securities shall be returned to the Contractor if Owner has no basis to withhold under the Contract Documents. Securities eligible for investment under this section shall include those listed in Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. Any escrow agreement entered by Owner and Contractor pursuant to Public Contract Code section 22300, shall be substantially similar to the form set forth in Public Contract Code section 22300.

§ 8.7.4 Wage Rates: The Project is a public work, the Work shall be performed as a public work, and under California Labor Code Section 1770 *et seq.*, the Director of the California Department of Industrial Relations ("DIR") has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which the work is to be performed, for each craft, classification or type of worker needed to execute this Contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. Copies of the rates are on file at the Owner's principal office. The rate of prevailing wage for any craft, classification or type of workmanship to be employed on this Project is the rate established by the applicable collective bargaining agreement which rate so provided is hereby adopted by reference and shall be effective for the life of this Agreement or until the Director of the DIR determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement. The Contractor and any subcontractor under the Contractor as a penalty to the Owner shall forfeit not more than Two Hundred Dollars (\$200.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed. The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

§ 8.7.5 DIR Registration: The Owner will not accept any bid or enter into any contract without proof of the bidder's current registration to perform public work under Labor Code Section 1725.5. Bidders shall not accept any subbid or enter into any subcontract without proof of the subcontractor's current registration to perform public work under Labor Code Section 1725.5.

§ 8.7.6 Payroll Records: The Contractor and each Subcontractor shall keep or cause to be kept an accurate record for work on this Project showing the names, addresses, social security numbers, work classification, straight time and overtime hours worked and occupations of all laborers, workers and mechanics employed by them in connection with the performance of this Contract or any subcontract thereunder, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Standards Enforcement of the DIR. Contractor and all subcontractors shall comply with Labor Code section 1776. In accordance with Labor Code section 1771.4(a)(1), the Project is subject to compliance monitoring and enforcement by the DIR. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner on a monthly basis, unless directed by the Owner to furnish such records more often, and in the format prescribed by the Labor Commissioner.

§ 8.7.7 Subcontracting: Subcontracting under this Agreement shall be governed by the California "Subletting and Subcontracting Fair Practices Act", Public Contract Code Sections 4100-4114.

§ 8.7.8 Working Hours: In accordance with the provisions of Sections 1810 to 1815, inclusive, of the Labor Code of

the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or a Subcontractor doing or contracting to do any part of the Work contemplated by this Agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, that work may be performed by such employee in excess of said eight hours per day or forty hours per week provided that compensation for all hours worked in excess of eight hours per day, and forty hours per week, is paid at a rate not less than one and one-half (1½) times the basic rate of pay. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by them in connection with the Work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Law Enforcement. The Contractor shall as a penalty to the Owner forfeit Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Agreement by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day, and forty hours in any one calendar week, except as herein provided.

§ 8.7.9 California Code of Regulations Compliance: The Contractor shall comply with California Code of Regulations (CCR), Title 24, in addition to all other applicable regulations. Contractor shall keep a copy of the latest edition of Title 24, Part 1 through Part 5 and Part 9, on the job site at all times, and keep it available for reference use. Nothing in these contractor documents shall be construed to permit work not conforming to these codes. A copy of the stamped contract documents shall be kept on the job site and made available to the Owner's Inspector. Where the requirements of these Contract Documents exceed those of such codes or ordinances, these Contract Documents shall govern. The provisions of all applicable building codes and ordinances shall be considered a minimum requirement.

§ 8.7.10 Apprentices: The Contractor shall comply with California Labor Code Sections 1777.5 and 1777.6. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than 1 hour of apprentice's work for each 5 hours of work performed by a journeyman (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color. Only apprentices as defined in Labor Code Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements, will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the Contractor for all apprenticeable occupations.

§ 8.7.11 DSA Oversight Process: The Contractor must comply with the applicable requirements of the Division of State Architect ("DSA") Construction Oversight Process ("DSA Oversight Process"), including but not limited to (a) notifying the Inspector of Record ("IOR") upon commencement and completion of each aspect of the work as required under DSA Form 156; (b) coordinating the Work with the IOR's inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the Owner, Owner's Architect, any Construction Manager, any laboratories, and the IOR to meet the DSA Oversight Process requirements without delay or added costs to the Project. Contractor shall be responsible for any additional DSA fees related to review of proposed changes to the DSA-approved construction documents, to the extent the proposed changes were caused by Contractor's wrongful actions or omissions. If inspected work is found to be in non-compliance with the DSA-approved construction documents or the DSA-approved testing and inspection program, then it must be removed and corrected. Any construction that covers unapproved or uninspected work is subject to removal and correction, at Contractor's expense, in order to permit inspection and approval of the covered work in accordance with the DSA Oversight Process.

§ 8.7.12 Prequalification of Contractor and Certain Subcontractors: Owner has determined that the Project is subject to the requirements of Public Contract Code section 20111.6. Accordingly, the Owner has required that Contractor and all electrical, mechanical, and plumbing subcontractors to be utilized on the Project complete and submit to the Owner a standardized prequalification questionnaire and financial statement. The questionnaire and financial statement has been verified under oath by the prequalification applicants in the manner in which civil pleadings in civil actions are verified. The questionnaires and financial statements are not public records and are not open to public inspection. The Owner has adopted and applied a uniform system of rating the prequalification applicants on the basis of the completed questionnaires and financial statements. The questionnaire and financial statement, and the uniform system of rating applicants cover, at a minimum, the issues covered by the standardized questionnaire and model guidelines for rating bidders developed by the DIR pursuant to Public Contract Code section 20101(a).

- .1 If the Project includes electrical, mechanical, or plumbing components that will be performed by electrical, mechanical, or plumbing contractors, then a list of prequalified general contractors and electrical, mechanical, and plumbing subcontractors has been or will be made available by the Owner to all bidders at least five business days prior to the dates fixed for the receiving and opening of bids on the Project.
- .2 In addition, each prospective contractor and electrical, mechanical, and plumbing subcontractor on the Project has been furnished by the Owner with a standardized proposal form that, when completed and executed, has been or will be submitted as his or her bid. Bids not presented on the forms so furnished shall be disregarded. A proposal form has not and will not be accepted from any person or other entity that is required to submit a completed questionnaire and financial statement for prequalification or from any person or other entity that uses a subcontractor that is required to submit a completed questionnaire and financial statement for prequalification, but has not done so at least 10 business days prior to the date fixed for the receiving and opening of bids on the Project or has not been prequalified for at least five business days prior to that date.
- .3 For purposes of this Article, electrical, mechanical, and plumbing subcontractors are contractors licensed pursuant to Section 7058 of the California Business and Professions Code, specifically contractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and C-46 licenses, pursuant to regulations of the Contractors' State License Board.

§ 8.7.13 DVBE Goals: Compliance with Disabled Veteran Business Enterprise (DVBE) contracting goals is required for this Project. In accordance with Education Code section 17076.11 the Owner has a DVBE participation goal of 3% per year of the overall dollar amount of state funds allocated to the Owner pursuant to the Leroy F. Green School Facilities Act of 1998, and expended each year by the Owner for this Project. The Owner is seeking DVBE participation under this Agreement. The Contractor must make a good faith effort to contact and utilize DVBE subcontractors and suppliers in securing bids, in the manner set forth in this Article for performance of the Project. Information regarding certified DVBE firms can be obtained from the State's Office of Small Business and DVBE Services (OSDS) at (916) 375-4940 as well as the OSDS website at www.bidsync.com/DPXBisCASB. Verification of DVBE status must be obtained from the OSDS by receiving an approved certification letter and reference number from that office. Contractor is required, as a material condition of this Agreement, to retain documentation of its good faith efforts in utilizing DVBEs for this Project, for submission to the Owner or to the applicable state agency in the event such documentation is requested.

- .1 Good faith efforts are demonstrated by evidence of the following: (a) contact was made with the Owner regarding the identification of DVBE; (b) contact was made with other state agencies and with local DVBE organizations to identify DVBEs; (c) advertising was published in trade papers and other papers focusing on DVBEs; (d) invitations to bid or proposal solicitations were submitted to potential DVBE contractors; and (e) available DVBEs were considered. Contractor shall certify, under penalty of perjury, that a good faith effort was made to include DVBE subcontractors and suppliers in the Project.
- .2 Prior to, and as a condition precedent for the release of any retention withheld from Sublease payments made to Contractor by the Owner pursuant to Section 6 of the Sublease, the Contractor shall provide the Owner with written documentation identifying the amount paid to certified DVBE subcontractors and suppliers in performance of the Project. The Contractor shall also provide the Owner with a copy of the DVBE Certification Letter issued by OSDS for each DVBE that has participated in the Project. This documentation will be used by the Owner to evaluate its success in meeting its DVBE participation goal.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™-2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

- .5 Drawings: Drawing sheets as listed in the Drawing Index on Sheet G1.

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(Table Deleted)

.6 Specifications: Divisions 00 through 34 as listed in the Project Manual Table of Contents.

(Table Deleted)

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

(Paragraphs Deleted)

(Table Deleted)

[X] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Section 00 7310	Supplementary Conditions		

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

CONTRACTOR (Signature)

(Printed name and title)

(Printed name and title)

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Additions and Deletions Report for AIA® Document A101™ – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 14:22:27 on 10/11/2018.

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EXHIBIT A – INSURANCE AND BONDS

...

[☒] A date set forth in a notice to proceed issued by the Owner.

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§ 4.5.1 Step One Liquidated Damages: Failure to complete the Project, or applicable phases of the Project, within the date(s) and in the manner provided for by the Contract Documents, shall subject the Contractor to liquidated damages for each calendar day by which such completion is delayed beyond the applicable Date for Completion.
For purposes of liquidated damages, the concept of substantial completion shall not constitute completion and is not part of the Contract Documents. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Project were not completed by the applicable Date for Completion are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages that the Owner would suffer if completion is delayed include, but are not limited to, loss of the use of the Project, disruption of activities, costs of administration, supervision and the incalculable inconvenience and loss suffered by the public. Accordingly, the Parties agree that the following dollar figure shall be the amount of damages which the Owner shall directly incur upon failure of the Contractor to complete the Project, or applicable parts thereof, within the time specified, \$1,000.00 for each calendar day by which completion of the Project, or applicable parts thereof, is delayed beyond the Date for Completion as adjusted by change orders. If the Contractor becomes liable under this Section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold all retained percentages of payments and/or progress payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this Article has been finally determined. If the retained percentages and withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Section, then the Contractor and its sureties shall continue to remain liable to the Owner for such liabilities until all such liabilities are satisfied in full. If the Owner accepts any work or makes any payment under this Agreement after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of completion and liquidated damages.

...

§ 4.5.2 Step Two Liquidated Damages: Should the Contractor fail to complete and closeout this contract within 65 days of the Notice of Completion, pursuant to Government Code Section 53069.85, said Contractor shall forfeit and pay (or the Owner may deduct the amount thereof from any money due or to become due to the Contractor) the sum of Two Hundred and Fifty Dollars (\$250.00) for each calendar day as Step Two Liquidated Damages, in addition to amounts which may be assessed for Step One liquidated damages.

...

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the ~~25th~~ day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the ~~day of the 25th day of the following~~ month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ~~(Thirty (30))~~ days after the Architect receives the Application for Payment.

PAGE 5

Five Percent (5 %)

PAGE 6

%-12.00 % per annum

...

[☒] Litigation in a court of competent jurisdiction

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§ 8.7.1 License Required: In accordance with Section 3300 of California Public Contract Code, the Contractor and all subcontractors are required by law to be licensed as regulated by the Contractors' State License Board, and shall maintain that license in good standing through Project completion and all applicable warranty periods. License classification required for this project is indicated in Specification Section 00 1110 - Instructions to Bidders.

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§ 8.7.2 Indemnification and Insurance: The Contractor will defend, indemnify and hold harmless the Owner, its governing board, officers, agents, trustees, employees and others as provided in the General Conditions. By this statement the Contractor represents that it has secured the payment of Workers' Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation. Contractor shall provide the insurance set forth in the General Conditions and Supplementary Conditions.

...

§ 8.7.3 Escrow Account in Lieu of Retention: In accordance with section 22300 of the Public Contract Code, the Owner will permit the substitution of securities for any retention monies withheld by the Owner 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 Owner, or with a state or federally chartered bank as the escrow agent, who shall then pay such retention monies to the Contractor. Upon completion of the Contract, the securities shall be returned to the Contractor if Owner has no basis to withhold under the Contract Documents. Securities eligible for investment under this section shall include those listed in Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. Any escrow agreement entered by Owner and Contractor pursuant to Public Contract Code section 22300, shall be substantially similar to the form set forth in Public Contract Code section 22300.

...

§ 8.7.4 Wage Rates: The Project is a public work, the Work shall be performed as a public work, and under California Labor Code Section 1770 et seq., the Director of the California Department of Industrial Relations ("DIR") has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which the work is to be performed, for each craft, classification or type of worker needed to execute this Contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. Copies of the rates are on file at the Owner's principal office. The rate of prevailing wage for any craft, classification or type of workmanship to be employed on this Project is the rate established by the applicable collective bargaining agreement which rate so provided is hereby adopted by reference and shall be effective for the life of this Agreement or until the Director of the DIR determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement. The Contractor and any subcontractor under the Contractor as a penalty to the Owner shall forfeit not more than Two Hundred Dollars (\$200.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed. The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

...

§ 8.7.5 DIR Registration: The Owner will not accept any bid or enter into any contract without proof of the bidder's current registration to perform public work under Labor Code Section 1725.5. Bidders shall not accept any subbid or enter into any subcontract without proof of the subcontractor's current registration to perform public work under Labor Code Section 1725.5.

...

§ 8.7.6 Payroll Records: The Contractor and each Subcontractor shall keep or cause to be kept an accurate record for work on this Project showing the names, addresses, social security numbers, work classification, straight time and overtime hours worked and occupations of all laborers, workers and mechanics employed by them in connection with the performance of this Contract or any subcontract thereunder, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Standards Enforcement of the DIR. Contractor and all subcontractors shall comply with Labor Code section 1776. In accordance with Labor Code section 1771.4(a)(1), the Project is subject to compliance monitoring and enforcement by the DIR. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner on a monthly basis, unless directed by the Owner to furnish such records more often, and in the format prescribed by the Labor Commissioner.

...

§ 8.7.7 Subcontracting: Subcontracting under this Agreement shall be governed by the California "Subletting and Subcontracting Fair Practices Act", Public Contract Code Sections 4100-4114.

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§ 8.7.8 Working Hours: In accordance with the provisions of Sections 1810 to 1815, inclusive, of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or a Subcontractor doing or contracting to do any part of the Work contemplated by this

Agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, that work may be performed by such employee in excess of said eight hours per day or forty hours per week provided that compensation for all hours worked in excess of eight hours per day, and forty hours per week, is paid at a rate not less than one and one-half (1½) times the basic rate of pay. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by them in connection with the Work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Law Enforcement. The Contractor shall as a penalty to the Owner forfeit Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Agreement by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day, and forty hours in any one calendar week, except as herein provided.

...

§ 8.7.9 California Code of Regulations Compliance: The Contractor shall comply with California Code of Regulations (CCR), Title 24, in addition to all other applicable regulations. Contractor shall keep a copy of the latest edition of Title 24, Part 1 through Part 5 and Part 9, on the job site at all times, and keep it available for reference use. Nothing in these contractor documents shall be construed to permit work not conforming to these codes. A copy of the stamped contract documents shall be kept on the job site and made available to the Owner's Inspector. Where the requirements of these Contract Documents exceed those of such codes or ordinances, these Contract Documents shall govern. The provisions of all applicable building codes and ordinances shall be considered a minimum requirement.

...

§ 8.7.10 Apprentices: The Contractor shall comply with California Labor Code Sections 1777.5 and 1777.6. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than 1 hour of apprentice's work for each 5 hours of work performed by a journeyman (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color. Only apprentices as defined in Labor Code Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements, will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the Contractor for all apprenticeable occupations.

...

§ 8.7.11 DSA Oversight Process: The Contractor must comply with the applicable requirements of the Division of State Architect ("DSA") Construction Oversight Process ("DSA Oversight Process"), including but not limited to (a) notifying the Inspector of Record ("IOR") upon commencement and completion of each aspect of the work as required under DSA Form 156; (b) coordinating the Work with the IOR's inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the Owner, Owner's Architect, any Construction Manager, any laboratories, and the IOR to meet the DSA Oversight Process requirements without delay or added costs to the Project. Contractor shall be responsible for any additional DSA fees related to review of proposed changes to the DSA-approved construction documents, to the extent the proposed changes were caused by Contractor's wrongful actions or omissions. If inspected work is found to be in non-compliance with the DSA-approved construction documents or the DSA-approved testing and inspection program, then it must be removed and corrected. Any construction that covers unapproved or uninspected work is subject to removal and correction, at Contractor's expense, in order to permit inspection and approval of the covered work in accordance with the DSA Oversight Process.

...

§ 8.7.12 Prequalification of Contractor and Certain Subcontractors: Owner has determined that the Project is subject to the requirements of Public Contract Code section 20111.6. Accordingly, the Owner has required that Contractor and all electrical, mechanical, and plumbing subcontractors to be utilized on the Project complete and submit to the Owner a standardized prequalification questionnaire and financial statement. The questionnaire and financial statement has been verified under oath by the prequalification applicants in the manner in which civil pleadings in civil actions are verified. The questionnaires and financial statements are not public records and are not open to public inspection. The Owner has adopted and applied a uniform system of rating the prequalification applicants on the basis of the completed questionnaires and financial statements. The questionnaire and financial statement, and the uniform system of rating applicants cover, at a minimum, the issues covered by the standardized questionnaire and model guidelines for rating bidders developed by the DIR pursuant to Public Contract Code section 20101(a).

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.1 If the Project includes electrical, mechanical, or plumbing components that will be performed by electrical, mechanical, or plumbing contractors, then a list of prequalified general contractors and electrical, mechanical, and plumbing subcontractors has been or will be made available by the Owner to all bidders at least five business days prior to the dates fixed for the receiving and opening of bids on the Project.

...

.2 In addition, each prospective contractor and electrical, mechanical, and plumbing subcontractor on the Project has been furnished by the Owner with a standardized proposal form that, when completed and executed, has been or will be submitted as his or her bid. Bids not presented on the forms so furnished shall be disregarded. A proposal form has not and will not be accepted from any person or other entity that is required to submit a completed questionnaire and financial statement for prequalification or from any person or other entity that uses a subcontractor that is required to submit a completed questionnaire and financial statement for prequalification, but has not done so at least 10 business days prior to the date fixed for the receiving and opening of bids on the Project or has not been prequalified for at least five business days prior to that date.

...

.3 For purposes of this Article, electrical, mechanical, and plumbing subcontractors are contractors licensed pursuant to Section 7058 of the California Business and Professions Code, specifically contractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and C-46 licenses, pursuant to regulations of the Contractors' State License Board.

...

§ 8.7.13 DVBE Goals: Compliance with Disabled Veteran Business Enterprise (DVBE) contracting goals is required for this Project. In accordance with Education Code section 17076.11 the Owner has a DVBE participation goal of 3% per year of the overall dollar amount of state funds allocated to the Owner pursuant to the Leroy F. Green School Facilities Act of 1998, and expended each year by the Owner for this Project. The Owner is seeking DVBE participation under this Agreement. The Contractor must make a good faith effort to contact and utilize DVBE subcontractors and suppliers in securing bids, in the manner set forth in this Article for performance of the Project. Information regarding certified DVBE firms can be obtained from the State's Office of Small Business and DVBE Services (OSDS) at (916) 375-4940 as well as the OSDS website at www.bidsync.com/DPXBisCASB. Verification of DVBE status must be obtained from the OSDS by receiving an approved certification letter and reference number from that office. Contractor is required, as a material condition of this Agreement, to retain documentation of its good faith efforts in utilizing DVBEs for this Project, for submission to the Owner or to the applicable state agency in the event such documentation is requested.

...

.1 Good faith efforts are demonstrated by evidence of the following: (a) contact was made with the Owner regarding the identification of DVBE; (b) contact was made with other state agencies and with local

DVBE organizations to identify DVBEs; (c) advertising was published in trade papers and other papers focusing on DVBEs; (d) invitations to bid or proposal solicitations were submitted to potential DVBE contractors; and (e) available DVBEs were considered. Contractor shall certify, under penalty of perjury, that a good faith effort was made to include DVBE subcontractors and suppliers in the Project.

...

.2 Prior to, and as a condition precedent for the release of any retention withheld from Sublease payments made to Contractor by the Owner pursuant to Section 6 of the Sublease, the Contractor shall provide the Owner with written documentation identifying the amount paid to certified DVBE subcontractors and suppliers in performance of the Project. The Contractor shall also provide the Owner with a copy of the DVBE Certification Letter issued by OSDS for each DVBE that has participated in the Project. This documentation will be used by the Owner to evaluate its success in meeting its DVBE participation goal.

...

.5 ~~Drawings~~Drawings: Drawing sheets as listed in the Drawing Index on Sheet G1.

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Number	Title	Date

...

.6 ~~Specifications~~Specifications: Divisions 00 through 34 as listed in the Project Manual Table of Contents.

...

Section	Title	Date	Pages

...

[] AIA Document E204™ 2017, Sustainable Projects Exhibit, dated as indicated below:

...

(Insert the date of the E204 2017 incorporated into this Agreement.)

...

[] The Sustainability Plan:

...

Title	Date	Pages

...

[X] Supplementary and other Conditions of the Contract:

...

Section 00 7310

Supplementary
Conditions

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, James Ryan Morrelli, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 14:22:27 on 10/11/2018 under Order No. 2470530043 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ - 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

SECTION 00 5260 - ESCROW AGREEMENT

- 1. GENERAL:** Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division I - Specification Sections, apply to this Section.
- 2. ESCROW AGREEMENT FORM:** The Escrow Agreement form to be used for this project shall be the "Escrow Agreement for security deposits in lieu of Retention" included in this section.

END OF SECTION 00 5260

**ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION**

This is a fiduciary account created by statute, Public Contract Code section 22300. The funds deposited in this account shall not be released to Contractor or any other person or entity, other than Owner, including pursuant to any purported lien or writ of attachment or execution, without the prior written, express approval of Owner.

This Escrow Agreement is made and entered into by and between _____ School District, whose address is _____ ("Owner"), _____, whose address is _____ ("Contractor"); and _____, a state or federally chartered bank in California whose address is _____ ("Escrow Agent").

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

1. Pursuant to California Public Contract Code section 22300, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by the Owner pursuant to the Contract entered into between the Owner and Contractor in the amount of _____ Dollars (\$ _____), and dated _____, ____ (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 retention earnings, the Escrow Agent shall notify the Owner within ten (10) calendar days of the deposit. The market value of the securities at the time of the substitution, as valued by the Owner, shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract. If the Owner determines that the securities are not adequate it will notify Contractor and Escrow Agent, and Contractor shall deposit additional security as further determined by the Owner. Securities shall be held in the name of the Owner and shall designate the Contractor as the beneficial Owner.
2. Thereafter, Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract, provided that the Escrow Agent holds securities in the form and amount specified above.
3. Pursuant to Public Contract Code section 22300, as an alternative to the procedures set forth above, Contractor may request in writing that the Owner pay retention amounts directly to Escrow Agent. When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for benefit of the Contractor until such time as the escrow created under this Escrow Agreement is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.
4. The 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 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 the right to draw upon the securities or any amount paid directly to Escrow Agent in the event of default of the Contract by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash, including any amounts paid directly to Escrow Agent pursuant to Section 3 above, as instructed by Owner. Escrow Agent shall not be concerned with the validity of any notice of default given by Owner pursuant to this paragraph, and shall promptly comply with Owner's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to a conflicting demand and waives any present or future opportunity of interpleader.
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 Contractor pursuant to Sections (4), (5), (6), (7) and (8) 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. Pursuant to Public Contract Code §22300, Contractor shall pay to each subcontractor, not later than 20 days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor.
11. Securities eligible for investment under this Agreement, as provided by Public Contract Code §22300, shall be those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and Owner.
12. The Contractor shall indemnify and hold harmless the Owner, and the Owner's agents and employees, from and against all liability, claims, actions, costs, damages or losses of any kind, including but not limited to attorney's fees, arising out of or resulting from any loss due to reduction of interest earnings or value of securities, or by reason of any delinquency, negligence, or default of escrow agent.

13. The venue of any litigation concerning the rights and obligations of the parties to this agreement shall be the County of Tulare and the removal provisions of Code of Civil Procedure Section 394 shall not apply to any such litigation.
14. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner, the Contractor, and the Escrow Agent in connection with the foregoing, and exemplars of their respective signatures are as follows:

ON BEHALF OF OWNER	ON BEHALF OF CONTRACTOR	ON BEHALF OF ESCROW AGENT
_____ Signature	_____ Signature	_____ Signature
_____ Typewritten Name	_____ Typewritten Name	_____ Typewritten Name
_____ Title	_____ Title	_____ Title

In Witness Whereof, the parties have executed this Agreement by their proper officers on the date first set forth above.

OWNER	CONTRACTOR	ESCROW AGENT
_____ Signature	_____ Signature	_____ Signature
_____ Typewritten Name	_____ Typewritten Name	_____ Typewritten Name
_____ Title	_____ Title	_____ Title

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.

SECTION 00 6100 - BOND FORMS

1. **GENERAL:** Contractor shall pay for and maintain the required bonds during the terms specified.
2. **PERFORMANCE / PAYMENT BOND:** Performance / Payment Bond shall be submitted with the Agreement Form in the amount of 100% percent of the Contract Price and shall guarantee the Faithful Performance of the Contract, and shall insure the Owner during the life of the Contract, and for the term of any warranties or guarantees specified, and shall guarantee the payment in full of all claims for labor and material in accordance with the provisions of Sections 3247 and 3248 of the Civil Code.
3. **BOND FORMS:** Bonds to be used on this project shall be the American Institute of Architects Documents listed below, or bond forms that conform to applicable provisions of the California Civil Code, issued by a corporation duly and legally licensed to transact business in the State of California, and provided by an admitted surety insurer.

Bid Bond

Performance / Payment Bond

AIA Document A310 (2010)

Bond forms attached to this Section

The Contractor shall provide a minimum of four wet-signature copies of the Performance Bond and the Labor and Material Payment Bond to satisfy the needs of the Owner, the County Recorder, and other governmental agencies.

END OF SECTION 00 6100

PROJECT PAYMENT BOND
(Civil Code § 9550 et seq.)

_____ (the "Owner" of the public works project described below) and
_____ [CONTRACTOR'S BUSINESS NAME] (the "Principal") have entered into a Contract, the
terms of which are incorporated herein by reference, dated _____, 2023 for the furnishing of all materials and labor,
services and transportation, necessary, convenient, and proper to construct the _____
[NAME OF PROJECT], at _____ [PROJECT ADDRESS], [COUNTY NAME] COUNTY,
CALIFORNIA. The Principal is required, before entering upon the performance of the work, to file a good and sufficient bond
with the Owner to secure the claims arising under said Contract.

The Principal and the undersigned _____ ("Surety") are held and firmly bound
unto all laborers, material men, and other persons, and bound for all amounts due, referred to in Civil Code section 9554,
subdivision (b), in the sum of _____ Dollars (\$ _____) which sum
well and truly be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally,
by this payment bond.

The condition of this obligation is that if the said Principal or any of its subcontractors, or the heirs, executors, administrators,
successors, or assigns of any of them, shall fail to pay any of the persons named in Civil Code section 9100, or any of the
amounts due, as specified in Civil Code section 9554, subdivision (b), that said Surety will pay the same in an amount not
exceeding the sum shown above, and also in case suit is brought upon this bond, will pay costs and reasonable attorney's
fees to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment rendered. It is hereby
expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations
entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be
and remain in full force. The Surety, for value received, stipulates and agrees that no change, extension of time, alteration,
or addition to the terms of the Contract, to the Work to be performed under the Contract, or to the specifications of the
Contract, shall in any manner affect its obligations on this bond, and it waives notice of any such change, extension, alteration,
or addition.

(To be signed by _____)
(Principal and Surety, _____)
(and acknowledged and _____)
(Notarial Seal attached _____)

Principal

Surety

By: _____
Attorney-in-Fact

The above bond is accepted and approved on _____, 20

PROJECT PERFORMANCE BOND

We [CONTRACTOR'S BUSINESS NAME], as Principal, and _____ as Surety, are held and firmly bound unto _____ [OWNER NAME], in the County of [NAME], State of California (the "Owner") in the sum of \$_____ for the payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, to the Owner for the full performance of a certain contract with the Owner, the terms of which are incorporated herein by reference, dated _____, 2023, for construction of a public work project described as _____ [NAME OF PROJECT], at _____ [PROJECT ADDRESS], [COUNTY NAME] County, California.

The condition of this obligation is such that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the Owner, with or without notice to the Surety, and for the period of time specified in said Contract after completion for correction of faulty or improper materials and workmanship and during the life of any guarantee or warranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of said Contract that may hereafter be made, then this obligation is to be void, otherwise to remain in full force.

The Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, to the Work to be performed under the Contract, or to the specifications of the Contract, shall in any way affect its obligation on this bond, and it waives notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the Work, or to the specifications.

No further agreement between Surety and Owner shall be required as a prerequisite to the Surety performing its obligations under this bond.

(To be signed by Principal and)	_____
(Surety, and acknowledged)	(Individual Principal)
and Notarial Seal attached)	_____
(Affix Corporate Seal)	(Business Address)
(Affix Corporate Seal)	_____
(Affix Corporate Seal)	(Corporate Principal)

	(Business Address)

	(Corporate Surety)

	(Business Address)
	By: _____

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

The total amount of premium charged is _____.

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/2024
2022 CBC

The above must be filled in by Corporate Surety.

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

BOND AMOUNT: \$**PROJECT:**

(Name, location or address, and Project number, if any)

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Init.

Signed and sealed this day of ,

(Contractor as Principal)

(Seal)

(Witness)

(Title)

(Surety)

(Seal)

(Witness)

(Title)

Init.

Additions and Deletions Report for AIA® Document A310™ – 2010

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 17:49:57 on 02/01/2018.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, James Ryan Morrelli, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:49:57 on 02/01/2018 under Order No. 1526130616 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ - 2010, Bid Bond, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

SECTION 00 7210 - GENERAL CONDITIONS

- 1. GENERAL CONDITIONS:** The General Conditions form to be used for this Project shall be the American Institute of Architects' Document A201, General Conditions of the Contract for Construction, 2017 Edition.
- 2. REFERENCE COPY:** If the above referenced Document is not bound herein following this page, a copy may be obtained or referred to at the office of the Architect.
- 3. MODIFICATIONS:** Refer to Section 00 7310 - Supplementary Conditions, for modifications, deletions, and supplements to the above General Conditions Form.

END OF SECTION 00 7210

AIA[®] Document A201[™] – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

Language struck out is deleted by Section 00 7310 – Supplementary Conditions.
Language added by Section 00 7310 – Supplementary Conditions is noted thus - ++

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- 1 GENERAL PROVISIONS
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- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503[™], Guide for Supplementary Conditions.

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15 CLAIMS AND DISPUTES

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. ++

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. 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 Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner 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.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

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§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. ++

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

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§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

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.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 ++

(Paragraph Deleted)

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein. +-+

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 ++

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§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

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ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its 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 or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall 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, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services 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.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

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§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but

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shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2

(Paragraphs Deleted)

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§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

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§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

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§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of

the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

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§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 ++

§ 3.18.2 ++

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ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect 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 to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 ++

§ 5.2.2 ++

§ 5.2.3 ++

§ 5.2.4 ++

§ 5.3 Subcontractual Relations

By appropriate written agreement, 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 obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and 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, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. 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, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

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ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

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ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

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§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

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- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. +-+

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

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ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

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§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

(Paragraph Deleted)

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§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. 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.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and 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.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work .

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

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ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or 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.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

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§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily

injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

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§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, 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 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS++

(Paragraphs Deleted)

(Paragraphs Deleted)

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

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§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any 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 notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within

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a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

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§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

(Paragraph Deleted)

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§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 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.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 ++

§ 13.4.2 ++

(Paragraph Deleted)

§ 13.4.4 ++

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

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ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1

(Paragraphs Deleted)

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§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1

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(Paragraphs Deleted)

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§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 ++

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Additions and Deletions Report for AIA® Document A201™ – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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PAGE 1

Language struck out is deleted by Section 00 7310 – Supplementary Conditions.

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Language added by Section 00 7310 – Supplementary Conditions is noted thus - ++

PAGE 3

15 CLAIMS AND

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INDEXDISPUTES

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INDEX

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The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. ~~Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.~~ ++

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§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent

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consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. ++

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~~§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.~~ ++

...

~~§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.~~

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~~§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~ ++

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~~§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.~~ ++

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§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

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§ 3.8.2 Unless otherwise provided in the Contract Documents,

...

~~.1—allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;~~

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~~.2—Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and~~

...

~~.3—whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.~~

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§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or

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anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18. ++

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~~§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts. ++~~

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~~§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. ++~~

...

~~§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection. ++~~

...

~~§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required. ++~~

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~~§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution. ++~~

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§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. ++

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If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

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§ 9.9.3 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.~~

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ARTICLE 11 INSURANCE AND BONDS BONDS++

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§ 11.1 Contractor's Insurance and Bonds

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§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

...

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

...

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

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§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

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§ 11.2 Owner's Insurance

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§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

...

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

...

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

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§ 11.3 Waivers of Subrogation

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§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for

damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

...

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

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§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

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The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

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§ 11.5 Adjustment and Settlement of Insured Loss

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§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

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§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the

Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

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...

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

...

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§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require. ++

...

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense. ++

...

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary

by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

...

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect. ~~++~~

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§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

...

- ~~1~~ Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

...

- ~~2~~ An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

...

- ~~3~~ Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

...

- ~~4~~ The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

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...

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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- ~~1~~ repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

...

~~.2— fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;~~

...

~~.3— repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or~~

...

~~.4— otherwise is guilty of substantial breach of a provision of the Contract Documents.~~

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ARTICLE 15 CLAIMS AND DISPUTES ++

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§ 15.1 Claims

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§ 15.1.1 Definition

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A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

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§ 15.1.2 Time Limits on Claims

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The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

...

§ 15.1.3 Notice of Claims

...

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

...

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

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§ 15.1.4 Continuing Contract Performance

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§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

...

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

...

§ 15.1.5 Claims for Additional Cost

...

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

...

§ 15.1.6 Claims for Additional Time

...

~~§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.~~

...

~~§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.~~

...

§ 15.1.7 Waiver of Claims for Consequential Damages

...

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

...

- ~~1—damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and~~

...

- ~~2—damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.~~

...

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

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§ 15.2 Initial Decision

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§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

...

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

...

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

...

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

...

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

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§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

...

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

...

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

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§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

...

§ 15.3 Mediation

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§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

...

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

...

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

...

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

...

§ 15.4 Arbitration

...

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

...

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

...

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

...

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

...

§ 15.4.4 Consolidation or Joinder

...

~~§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

...

~~§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

...

~~§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, James Ryan Morrelli, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 17:42:35 on 02/01/2018 under Order No. 1526130616 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ - 2017, General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)

SECTION 00 7310 - SUPPLEMENTARY CONDITIONS

MODIFICATION OF GENERAL CONDITIONS: The following provisions modify, delete or supplement the General Conditions, Section 00 7210. All Section numbers refer to the AIA Document A201 - 2017, General Conditions of the Contract for Construction. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

1.1.1 Delete the last sentence and **substitute** the following:

The Contract Documents shall include other documents included in Division 0, including the Invitation to Bid, the Instructions to Bidders, Bid Scopes, Preliminary Schedules, Information Available to Bidders, Bid Form, Fingerprinting Requirements, and portions of Addenda relating to these documents.

Add the following Definitions, new Sections 1.1.9 through 1.1.22:

1.1.9 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.

1.1.10 Addenda: Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda only to the extent specified.

1.1.11 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.

1.1.12 Deferred Approvals: The requirements approved by the governing jurisdiction on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing, or specification.

1.1.13 Division 1: Sections of Division 1 - General Requirements govern the execution of the work of all sections of the specifications.

1.1.14 General Conditions: The General Conditions and any supplementary general conditions are a part of each and every section of the Specifications.

1.1.15 Metric: The Specifications may indicate metric units of measurement as a supplement to US customary units. When indicated thus: 1" (25 mm), the US 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."

1.1.16 Plural: Words in the singular shall include the plural whenever applicable or the context so indicates.

1.1.17 Project Communications: Routine written communications between the Architect and the Contractor, including documentation of telephone conversations, shall be in letter, field memo, or fax format. Such communications shall not be identified as Requests for Information nor shall they substitute for any other written requirement pursuant to the provisions of these Contract Documents.

1.1.18 Provide: "Provide" means "provided complete in place," that is, furnished, installed, tested, and ready for operation and use.

1.1.19 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 as of the date the Notice to Bidders is first published. 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.

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

1.1.21 Or: "Or" shall include "and/or."

1.1.22 Completion: Statutory definitions of "completion" and "complete" shall apply for those statutory purposes. For accrual of liquidated damages, claim and warranty purposes, "completion" and "complete" mean the point in the Project where (1) Contractor has fully and correctly performed all Work in all parts and requirements, including corrective and punch list work, and (2) Owner's representatives have conducted a final inspection that confirmed this performance. "Substantial" or any other form of partial or non-compliant performance of the Work shall not constitute "completion" or "complete" under the Contract Documents.

1.2.1 Add the following sentence:

Work not particularly detailed, marked, or specified shall be the same as similar parts that are detailed, marked or specified.

1.2.1 Add the following:

The provisions of all applicable building codes and ordinances shall be considered a minimum requirement. Where the requirements of these Contract Documents exceed those of such codes or ordinances, these Contract Documents shall govern. In the event of conflict between any of the Contract Documents, the Architect shall determine which of the conflicting provisions shall be followed, and the Contractor shall be obligated to construct the work according to the selected provision without additional cost to the Owner.

Add the following new Sections 1.2.4 and 1.2.5:

1.2.4 Addenda: Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be approved by the Division of the State Architect (DSA).

1.2.5 Deferred Approvals: The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.

1.5.1 Delete in its entirety and **substitute** the following:

The Drawings, Specifications, and other documents prepared on behalf of the Owner are instruments of the services of the Architect and its consultants and are the property of the Owner. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, upon request upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They 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 without the specific written consent of the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by the Architect appropriate to and for use 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 Owner's property interest or other reserved right. All copies made under this license shall bear appropriate attribution and the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.

1.5.2 Delete in its entirety without substitution.

2.1.2 Delete the entire Section referring to mechanic's liens, which do not apply to public works. Refer to Civil Code Section 3109.

2.3.6 Delete in its entirety and **substitute** the following:

Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor **25 copies** of the Contract Documents without charge. Additional sets will be furnished, upon request from the Contractor, at the price of 1.15 times the Architect's cost of reproduction and delivery.

Add the following new Section 2.3.7:

2.3.7 Existing Utility Lines:

- .1 Removal and Relocation of Existing Utility Lines:** Pursuant to Government Code section 4215, the Owner assumes the responsibility for removal, relocation, and protection of utilities located on the Site at the time of commencement of construction under this Contract with respect to any such utility facilities which are not identified in the drawings and specifications made part of the invitation to bid. The Contractor shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of the Owner to provide for removal or relocation of such utility facilities. Owner shall compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, removing or relocating such utility facilities, and for equipment necessarily idle during such work.
- .2 Assessment of Liquidated Damages:** These sub-sections shall not be construed to preclude assessment against the Contractor for any other delays in completion of the Work. Nothing in these sub-sections shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such 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.
- .3 Notification:** If the Contractor, while performing work under this Contract, discovers utility facilities not identified by the Owner in the Contract plans or specifications, then Contractor shall immediately notify the Owner and the utility in writing.
- .4 Underground Utility Clearance:** It shall be Contractor's sole responsibility to timely notify all public and private utilities serving the Site prior to commencing work. The Contractor shall notify and receive clearance from any cooperative agency, such as Underground Service Alert, in accordance with Government Code section 4216, et seq. Contractor shall promptly provide a copy of all such notifications to the Owner.

Add the following new Section 2.6:

2.6 Owner's Inspector: The Owner will employ one or more inspectors to provide inspection during normal working hours. The Inspector shall be acceptable to the Architect, Structural Engineer and the Division of the State Architect. The Inspector will have the responsibilities and duties required by law and as assigned to him by the Owner. Inspector and inspection of the Work shall be in accordance with Title 24, Part 1, California Code of Regulations, Section 4-333(b) and 4-342. Special inspection shall be in accordance with Title 24, Part 1, California Code of Regulations, Section 4-333(c). The Inspector will maintain a current copy of the 2022 Title 24, Parts 1 through 5, and Part 9, in good condition on the job site at all times.

Add the following new Section 2.7:

2.7 Right to Audit: The Contractor shall maintain and make available to the Owner all books, papers, contracts, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractors, and financial records related to or which arise out of the Work or under terms of the Contract. The form of record keeping shall be subject to approval by the Owner. These books, papers, records, claims, and accounts shall be made available for examination during normal business hours by Owner and Owner's representative and shall be retained at Contractors principal place of business, in California, for audit during normal business hours at such place of business for four years after recording of the notice of completion of the project. Contractor shall provide an office to enable Owner and Owner's representative to conduct such audit.

Add the following new Sections 3.4.4:

3.4.4 Common Practice: The Contractor shall waive "common practice", "common usage", and "industry standard" as construction criteria wherever the Contract Documents, details, plans, specifications, governing code or ordinances require greater quantity or better quality than common practice, common usage, or industry standard would require.

3.7.3 Delete the phrase "knowing it to be" in the first line.

3.8.2 Delete in its entirety, including sub-sections 3.8.2.1, 3.8.2.2, and 3.8.2.3, and **substitute** the following:

Unless otherwise provided in the Contract Documents, allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes less applicable trade discounts, Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts. Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The Change Order shall reflect the difference between the actual costs and the allowances.

Add the following new Sections 3.9.4:

3.9.4 Should the Contractor's superintendent be deemed unacceptable to the Owner at any time during the performance of the Work, the Contractor shall replace the superintendent without cost or liability to the Owner.

Add the following new Sections 3.10.4:

3.10.4 In connection with the DSA Construction Oversight Process, which includes the use of inspection cards and review of changes to the DSA-approved construction documents, the Contractor must (a) include specific tasks in its baseline schedule to take into account these procedures since they are critical path issues; and (b) include a reasonable amount of float in the baseline schedule to accommodate the additional time required by these DSA procedures.

Add the following new Sections 3.12.11 and 3.12.13:

3.12.11 Substitutions:

- .1 One Product Specified:** Unless the Specifications state that no substitution is permitted, whenever in the Contract Documents any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by 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 material, process, or article desired and shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article, which shall be substantially equal or better in every respect to that so indicated or specified and will completely accomplish the purpose of the Contract Documents.

- .2 Two or More Products Specified:** When two or more acceptable products are specified for an item of the Work, the choice will be up to the Contractor. Contractor shall utilize the same product throughout the Project. If a timely substitution request as set forth in Section 3.12.11.3 is not provided and an "or equal" substitution is requested, then the Owner may consider the substitution if the product specified is no longer commercially available. If the Owner allows the substitution to be proposed pursuant to such an untimely request, then the Contractor will be responsible for the professional fees incurred by the Architect or Architect's consultants in reviewing the proposed substitution, which fees may be withheld from sublease payments and/or retention.
- .3 Substitution Request Form:** Requests for substitutions of products, materials, or processes other than those specified must be made on the Substitution Request form available in Section 01 2500 of the Specifications. Unless otherwise allowed by the Owner, any Requests submitted less than 35 days after the date of the Notice to Proceed will not be considered, except as noted in Section 3.12.11.2. A Substitution Request must be accompanied by evidence as to whether or not the proposed substitution: is equal in quality and serviceability to the specified item; will entail no changes in detail and construction of related work; will be acceptable in consideration of the required design and artistic effect; will provide no cost disadvantage to Owner; and will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts. The burden of proof of these facts shall be upon the Contractor. The Contractor shall furnish with its request sufficient information to determine whether the proposed substitution is equivalent including, but not limited to, all drawings, specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the Owner in determining whether the proposed substitution is acceptable. The final decision shall be the Owner's. The written approval of the Owner, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. Owner may condition its approval of the substitution upon delivery to Owner of an extended warranty or other assurances of adequate performance of the substitution. All risks of delay due to review and approval by the Division of the State Architect or any other governmental agency having jurisdiction shall be on the requesting party.
- .4 List of Manufacturers and Products Required:** The Subcontractor shall prepare and submit to the Contractor within thirty (30) days of execution of the Contract comprehensive list of the manufacturers and products proposed for the Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for Contractor's or Architect's preliminary approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of the Contractor and the Architect.
- 3.12.12 Contractor's Representation Substituted Materials:** By making requests for substitutions the Contractor:
- .1** Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2** Represents that the Contractor will provide the same or better warranty for the substitution that the Contractor would for that specified;
- .3** Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
- .4** Represents that if the substitution is accepted, the Contractor will be solely responsible coordinate the installation and fit the accepted substitute into the available space in a manner acceptable to the Owner and the Architect, and for the proper operation of the substitute will all other equipment and building systems with which it may be associated, making such changes as may be required for the Work to be complete in all respects.

3.12.13 Deferred Approvals: Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All risks of delay due to review and approval by the Division of the State Architect or any other governmental agency having jurisdiction shall be on the requesting party.

3.18.1 and 3.18.2 Delete in their entirety and **substitute** new Sections 3.18.1 through 3.18.6 as follows:

3.18.1 Contractor's Indemnity: To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and

directors (collectively "Indemnitees"), from and against claims, damages, losses, and expenses (including, but not limited to attorneys' fees, consultants' and experts' fees, and all other related costs and expenses, (collectively "Claims") arising out of or resulting from: performance of the Work (including, but not limited to) the Contractor's or its Subcontractor's use of the Site; the Contractor's or its Subcontractor's construction of the Project, or failure to construct the Project, or any portion thereof, excluding only such Claims that arise from the sole or active negligence, or willful misconduct of the Indemnitees, or for defected in design furnished by Indemnitees; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Contractor, its Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this Section.

3.18.2 Subcontractor's Indemnity: The Subcontractors shall defend, indemnify, and hold harmless Indemnitees from and against Claims arising out of or resulting from: performance of the Work, excluding only such Claims that arise from the sole or active negligence, or willful misconduct of the Indemnitees, or for defects in design furnished by Indemnitees, (including, but not limited to) the Subcontractors' use of the Site; the Subcontractors' construction of the Project or failure to construct the Project or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this Section.

3.18.3 Subcontractor Joint and Several Liability: In the event more than one Subcontractor is connected with an accident or occurrence covered by this indemnification, then all such Subcontractors shall be jointly and severally responsible to each of the Indemnitees for indemnification, and the ultimate responsibility among such indemnifying Subcontractors for the loss and expense of any such indemnification shall be resolved without jeopardy to any Indemnitee. The provisions of the indemnity provided for herein shall not be construed to indemnify any Indemnitee for its own negligence if not permitted by law or to eliminate or reduce any other indemnification or right which any Indemnitee has by law or equity.

3.18.4 No Limitation: The Contractor's and the Subcontractor's obligation to indemnify and defend the Indemnitees hereunder shall include, without limitation, any and all claims, damages, and costs: for injury to persons and property (including loss of use), and sickness, disease or death of any person; for breach of any warranty, express or implied; for failure of the Contractor or the Subcontractor to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work.

3.18.5 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Sections 3.18.1 and 3.18.2 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

3.18.6 In the event the Contractor enters into any agreement with the owners of any adjacent property to enter upon such property for the purpose of performing this Contract, the Contractor shall fully indemnify, defend, and hold harmless such person, firm, or corporation, state, or other governmental agency, which owns or has any interest in the adjacent property. The form and content of the indemnification agreement shall be approved by the Owner

prior to commencement of any work on or about such property. These provisions shall be in addition to any other requirements of the owners of the adjacent property.

Add the following new Section 3.19:

3.19 Contractor's Duties under California Code of Regulations, Title 24, Part 1: The Contractor shall comply with all duties and obligations under California Code of Regulations, Title 24, Part 1, Section 4-343. The Contractor shall submit Verified Reports in accordance with Section 4-336 and 4-343(c).

5.2.1, 5.2.2, 5.2.3, and 5.2.4 Delete in their entirety and **substitute** new Sections 5.2.1 through 5.2.4 as follows:

5.2.1 Assignment or Substitution - Consent of Owner: The Contractor, without the written consent of the Owner, shall not substitute any person or entity as a Subcontractor in place of the Subcontractor originally selected under the Agreement; permit any such Subcontract to be assigned or transferred, or allow it to be performed by any person or entity other than such original Subcontractor; . Any assignment or substitution made without the prior written consent of the awarding authority shall be void, and the assignees shall acquire no rights in the Contract. Any consent, if given, shall not relieve Contractor or its Subcontractors from their obligations under the terms of the Contract Documents.

5.2.2 Grounds for Substitution: Pursuant to the procedure set forth therein, the Contractor may request to substitute any person or entity as a Subcontractor in place of a Subcontractor originally selected under the Agreement in the following instances:

- .1 When the Subcontractor originally selected, after having a reasonable opportunity to do so, fails or refuses to execute a written Contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written Contract, based upon the general terms, conditions, plans and specifications for the Project involved or the terms of that Subcontractor's written bid, is presented to the Subcontractor by the prime contractor;
- .2 When the listed Subcontractor becomes bankrupt or insolvent;
- .3 When the listed Subcontractor fails or refuses to perform its Subcontract;
- .4 When the listed Subcontractor fails or refuses to meet the bond requirements of the prime contractor set forth in Public Contract Code section 4108.
- .5 When the Contractor demonstrates to the Owner, that the name of the Subcontractor was listed as the result of inadvertent clerical error;
- .6 When the listed Subcontractor is not licensed pursuant to the Contractors License Law; or
- .7 When the Owner, determines that the Work being performed by the listed Subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the Subcontractor is substantially delaying or disrupting the progress of the Work.
- .8 When the listed Subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.
- .9 When the Owner determines that a listed Subcontractor is not a responsible contractor.

5.2.3 No Change in Contract: Any substitutions of Subcontractors shall not result in any increase in the Contract Sum or result in the granting of any extension of time for the completion of the Project.

5.2.4 Substitution Due to Clerical Error: The Contractor, as a condition of asserting a claim of inadvertent clerical error in the listing of a Subcontractor, shall, pursuant to Public Contract Code Section 4107.5, within two working days after the time of the prime bid opening by the Owner, give written notice to the Owner and copies of such notice to both the Subcontractor it claims to have listed in error, and the intended Subcontractor who had bid to the Contractor prior to bid opening. Any listed Subcontractor who has been notified by the Contractor in accordance with the provisions of this section as to an inadvertent clerical error, shall be allowed six working days from the time of the prime bid opening within which to submit to the Owner and to the Contractor written objection to the Contractor's claim of inadvertent clerical error.

- .1 In all other cases, the Contractor must make a request in writing to the Owner for the substitution of a subcontractor, giving reasons therefore. The Owner shall mail a written notice to the listed Subcontractor giving

reasons for the proposed substitution. The listed Subcontractor shall have five working days from the date of such notice within which to file with the Owner written objections to the substitution.

- .2 Failure to file written objections pursuant to the provisions of this section within the times specified herein shall constitute a complete waiver of objection to the substitution by the listed Subcontractor and, where the ground for substitution is an inadvertent clerical error, an agreement by the listed Subcontractor that an inadvertent clerical error was made.
- .3 If written objections are filed, then the Owner shall give five days notice to the Contractor and to the listed Subcontractor of a hearing by the Owner on the Contractor's request for substitution as provided in Public Contract Code Section 4107. The determination by the Owner shall be final.

Add new Sections 5.5

5.5 SUBCONTRACTOR RESPONSIBILITIES

5.5.1 Remedies for Failure to Perform: Without limitation of any other right or remedy available to Contractor under the Contract Documents or at law, should: the Subcontractor fail to perform its portion of the Work in a skilled and expeditious manner in accordance with the terms of the Contract Documents with sufficient labor, materials, equipment, and facilities; delays the progress of the job or otherwise fail in any of its obligations; or either a receiver is appointed for the Subcontractor or the Subcontractor is declared to be bankrupt or insolvent, and such appointment, bankruptcy, or insolvency proceedings or declaration is not set aside within 30 days, then the Contractor, upon three days notice to the Subcontractor (subject to the requirements of Public Contract Code, §4107), may provide such labor, materials, or perform such work and recover the cost plus profit and overhead from monies due or to become due thereafter to the Subcontractor. The Contractor may terminate the employment of the Subcontractor, taking possession of its tools, materials, and equipment related to the Work and cause the entire portion of the Subcontractor's Work to be finished either by another Subcontractor or through the Contractor's own forces.

5.5.2 Disputes Not to Affect Work: If there is any dispute as to whether or not any portion of the Work is within the scope of the Work to be performed by a Subcontractor, or any dispute as to whether or not the Subcontractor is entitled to a Change Order for any Work requested of it or entitled to payment, then the Subcontractor shall continue to proceed diligently with the performance of the Work. Regardless of the size or nature of the dispute, the Subcontractor shall not under any circumstances cease or delay performance of its portion of the Work during the existence of the dispute. The Contractor shall continue to pay the undisputed amounts called for under the Subcontract Agreement during the existence of the dispute. Any party stopping or delaying the progress of the Work because of a dispute shall be responsible in damages to the Owner, the Architect, and the Contractor for any losses suffered as a result of the delay.

5.5.3 Compliance with Procedures: Each Subcontractor shall comply with all procedures established by the Contractor for coordination among the Owner, the Owner's consultants, Architect, Contractor, and the various Subcontractors for coordination of the Work with all local municipal authorities, government agencies, utility companies, and any other agencies with jurisdiction over all or any portion of the Work. The Subcontractor shall cooperate fully with all of the foregoing parties and authorities.

5.5.4 Non-Exclusive Obligations: The specific requirements of Article 5 are not intended to exclude the obligation of the Subcontractor to comply with any of the other provisions of the General Conditions and the other Contract Documents which are relevant to the proper performance of its portion of the Work.

Add the following new Sections 7.2.2 through 7.2.10 as follows:

7.2.2 Determination of Adjustments to the Contract Sum: The value of any work covered by a change order or any request for an increase or decrease in the Contract Sum shall be determined on the basis of the cost of the work plus a Contractor's fee for overhead and profit. The following format shall be used as applicable by the Owner and the Contractor to communicate proposed additions and deductions to the Contract.

CHANGE ORDER REQUEST			
	DESCRIPTION	ADDED COST	DEDUCTIVE COST
1	Subcontractor Labor Total ₁	\$ _____	\$ _____
2	Subcontractor Material Total _{1,2}	\$ _____	\$ _____
3	Subcontractor Equipment Total _{1,2}	\$ _____	\$ _____
4	SUBTOTAL #1 (Sum lines 1, 2, and 3) →	\$ _____	\$ _____
5	Subcontractor Overhead and Profit for Subtotal #1 _{3,5}	\$ _____	\$ _____
6	SUBTOTAL #2 (Sum lines 4 and 5) →	\$ _____	\$ _____
7	Contractor Overhead and Profit for Subtotal #2 _{3,5}	\$ _____	\$ _____
8	SUBTOTAL #3 (Sum lines 6 and 7) →	\$ _____	\$ _____
9	Contractor Labor Total ₁	\$ _____	\$ _____
10	Contractor Material Total _{1,2}	\$ _____	\$ _____
11	Contractor Equipment Total _{1,2}	\$ _____	\$ _____
12	SUBTOTAL #4 (Sum lines 9, 10, and 11) →	\$ _____	\$ _____
13	Contractor Overhead and Profit for Subtotal #4 _{3,5}	\$ _____	\$ _____
14	SUBTOTAL #5 (Sum lines 12 and 13) →	\$ _____	\$ _____
15	Contractor Bonds and Insurance ₄	\$ _____	\$ _____
16	TOTAL (Sum lines 8, 14, and 15) →	\$ _____	\$ _____
17	Other costs ₆	\$ _____	\$ _____
18	GRAND TOTAL (Sum lines 16 and 17) →	\$ _____	\$ _____

FOOT NOTES:

1: Attach itemized list(s) indicating hours, rates, material quantity, material costs, and unit costs. Payroll taxes, fringe benefits, insurance and travel shall be included in Additive Costs and shall be credited in Deductive Costs.

2: State and City sales taxes shall be included in Additive Costs and shall be credited in Deductive Costs.

3: Refer to the Overhead and Profit Schedule below.

4: Contractor's bonds and insurance premium. Total cost shall not exceed 2% of the Grand Total (Line 16).

5: Overhead and profit shall only be allowed on the net increase.

6: Includes all direct and indirect costs, including but not limited to extended overhead where permitted, acceleration, cumulative effect of the change, expediting the Work, scheduling, etc.

7.2.3 Cost of the Work: The term “cost of the work” means the sum of all costs necessarily incurred and paid by the Contractor in the proper performance of the extra work required or permitted under a change order. Except as otherwise may be agreed to in writing by the Owner, such costs shall include only the following items:

- .1 Cost of Labor:** Payroll cost of employees in direct performance of the work including:
 - .1** Payroll wages comparable to but no higher than prevailing wage rates for the specific job classification. Prevailing wage is inclusive of the basic hourly rate, health and welfare, pension, vacation/holiday pay only when applicable, training and “other payments” all as defined by the Director of Industrial Relations.
 - .2** Fringe benefit mark-up is only allowed on the prevailing wage total hourly rate. Cost of fringe benefits are limited to Social Security contributions, Medicare, Federal and State Unemployment tax, State Disability tax and workers compensation but in no case shall they exceed 25% total.
 - .1** Provide full breakdown of labor rate with fringe benefits and insurance upon request.
 - .2** Additionally, provide insurance certificates and internal accounting documentation to support cost of insurance if requested.
 - .3** Travel and subsistence as required by the Labor Code or Master Labor Agreements and only when the new work exceeds the original Contract Time.
- .2 Cost of the Material:** Cost of all material and equipment furnished and incorporated into the work including:
 - .1** Direct cost of material or equipment.
 - .2** Incidental or accessory material consumed during the installation.
 - .3** Taxes.
 - .4** Cost of delivery or transportation of the material or equipment.
 - .5** All rebates, refunds and credits for returns or surplus material shall accrue to the Owner.
 - .6** Material invoices shall be submitted with each change order request.
 - .7** Only materials used in the performance of the work will be paid. All excess and surplus materials shall be returned for credit to the Owner.
- .3 Cost of Rental Equipment:** The cost of all rental equipment necessary for the installation of the work, including:
 - .1** The actual rental cost paid to the Rental Agency.
 - .2** Cost of fuel to operate the equipment during the execution of the work only.
 - .3** Cost of transportation set up and take down of rental equipment only if the rental equipment requires specialized handling or set up, or is delivered by the rental company.
 - .4** Only equipment in good working condition and suitable for the intended purpose shall be used. Rental time will not be allowed for down time due to breakdown or non-use.
 - .5** Rental invoices shall be submitted for each item.
 - .6** Heavy equipment owned by the Contractor which would normally be rented, can be charged to the Owner at comparable rental rates substantiated by an actual rental agency cost bid and shall comply with all the requirements of this Section 7.2.3.3.
 - .7** The cost of the operator of the rental equipment shall be included in the cost of the labor and the employee shall be paid the prevailing per diem wage per hour for labor performed on the site.
- .4 Supplemental Expenses:**
 - .1** Any taxes not specifically identified above that is directly attributable to the cost of the work.
 - .2** Additional permit fees, inspection costs or additional governmental agency charges.

7.2.4 Costs Included in Overhead and Profit: The following are not considered a cost of the Work but are considered to be overhead costs and are included in the Contractor’s fee (Section 7.2.5 below):

- .1** Payroll costs and other compensation of Contractor’s officers, executives, principals (of partnership and sole proprietorships), managers, superintendents, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditor, timekeepers, clerks, and other personnel employed by the Contractor whether at the site or in Contractor’s principal or a branch office for general administration of the work.
- .2** Expenses of Contractor’s principal and branch offices other than Contractor’s office at the site.
- .3** Any part of Contractor’s capital expenses, including interest on Contractor’s capital employed for the work and charges against Contractor for delinquent payments.

- .4 Cost of premiums for all bonds and for all insurance whether or not Contractor is required by the Contract Documents to purchase and maintain the same. Cost shall not exceed 2% of the total cost of the work.
- .5 Cost due to the negligence of Contractor, any subcontractor, or anyone directly or indirectly employed by any of them for whose acts any of them may be liable, including but not limited to the correction of defective work, disposal of materials or equipment wrongly supplied and making good any damage to property.
- .6 Office supplies and equipment consumed in the field office or home office.
- .7 Cost of utility usage, including telephone and fax service, consumed during the installation of the work.
- .8 The use, depreciation, maintenance, rental and replacement of all hand tools (less than \$250.00 capital cost per item).
- .9 Contractor owned vehicles, fuel, insurance, and maintenance.
- .10 Cost of change order preparation and negotiation, estimating, scheduling, supervision, drafting, and clerical or secretarial services.
- .11 Cost of time and material documentation procedures.
- .12 Other overhead and general expense costs of any kind and the costs of any item not specifically and expressly included herein.

7.2.5 Contractor's Fee:

- .1 **Self-Performed Work:** The Contractor's fee allowed to Contractor for overhead and profit on self-performed work shall be determined by the following percentages of the various portions for the cost of the work:
 - .1 Labor 15%
 - .2 Materials.....15%
 - .3 Equipment Rental 15%
 - .4 Other items and expenditures.....15%
 - .5 Contractor's fee shall only be allowed on the net increase in the Contract Sum.
- .2 **Subcontracted Work:** For all allowable expenses defined as cost of the work incurred by subcontractors, the Contractor fee shall be 5% and no more than 2% for all bonds, insurance, builders risk, etc. on the net increase of the subcontracted portion of the cost of the work.
 - .1 In no case shall total combined mark-up on subcontracted and sub-subcontracted work exceed 27%.

7.2.6 Subcontractor Cost of the Work:

- .1 All work performed by the subcontractor in the performance of the additional work shall be subject to all requirements stated above and imposed on the General Contractor and shall comply with all the same recording and documentation requirements.
- .2 The subcontractor's fee allowed to subcontractor for overhead and profit shall be determined by the following percentages of the various portions for the cost of the work:
 - .1 Labor 15%
 - .2 Materials.....15%
 - .3 Equipment Rental 15%
 - .4 Other items and expenditures.....15%
 - .5 Subcontractor's fee shall only be allowed on the net increase in the cost of the work.
- .3 For all allowable expenses defined as cost of the work incurred by sub-subcontractors, the subcontractor fee shall be 5% on the net increase of the subcontracted portion of the cost of the work.
 - .1 In no case shall combined mark-up on subcontracted and sub-subcontracted work exceed 20%.

7.2.7 Changes Resulting in a Reduction of the Contract Sum: If the net value of a change results in a reduction of the Contract Sum from the Contractor or subcontractor, the credit given shall be the net cost of the work without overhead or profit.

7.2.8 Extended Overhead: The following items are "Extended Overhead" and may be considered as costs when Contract Time is extended due to additional work or due to a **Class 1** cause defined in 8.3, and solely to the extent directly attributable to extension of time. **In all other instances, the following items shall be considered included in overhead:**

- .1 Field offices, sheds, phones, sanitary facilities, utilities, drinking fountains, cleaning, safety programs, and other construction facilities and temporary controls not specifically required for additional work;

- .2 Additional costs of field supervision.

7.2.9 Itemized Cost Breakdown: Whenever the Contractor requests an adjustment to the Contract Sum, Contractor shall submit an itemized cost breakdown in a form acceptable to the Owner, together with supporting data, for all work performed by the Contractor and each subcontractor and sub-subcontractor. The itemized breakdown shall include copies of the original subcontractor invoices or cost statements, certified payroll, invoices for material, invoices for equipment rental, and other data required to substantiate costs claimed.

Add the following new Section 7.3.3.5:

7.3.3.5 Time and Material (T&M): By cost of material, equipment, labor and a fee for overhead and profit. If the value is determined by this method, then the following requirements shall apply:

.1 Daily Reports by Contractor:

- .1 At the close of each working day, the Contractor shall submit a daily report to the Inspector, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the Work, and for other services and expenditures when authorized concerning extra work items, including any schedule delay days required. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points that cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through the Contractor. The Contractor shall organize and forward copies of the Contractor's and Inspector's reports to the Architect upon the completion of each T&M activity.
- .2 Any reports not submitted in a timely manner and not signed by the Inspector shall not be considered as a part of the costs considered for the change order. The Contractor shall notify the Inspector prior to starting the work each day.
- .3 **Labor:** Show names of workers, classifications, hours worked, and hourly rate. Project Superintendent expenses are not allowed.
- .4 **Materials:** Describe and list quantities of materials used.
- .5 **Equipment:** Show type of equipment, size, identification number, and hours of operation, including, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost.
- .6 **Other Services and Expenditures:** Describe in such detail as the Owner may require.

8.1.3 Add the following:

The dates of Substantial Completion and Notice of Completion shall coincide.

Add the following new subsections 8.3.1.1, 8.3.1.2 and 8.3.1.3:

8.3.1.1 The basis for an extension of time exists if the Contractor is delayed in performing the Work, but solely to the extent that delays are unforeseeable, unavoidable, and beyond the control and without fault or negligence, in whole or in part, of the Contractor, subcontractors, sub-subcontractors, and suppliers at every tier, and said delays directly impact the Contractor's ability to achieve Completion in accordance with the Contract Time requirements, and said delays cannot be made up by reasonable efforts otherwise, and said delays stem from the following causes:

- .1 **Class 1 Cause:** An act or failure to act on the part of the Owner or Architect or an employee of either, or of a separate contractor employed by the Owner, or concealed or unknown conditions.
- .2 **Class 2 Cause:** Abnormal weather, fire, acts of God, riots, civil commotion, acts of War, unavoidable casualties, epidemics, quarantine restrictions, labor disputes, unusual delay in deliveries, freight embargoes, governmental action in connection with the Project including required submittal reviews by the Division of the State Architect, interference in the Project by neighbors, discovery or occurrence of any environmental matter or hazardous material, or the discovery of archaeological artifacts at the site.

8.3.1.2 If the basis exists for an extension of time under Section 8.3.1, the Owner may either:

- .1 in the case of a **Class 1** cause:

- .1 Include any Extended Overhead in the Change Order extending the Contract Time; or
- .2 Assign any Extended Overhead (defined in 7.2.8) to an allowance pending a final determination of actual impact at the conclusion of the Work, whichever occurs sooner;
- .2 Accept the reasonable and appropriate time extension as determined by the Architect to cover such delays, and in the case of a **Class 2** cause, there will be no corresponding adjustment in Contract Sum, and the sole recourse of the Contractor will be entitlement to time extension as provided by the Architect regardless of actual sources or cause of delay;
- .3 Order the Contractor to accelerate construction activity by working overtime and by adding extra forces in order to overcome such delays, and adjusting the Contract Sum in accordance with Article 7 to compensate the Contractor for such directed acceleration; however, direct costs used in determining such compensation shall be limited to properly substantiated and documented premium or overtime costs; or
- .4 Employ a combination of the above remedies.

8.3.1.3 Neither the Owner nor the Architect will be obligated or liable to the Contractor for, and the Contractor hereby expressly waives claims against the Owner and Architect on account of damages, costs, expenses, or related impacts which the Contractor, subcontractors, sub-subcontractors, suppliers, or other persons may incur as a result of a **Class 2** cause enumerated in 8.3.1; the Contractor's sole remedy and full compensation in such event shall be extension of Contract Time in accordance with provisions of the Contract Documents. The Contractor likewise waives claims of damages, costs, or expenses due to a delay resulting from a **Class 1** cause except and solely to the extent of costs allowed under 7.2.3, 7.2.4, 7.2.5, and 7.2.6.

Add the following new Section 8.3.4:

8.3.4 In accordance with the provisions of Government Code Section 4215, the Contractor shall not be assessed liquidated damages where delay is caused by failure of the public agency or owner of the utility to provide for the removal or relocation of utility facilities, but only if such utilities are not identified by the Owner in the Contract Documents.

Add new Section 8.4 as follows:

8.4 HOURS OF WORK

8.4.1 Sufficient Forces: Contractors and Subcontractors shall furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

8.4.2 Performance During Working Hours: Work shall be performed during regular working hours, except that if there is an emergency or when required to complete the Work in accordance with job progress, then work may be performed outside of regular working hours with the advance written consent of the Owner.

8.4.3 Labor Code: As provided in Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight hours during any one calendar day and 40 hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractors in excess of eight hours per day and 40 hours during any one week shall be permitted upon this public work with compensation provided for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay.

- .1 Contractor or subcontractor shall pay to the Owner a penalty of Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight hours in any calendar day and 40 hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half times the basic rate of pay for all hours worked in excess of eight hours per day.

8.4.4 Costs for After Hours Inspection: If the work done after hours is required by the Contract Documents to be done outside the Contractor's or the Inspector of Record's regular working hours, then the costs of any inspections, if required to be done outside normal working hours, shall be borne by the Owner.

- .1 If the Owner allows the Contractor to do work outside regular working hours for the Contractor's own convenience, then the costs of any inspections required outside regular working hours, among other remedies, shall be invoiced to the Contractor by the Owner and withheld from payments and/or retention. Contractor shall give Owner at least 48 hours notice prior to working outside regular working hours.
- .2 If the Contractor elects to perform work outside the Inspector of Record's regular working hours, then costs of any inspections required outside regular working hours, among other remedies, may be invoiced to the Contractor by the Owner and withheld from payments and/or retention.

Add the following subsections 9.5.1.8 through 9.5.1.18:

- .8 liquidated damages against the Contractor, whether already accrued or estimated to accrue in the future;
- .9 failure of the Contractor to maintain record drawings;
- .10 erroneous estimates by the Contractor of the value of the Work performed, or other false statements in connection with a payment or the Contractor's submissions to the Owner prior to any payment;
- .11 unauthorized deviations from the Contract Documents;
- .12 subsequently discovered evidence or observations nullifying the whole or part of a previously issued Sublease Payment;
- .13 overpayment to Contractor on a previous payment;
- .14 credits owed to Owner for reduced scope of work or work that Contractor will not perform;
- .15 the estimated cost of performing work pursuant to Section 2.4;
- .16 actual damages related to false claims by Contractor; and
- .17 as permitted by other provisions in the Contract or as otherwise allowed by law, including statutory penalties Owner or other entities assessed against Contractor. (See e.g., Labor Code section 1813 (working hours) or Public Contract Code section 4110 (subcontractor listings and substitutions)). Owner may withhold from a payment up to 150% of disputed amounts. No interest shall be paid on any amounts withheld.
- .18 for any stop payment notice, the Owner shall withhold the amount stated in the stop payment notice, the stop notice claimant's anticipated interest and court costs, and an amount to provide for the public entity's reasonable cost of any litigation pursuant to the stop payment notice. For any stop payment notice action the parties resolve before judgment is entered, Owner has the right to permanently withhold for any reasonable cost of litigation for that stop payment notice, even if it exceeds the amount originally withheld by Owner for the estimated reasonable cost of litigation. However, if (1) the Contractor at its sole expense provides a bond or other security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claim, and (2) the Owner chooses to accept the bond, then Owner would release the stop payment notice funds withheld to the Contractor, except that Owner may permanently withhold for any reasonable cost of litigation. Any stop payment notice release bond shall be executed by a California admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and performance bond sureties.

Add new section 9.5.5 as follows:

9.5.5 This Project is subject to the provisions of Public Contract Code § 22300 whereby the Contractor may elect to enter into an escrow for the deposit of securities and/or funds withheld to ensure performance of the contract. Any escrow used shall be established using the escrow agreement form specified in the Contract Documents.

9.7 Delete this Section in its entirety and **substitute** the following:

If the Owner does not pay the Contractor within thirty days after receipt of an undisputed and properly submitted payment request for a progress payment, excluding that portion of the final payment designated by the contract as retention earnings, then the Owner shall pay interest to the Contractor as provided by Public Contract Code Section 20104.50. If the Architect does not issue a Certificate for Payment, through no fault of the Contractor,

within seven days after receipt of the Contractor's Application for Payment, the number of days available to Owner to make payment without incurring interest pursuant to this section shall be reduced by the number of days by which the Owner exceeds the seven-day return requirement set forth in Section (2) of subdivision (c) of Public Contract Code Section 20104.50. As further provided by Public Contract Code Section 20104.50, said interest penalty is the sole recourse of Contractor and Contractor shall have no right to stop the Work until payment of the amount owing has been received, nor shall the Contract Time be extended, nor shall the Contract Sum be increased in any way, including by reason of any costs incurred by the Contractor, except to the extent of said interest payment.

Add the following new Section 9.7.1:

9.7.1 Notwithstanding this section and notwithstanding the provisions of Public Contract Code Section 20104.50, the Contractor understands and agrees that funds for payment to the Contractor are to be provided by the State of California, State Allocation Board during the course of the Work. If such funds are not provided in a timely fashion through no fault of the Owner and for that reason are not available to make a progress payment, the provisions of this section requiring interest payments to the Contractor shall not be applicable.

9.9.3 Delete the phrase “not complying with the requirements of the Contract Documents”.

Add the following new Section 9.10.6:

9.10.6 Pursuant to Public Contract Code Section 7107, in the event of a dispute between the Owner and Contractor, the Owner may withhold from the final payment an amount not to exceed 150 percent of the disputed amount plus any amounts necessary to cover any filed and unreleased stop notices. Except as so withheld, the Owner shall release the retention withheld within 35 days after the date of completion of the work of improvement, as "completion" is defined in Public Contract Code Section 7107. In the event that retention payments are not made within the time periods required by Public Contract Code Section 7107, the Owner or the Contractor withholding the unpaid amounts shall be subject to the interest provisions of Public Contract Code Section 7107.

10.2.2 Add the following:

The Contractor shall comply with California Code of Regulations, Title 24, in addition to all other applicable regulations, as noted in Section 10.2.2. Contractor shall keep a copy of the latest edition, Parts 1 through 5, Part 7 and Part 9, on the job site at all times, and keep it available for reference use. Nothing in these plans or specifications shall be construed to permit work not conforming to these codes. A copy of stamped plans and specifications shall be kept on the job site and made available to the Owner's Inspector.

Add the following new Sections 10.2.9 and 10.2.10:

10.2.9 Fingerprinting: At its own expense, Contractor shall comply with all fingerprinting requirements under law and Contract, including, but not limited to, the requirements of California Education Code section 45125.2 and the Independent Contractor Student Contact Form which is a part of the Contract. Contractor shall hold harmless, defend and indemnify the Owner under Section 3.18, for any costs, including attorneys' fees, Owner incurs from Contractor's failure to comply.

10.2.10 Alcohol and Tobacco: At its own expense, Contractor shall take all steps necessary to ensure that employees and agents of Contractor or any of its Subcontractors do not use, consume, or work under the influence of any alcohol, tobacco or controlled substance while on school property, or performing any functions related to the Project. Contractor shall further prevent any of its employees or agents, or those of its Subcontractors 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.

10.2.11 Sanctioned Entities & Iran Contracting Act:

- .1 Contractor is not an entity under any form of sanction imposed by the United States of America, or the State of California, and is not listed as such by the U.S. Department of State (a "Sanctioned Entity"), which list may be referenced at: <https://sanctionssearch.ofac.treas.gov/> or <https://www.treasury.gov/ofac/downloads/ssi/ssilist.pdf>. Further, Contractor is not an Affiliate (any person or entity directly or indirectly controlling; controlled by or under common control with Contractor; owned in whole or in part by Contractor; that owns any interest in Contractor, in whole or in part; that is a current creditor or debtor to Contractor) of any Sanctioned Entity.
- .2 Contractor shall exercise all due diligence, including, without limitation, consulting the U.S. Department of State list of sanctioned entities, which may be referenced at <https://sanctionssearch.ofac.treas.gov/> or <https://www.treasury.gov/ofac/downloads/ssi/ssilist.pdf>, to ensure Contractor is not currently party to any contract with, and shall not enter into any contractual relationship with any Sanctioned Entity during the term of any agreement by and between Contractor and Owner or in relation to any agreement by and between Contractor and Owner.

10.2.12 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 to 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 or cause damage to 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 Owner.

Add the following new Sections 10.3.7 and 10.3.8:

10.3.7 The covenants, warranties, and representations contained in this Section will be effective on the date of execution of this Contract and will survive completion of the project. Contractor covenants, warrants and represents to Owner that:

- .1 To Contractor's knowledge after due inquiry, no asbestos-containing materials or PCB's will be installed or exposed in the project at any time during the Contractor's construction thereof.
- .2 To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or will be located on the project at any time during Contractor's construction thereof.
- .3 Contractor's operations concerning the project are not and will not be in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials, substances or toxic substances, and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any work, repairs, construction, alteration or installation on or in connection with the project in order to comply with any such laws, ordinances, codes or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide the Owner with copies thereof.

10.3.8 Environmental Indemnification: To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and directors (collectively "Indemnitees"), from and against claims, damages, losses, and expenses (including, but not limited to attorneys' fees, consultants' and experts' fees, and all other related costs and expenses, (collectively "Claims") arising out of any breach of the environmental or toxic warranty, representations or covenants of the Contractor under this contract excluding only such Claims that arise from the sole or active negligence, or willful misconduct of the Indemnitees, or for defect in design furnished by Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part

by the acts or omissions of the Contractor, its Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this Section. Contractor further agrees to indemnify, defend, and hold harmless Owner, Architect, their officers, employees and agents, from and against any and all liability as follows:

- .1 From all foreseeable and all unforeseeable consequential damages, directly or indirectly arising out of use, generation, storage, or disposal of hazardous materials by Contractor; and
- .2 Without limitation, from the cost of any required or necessary repair, cleanup or detoxification and the preparation of any closure or other required plans, whether such action is required or necessary prior to or following filing of the Notice of Substantial Completion, to the full extent that such action is attributable, directly or indirectly, to the presence or use, generation, storage, release, threatened release or disposal of hazardous materials by any person on the project prior to filing of the Notice of Substantial Completion.
- .3 Contractor's obligations pursuant to the foregoing indemnity shall survive the filing of Notice of Completion of the Project.
- .4 This agreement, as to indemnity and reimbursement as above set forth to be undertaken by the Contractor, shall survive the performance of the remainder of said Contract and shall remain in full force and effect notwithstanding such performance.

Delete Article 11 in its entirety and substitute the following:

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 Liability Insurance Requirements: Before commencement of the Work and within limits acceptable to the Owner, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports. The amount of general liability insurance shall be \$2,000,000 per occurrence for bodily injury, personal injury, and property damage, and the amount of automobile liability insurance shall be \$1,000,000 per accident for bodily injury and property damage combined single limit. The policies will protect the Contractor from claims set forth below, which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations are by the Contractor, by a Subcontractor, by Sub-subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims for damages because of bodily injury (including emotional distress), sickness, disease, or death of any person other than the Contractor's employees. This coverage shall be provided in a form at least as broad as Insurance Services Office (ISO) Form CG 0001 11188;
- .2 Claims for damages arising from personal or advertising injury in a form at least as broad as ISO Form CG 0001 11188;
- .3 Claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents; and
- .4 Claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work; and
- .5 Claims involving blanket contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and
- .6 Claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

If commercial general liability insurance or another insurance form with a general aggregate limit is used, then either the general aggregate limit shall apply separately to the project location (with the ISO CG 2501 or

insurer's equivalent endorsement provided to the Owner) or the general aggregate limit shall be twice the required occurrence limit.

Any deductible or self-insured retention must be declared to and approved by the Owner. At the option of the Owner, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its Board of Trustees, members of its Board of Trustees, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

11.1.2 Subcontractor Insurance Requirements: The Contractor shall require its Subcontractors and any Sub-subcontractors to take out and maintain similar public liability insurance and property damage insurance, in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports, in like amounts and scope of coverage.

11.1.3 Owner's Insurance: The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.1.4 Additional Insured Endorsement Requirements: The Contractor shall name, on any policy of insurance, the Owner and the Architect as additional insureds. Subcontractors shall name the Contractor, the Owner and the Architect as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, then such other insurance shall be excess to any policy of insurance required herein. The amount of the insurer's liability shall not be reduced by the existence of such other insurance.

11.1.5 Workers' Compensation Insurance: During the term of this Contract, the Contractor shall provide workers' compensation insurance for all of the Contractor's employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor's work is sublet, the Contractor shall require the Subcontractor to provide workers' compensation insurance for all the Subcontractor's employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers' Compensation laws, the Contractor shall provide or cause a Subcontractor to provide adequate insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the Owner certificates of insurance as required under this Article and in compliance with Labor Code section 3700.

If the contractor fails to maintain such insurance, then the Owner may take out compensation insurance which the Owner might be liable to pay under the provisions of the Act by reason of an employee of the Contractor being injured or killed, and withhold from Sublease Payments the amount of the premium for such insurance.

11.1.6 Builder's Risk/"All Risk" Insurance: Contractor (unless otherwise provided by Owner at Owner's sole discretion), during the progress of the Work and until final acceptance of the Work by Owner upon completion of the entire Contract, shall maintain Builder's Risk/Course-of-Construction insurance satisfactory to the Owner, issued on a completed value basis on all insurable Work included under the Contract Documents. This insurance shall insure against all risks, including, but not limited to, the following perils: vandalism, theft, malicious mischief, fire, sprinkler leakage, civil authority, sonic boom, explosion, collapse, flood, earthquake (for projects not solely funded through revenue bonds, limited to earthquakes equivalent to or under 3.5 on the Richter Scale in magnitude), wind, hail, lightning, smoke, riot or civil commotion, debris removal (including demolition) and reasonable compensation for the Architect's services and expenses required as a result of such insured loss. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work. Su

ch insurance shall include the Owner, the Architect, and any other person or entity with an insurable interest in the Work as an additional named insured.

The Contractor shall submit to the Owner for its approval all items deemed to be uninsurable under the Builder's Risk/Course-of Construction insurance. The risk of the damage to the Work due to the perils covered by the Builder's Risk/Course-of-Construction insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the surety, and no claims for such loss or damage shall be recognized by the Owner, nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.

11.1.7 Consent of Insurer for Partial Occupancy or Use: Partial occupancy or use in accordance with the Contract Documents shall not commence until the insurance company providing property insurance has consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company and shall, without mutual consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of the insurance.

11.1.8 Fire Insurance: Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work included under the Contract Documents, insuring the full replacement value of such Work as well as the cost of any removal and demolition necessary to replace or repair all Work damaged by fire. The amount of fire insurance shall be subject to approval by the Owner and shall be sufficient to protect the Work against loss or damage in full until the Work is accepted by the Owner. Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced in accordance with the requirements of the drawings and specifications without additional expense to the Owner.

11.1.9 Other Insurance: The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

11.1.10 Proof of Carriage of Insurance: The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance, certificates, and an Additional Insured Endorsement and Declarations Page have been obtained and delivered in duplicate to the Owner for approval subject to the following requirements:

- .1** Certificates and insurance policies shall include the following clause:
This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the Owner. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.
- .2** Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.
- .3** Certificates of insurance shall clearly state that the Owner and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by Owner and any other insurance carried by the Owner with respect to the matters covered by such policy shall be excess and non-contributing.
- .4** The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the Owner.

11.1.11 Compliance: If any contractor fails to furnish and maintain any insurance required by this Article, then the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates, policies, Additional Insured Endorsement and Declarations Page evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the Owner and the Architect.

11.2 PERFORMANCE AND PAYMENT BONDS

11.2.1 Bond Requirements: Unless otherwise specified in the Contract Documents, prior to commencing any portion of the Work, the Contractor shall apply for and furnish Owner separate payment and performance bonds fo

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. All bonds shall be submitted on the Owner's approved form.

To the extent, if any, that the Total Sublease Amount is increased in accordance with the Contract Documents, the Contractor shall cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Owner. 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 Total Sublease Amount, 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 bond, then the Owner may terminate the Contract for cause.

11.2.2 Surety Qualification:

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure section 995.120 shall be accepted. The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bonds, have a rating not lower than "A-" as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.

Add the following new Section 12.2.2:

12.2.2 Non-Conformance Notice: A notice issued by the Architect or the Inspector documenting that the Work or some portion thereof fails to conform to the requirements of the Contract Documents. Upon receipt of a Non-Conformance Notice the Contractor shall provide a written response within 10 calendar days after receipt of the Notice. The Contractor's response shall detail either a) why it is believed that the Work was performed in accordance with the Contract documents or b) what corrective action will be taken, at the Contractor's sole expense, to correct the non-conforming Work. If the Contractor disputes issuance of the Notice the Architect has 10 working days in which to respond by either a) withdrawing the Notice of Non-Conformance or b) directing the Contractor to correct the Work. Such determination by the Architect shall be final and conclusive of the matter. If directed to correct the Work, the Contractor shall do so within 10 calendar days after receipt of such direction from the Architect, or such other time as may be agreed to with the Architect. Payment shall not be made on any portion of the Work for which a Non-Conformance Notice has been issued and the Work not corrected to the satisfaction of the Architect.

Add the following new Sections 12.2.6 and 12.2.7:

12.2.6 Existing Utilities: In accordance with the provisions of Government Code Section 4215, the Owner shall assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the site of the Work, if such utilities are not identified by the Owner in the plans and specifications made a part of the invitation for bids. The Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the contractor to exercise reasonable care, and removing or relocating such utility facilities if such are not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work. Nothing herein shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of the construction project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of the construction. If the Contractor while performing the Work discovers utility facilities not identified by the Owner in the plans or specifications, he shall immediately notify the Owner and utility in writing. 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.

12.2.7 Nonconforming Work and Withholding: If it is found at any time before completion of the Work that the Contractor has varied from the Contract Documents in materials, quality, form, finish, or in the amount or value of

the materials or labor used, then the Owner may, in addition to other remedies in the Contract Documents or under law and as allowed by law, accept the improper work. The Owner may withhold from any amount due or to become due Contractor that sum of money equivalent to the difference in value between the Work performed and that called for by the Drawings and Specifications. The Owner shall determine such difference in value. No structural related work shall be accepted that is not in conformance with the Contract Documents.

13.1 Delete in its entirety and **substitute** the following:

The Contract shall be governed by the law of the place where the Project is located.

13.4.1 Delete Section 13.4.1 in its entirety and **substitute** the following:

13.4.1: Tests and inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by the applicable laws, codes, rules and regulations or lawful orders of public authorities. The Owner, with the approval of the Architect and Division of the State Architect, will select a qualified testing laboratory as the testing agency to conduct the tests. The Contractor shall give the Project Inspector timely notice of when and where tests and inspections are to be made so that the Project Inspector may be present for such procedures. The Owner shall bear the costs of all tests and inspections; however, the Owner shall deduct from the Contract Sum by change order for such charges, (1) when such costs are stipulated by the Contract Documents to be paid by the Contractor, and (2) charges for retesting or reinspection when the work fails to meet the requirements of the Contract Documents, including compensation for the Architect's or Project Inspector's services and expenses.

13.4.2 Delete Section 13.4.2 in its entirety and **substitute** the following:

13.4.2 If the Inspector of Record, the Architect, the Owner, or authorities having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under section 13.4.1, then the Inspector of Record will, upon written authorization from the Owner, make arrangements for such additional testing, inspection, or approval. The Owner shall bear such costs except as provided in section 13.4.1.

13.4.3 Delete this Section without substitution.

13.4.4 Delete Section 13.4.4 in its entirety and **substitute** the following:

13.4.4: Testing laboratory test and special inspection reports shall be distributed by the testing laboratory or special inspector directly to the Owner, the Architect, the Structural Engineer, the Contractor and the authorities having jurisdiction.

Add the following new Section 13.6 through 13.12:

13.6 TRENCH EXCAVATION

13.6.1 Trenches Greater Than Five Feet: Pursuant to Labor Code section 6705, if the Contract Sum exceeds \$25,000 and involves the excavation of any trench or trenches five feet or more in depth, then the Contractor shall, in advance of excavation, submit to the Owner or a registered civil or structural engineer employed by the Owner 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, then 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 Owner or by the person to whom authority to accept has been delegated by the Owner.

13.6.3 No Tort Liability of Owner: Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the Owner 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 PREVAILING WAGE RATES

13.7.1 State Prevailing Wages: Pursuant to the provisions of Article 2 (commencing at § 1720), Chapter 1, Part 7, Division 2, of the Labor Code, the Owner 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 Owner 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.

- .1 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.
- .2 Wage Rates Not Affected by Subcontracts:** 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.
- .3 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.
- .4 Forfeiture and Payments:** Pursuant to Labor Code §1775, the Contractor shall forfeit to the Owner, 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 correct 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.
- .5 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, certified payroll records directly to the Labor Commissioner in accordance with Labor Code section 1771.4. All payroll records shall be furnished in a format 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.
 - .1** 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.

- .2 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 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.
- .3 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.

.6 Records of Wages Paid (Payroll Records):

- .1 Payroll Records:
 - .1 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.
 - .2 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) on a monthly basis (or more frequently if required by the District or the Labor Commissioner) and in a format prescribed by the Labor Commissioner. Payroll records as specified in Labor Code §1776 shall 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:
 - .3 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.
 - .4 A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of Owner, the Division of Labor Standards Enforcement or the Division of Apprenticeship Standards of the Department of Industrial Relations.
 - .5 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 Owner, 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.
 - .6 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.
 - .7 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.
 - .8 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the Owner, 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.

- .9 The Contractor shall inform the Owner 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.
- .10 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 Owner, 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.
- .11 Responsibility for compliance with this Article shall rest upon the Contractor.
- .2 Withholding of Contract Payments & Penalties:
 - .1 The Owner may withhold or delay contract payments to the Contractor and/or any Subcontractor if:
 - .2 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
 - .3 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
 - .4 The Contractor or Subcontractor(s) submit incomplete or inadequate payroll records; or
 - .5 The Contractor or Subcontractor(s) fail to comply with the Labor Code requirements concerning apprentices; or
 - .6 The Contractor or Subcontractor(s) fail to comply with any applicable state laws governing workers on public works projects.
- .7 Apprentices:
 - .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.
 - .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 apprentice-able 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 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. "Apprentice-able craft or trade" as used in this Article means a craft or trade determined as an apprentice-able 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.

- .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 Owner if requested. Within 60 days after concluding Work on the Project, the Contractor and Subcontractors shall submit to the Owner, if requested, and to the apprenticeship program a verified statement of the journeyman and apprentice hours performed on the Project.
- .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 apprentice-able 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.
- .5 Prime Contractor Compliance. The responsibility of compliance with Article 13 and §1777.5 of the Labor Code for all apprentice-able 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.
- .8 **Bonding:** The contractor shall provide a Statutory Payment Bond covering the full value of the Contract.

13.8 RECORD OF WAGES PAID

13.8.1 Application of Labor Code: Pursuant to section 1776 of the Labor Code:

- .1 Each Contractor and subcontractor shall keep accurate payroll records, 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 public work. Each payroll record shall contain or be verified by a written declaration that is made under penalty of perjury, stating both of the following:
 - .1 The information contained in the payroll record is true and correct.
 - .2 The employer has complied with the requirements of sections 1771, 1811 and 1815 for any work performed by his or her employees on the public works project.
- .2 The payroll records enumerated under subdivision (a) shall be certified and 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 enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the Owner and the Division of Labor Standards Enforcement of the Department of Industrial Relations ("DIR"). The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner monthly or more frequently, if so specified in the Agreement and in a format the Labor Commissioner prescribes.
 - .3 A certified copy of all payroll records enumerated in subdivision (a) 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 either the Owner or the Division of Labor Standards Enforcement of the DIR. If the requested payroll records have not been provided pursuant to Section (2), the requesting party shall, prior to being provided the records, reimburse the costs of the preparation by the contractor, subcontractors, and the entity through which the request was made. The public may not be given access to such records at the principal office of the Contractor.
- .3 Unless required as of January 1, 2015, to be furnished directly to the Labor Commissioner under Labor Code section 1771.4(a)(3), the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement of the DIR or shall contain the same information as the forms provided by the division.

The payroll records may consist of printouts of payroll data that are maintained as computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in (a) above.

- .4 A Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within 10 days after receipt of a written request.
- .5 Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement of the DIR 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 performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multi-employer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual's full social security number, but shall provide the last four digits of the social security number. 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 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual's social security number.
- .6 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. Any copies of records or certified payroll made available for inspection and furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or redacted to prevent disclosure of an individual's name, address, and social security number. An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subsection.
- .7 The contractor shall inform the Owner of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.
- .8 The contractor or subcontractor has 10 days in which to comply subsequent to receipt of written notice requesting the records enumerated in subdivision (a). If the Contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, 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 Labor Standards Enforcement of the DIR, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of the subcontractor to comply with this section.

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 at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered. Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and 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.

13.9.2 Apprentice Labor Pool: When the Contractor to whom the Contract is awarded by the Owner, or any Subcontractor under him or her, in performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the Site of the Project, 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, approval as established by the joint apprenticeship committee or committees shall be subject to the approval of the Administrator of Apprenticeship.

The joint apprenticeship committee or committees, subsequent to approving the subject Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor in order to comply with this section. Every Contractor and Subcontractor shall submit the contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the joint apprenticeship committee or committees administering the apprenticeship standards of the crafts or trade in the area of the Site of the public work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local joint apprenticeship committees provided they are already covered by the local apprenticeship standards. The ratio of work performed by apprentices to journeymen, who shall be employed in the craft or trade on the Project, may be the ratio stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but, except as otherwise provided in this section, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman. However, the minimum ratio for the land surveyor classification shall not be less than one (1) apprentice for each five (5) journeymen.

13.9.3 Journeyman/Apprentice Ratio; Computation of Hours: Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the job Site and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract. However, the Contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the job Site. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one (1) apprentice for each five (5) journeymen in a craft or trade classification.

13.9.4 Journeyman/Apprentice Ratio: The Contractor or Subcontractor, if he or she is covered by this section upon the issuance of the approval certificate, or if he or she has been previously approved in the craft or trade, then shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that he or she employs apprentices in the craft or trade in the state on all of his or her contracts on an annual average of not less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman, or in the land surveyor classification, one (1) apprentice for each five (5) journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 hourly ratio as set forth in this section. This section shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars (\$30,000) or twenty (20) working days. Any work performed by a journeyman in excess of eight (8) hours per day or forty (40) hours per week, shall not be used to calculate the hourly ratio required by this section.

.1 Apprenticeable Craft or Trade: "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 joint apprenticeship committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting a Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions is met:

- .1** Unemployment for the previous three-month period in the area exceeds an average of fifteen percent (15%).
- .2** The number of apprentices in training in such area exceeds a ratio of 1-to-5.
- .3** There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth (1/30) of its journeymen annually through the apprenticeship training, either on a statewide basis or on a local basis.
- .4** Assignment of an apprentice to any work performed under this contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

13.9.5 Ratio Exemption: When exemptions are granted to an organization which represents Contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member Contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

13.9.6 Apprentice Fund: A Contractor to whom the Contract is awarded or any Subcontractor under him or her, who, in performing any of the work under the Contract, employs journeymen or apprentices in any apprentice-able craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the site of the Project, to which fund or funds other contractors in the area of the site of the Project are contributing, shall contribute to the fund or funds in each craft or trade in which he or she employs journeymen or apprentices on the Project in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept the funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Contractor or Subcontractor may add the amount of the contributions in computing his or her bid for the contract. The Division of Labor Standards Enforcement is authorized to enforce the payment of the contributions to the fund or funds as set forth in the Labor Code section 227.

13.9.7 Prime Contractor Compliance: The responsibility of compliance with section 13.10 and section 1777.5 of the Labor Code for all apprentice-able occupations is with the Contractor.

13.9.8 Decisions of Joint Apprenticeship Committee: All decisions of the joint apprenticeship committee under this section 13.10 and Labor Code section 1777.5 are subject to Labor Code section 3081.

13.9.9 No Bias: It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in the Labor Code section 3077.

13.9.10 Violation of Labor Code: Pursuant to Labor Code section 1777.1, if a Contractor or Subcontractor willfully fails to comply with the provisions of this section 13.10 and Labor Code section 1777.5, among other things:

- .1 The Labor Commissioner may deny to the contractor or subcontractor, and to its responsible officers, the right to bid on, or be awarded or perform work as a subcontractor on, any public works project for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violation. Each period of debarment shall run from the date the determination of noncompliance by the Labor Commissioner becomes a final order.
- .2 A contractor or subcontractor who violates section 1777.5 shall forfeit as a civil penalty an amount not exceeding the sum of one hundred dollars (\$100) for each full calendar day of noncompliance. Upon receipt of a determination that a civil penalty has been imposed, the awarding body shall enforce the penalty, which includes withholding the amount of the civil penalty from the contract progress payments or retention then due or to become due.
- .3 In lieu of the penalty provided, the Labor Commissioner may for a first time violation and with the concurrence of an applicable apprenticeship program, order the contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.
- .4 Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund.
- .5 The interpretation and enforcement of section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council.
- .6 Pursuant to Public Contract Code section 6109, no contractor or subcontractor may bid on, be awarded, or perform work as a subcontractor on a public works project if ineligible to bid or work on, or be awarded, a public works project pursuant to section 1777.1 of the Labor Code.

13.10 ASSIGNMENT OF ANTITRUST CLAIMS

13.10.1 Application: Pursuant to Public Contract Code section 7103.5 and Government Code section 4552, 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 Owner 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 Bus. & Prof. 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 Owner tenders Final Sublease Payment to the Contractor, without further acknowledgment by the parties. If the Owner receives, either through 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, then the assignor may, upon demand, recover from the Owner any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the Owner 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 Owner 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 Owner has not been injured thereby or the Owner declines to file a court action for the cause of action.

13.11 AUDIT

Pursuant to and in accordance with the provisions of Government Code section 8546.7, or any amendments thereto, all books, records, and files of the Owner, 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 three (3) years after release of all retention under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period. During the progress of the Work and for three (3) years after release of all retention under the Contract, Owner shall also have the right to an audit, and Contractor must cooperate by producing all information requested within seven (7) days.

13.12 STORM WATER DISCHARGE PERMIT

If applicable, the Contractor shall file a Notice of Intent to comply with the terms of the general permit to discharge storm water associated with construction activity (WQ Order No. 920-08-DWQ). The Notice of Intent must be sent to the following address along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow warrant processing time.): California State Water Resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, CA 95812-1977. The Contractor may also call the State Water Board's Construction Activity Storm Water Hotline at (916) 657-1146. The Notice of Intent shall be filed prior to the start of any construction activity.

14.1.1 Delete Section 14.1.1 and related subsections in their entirety and **substitute the following:**

14.1.1 The Contractor may not terminate the Contract for convenience. The Contractor may terminate for cause if the Work is stopped by others for a period of 180 consecutive days through no act or fault of the Contractor, a Subcontractor of any tier, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, and the Work was stopped by others for one of the following reasons: (1) Issuance of an order of a court or other public authority having jurisdiction which requires Owner to stop all Work; (2) an act of government, such as a declaration of national emergency, making material unavailable which requires Owner to stop all Work, (3) because the Architect has not issued a certificate for payment and not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or (4) because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents. If such grounds exist, then the Contractor may serve written notice of such grounds on Owner and demand a meet-and-confer conference to negotiate a resolution in good faith within 20 days of Owner's receipt of such notice. If such conference does not lead to resolution and the grounds for termination still exist, then Contractor may terminate the Contract and recover from the Owner payment for Work executed and for reasonable verified costs with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable

overhead, profit, and damages for the Work executed, but excluding overhead (field and home office) and profit for (1) Work not performed and (2) the period of time that the Work was stopped.

14.2.1 Delete Section 14.2.1 and related subsections in their entirety and **substitute** the following:

14.2.1 The Owner may terminate the Contract if the Contractor:

- .1 Refuses or fails to supply enough properly skilled workers or proper materials, or refuses or fails to take steps to adequately prosecute the work toward completion within the Contract Time;
- .2 Fails to make payment to Subcontractors for materials or labor in accordance with Public Contract Code section 10262 or Business and Professions Code section 7108.5, as applicable;
- .3 Disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;
- .4 Violates Labor Code section 1771.1(a), subject to the provisions of Labor Code section 1771.1(f); or
- .5 Otherwise is in breach of the Contract Documents.

Delete Article 15 in its entirety and substitute the following:

ARTICLE 15 POTENTIAL CHANGE, CHANGE ORDER REQUESTS, CLAIMS AND DISPUTES

15.1 NOTICE OF POTENTIAL CHANGE

15.1.1 Potential Changes: If the Contractor identifies the potential for extra work, delay in the critical path schedule, or the need for additional money or time, or if the Contractor requests additional money or time, or if the Contractor believes that the Owner has failed to pay amounts due or otherwise breached the Contract, or otherwise believes that it is entitled to a modification of the Contract terms and conditions, then Contractor shall follow the procedures in this Article 15 and Articles 7 and 8, otherwise the Contractor shall have waived its rights to pursue those issues and any later attempts to recover money or obtain a modification shall be barred. The Contractor specifically acknowledges the Owner's and public's interest in, and need to know of, potential changes and disputes as early as possible so the Owner can investigate, mitigate and resolve adverse cost and time impacts, if any. It is the Contractor's obligation to know and comply with the requirements of this Article 15 and Articles 7 and 8, and Owner has no obligation to notify Contractor of any failure to comply with those requirements.

15.1.2 Notice of Potential Changes: Contractor shall submit a written Notice of Potential Change for extra work, critical path delay, or additional money or time. Contractor shall submit written Notices of Potential Change to Owner within five (5) days of Contractor becoming aware of the issues creating the potential for change, unless the issues are, or may soon be, adversely affecting the costs or critical path of the Work, in which case the Contractor must submit the written notice without delay so the Owner may take immediate action to mitigate cost and schedule impacts of the change, if any. The written notice shall explain the nature of the potential change so the Owner may take action to mitigate costs and schedule impacts, if necessary.

- .1 When submitting a written Notice of Potential Change based on extra work, Contractor shall not perform the extra work until directed in writing to do so by Owner. When submitting a written Notice of Potential Change for an issue of critical path delay, Contractor shall proactively mitigate the effects of the alleged delay as much as reasonably possible so as to minimize any impact to the schedule, until otherwise directed by Owner. If Contractor intends to rely on Owner's acts or omissions in support of a request for a time extension, then Contractor must also provide the notice set forth in Article 8.3.
- .2 Failure to timely submit a written Notice of Potential Change shall constitute a complete waiver by Contractor of any right to later submit a change order request or pursue a Claim on that issue, or to later pursue any additional money or time extensions in any manner related to that issue, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's Project management and the mitigation of Project costs and delays.

15.2 CHANGE ORDERS REQUESTS

15.2.1 If, after submitting a written Notice of Potential Change pursuant to Section 15.1, the Contractor continues to believe that it is entitled to additional money or time (including, but not limited to, grant of a time extension; payment of money or damages arising from work done by or on behalf of the Contractor, payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to; or an amount the payment of which

is disputed by the Owner) based on an issue, then the Contractor shall submit a Change Order Request to the Owner within twenty (20) days of (1) becoming aware of the issues creating a potential change, or (2) the date by which it should have become aware of the issues creating a potential change. A rejection at any time or a lack of a rejection by Owner of a Notice of Potential Change does not affect the timeline for submitting a Change Order Request.

15.2.2 Failure to timely submit a Change Order Request related to an issue, or failure to comply with any of the Change Order Request requirements in the Contract shall constitute a complete waiver by Contractor of any right to later submit a Change Order Request or Claim on that issue, or to later pursue any additional money (including time extensions) in any manner related to that issue, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

15.2.3 The Change Order Request shall state the grounds for the additional money or time requested and the amount of money or time requested and include all information supporting the Change Order Request. When a time extension is requested, the Contractor shall submit a time impact analysis with the Change Order Request showing the influence of the change or delay on the Contract Completion Date.

15.2.6 The Owner may accept the entire Change Order Request, accept part of the Change Order Request and reject the remainder, reject the entire Change Order Request, or request additional information. If the Owner does not respond within thirty (30) days by accepting the entire Change Order Request, accepting part of the Change Order Request and rejecting the remainder, or requesting additional information, then the entire Change Order Request shall be deemed rejected as of the thirtieth (30th) day. If the Owner requests additional information, then the Contractor shall submit the information within fifteen (15) days of the date of the request and the Owner shall have fifteen (15) days after the receipt of the additional information to accept or reject (in whole or in part) the Change Order Request. If the Owner fails to respond within fifteen (15) days after the submission of additional information, then the entire Change Order Request shall be deemed rejected as of the fifteenth (15th) day.

15.3 CLAIMS

15.3.1 Definition of Claim: A "Claim" is a separate demand by the Contractor for (1) a time extension, (2) payment of money or damages arising from work done by, or on behalf of, the Contractor, payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by the Owner. A claim includes any claim within the scope of Public Contract Code Section 20104 et seq. Resubmittal in any manner of a Change Order Request which was previously rejected under Section 15.2 constitutes a Claim, whether the Change Order Request was rejected in whole or in part, and whether the Change Order Request was rejected expressly or deemed rejected by Owner inaction. A Claim includes any dispute the Contractor may have with the Owner, including one which does not require a Notice of Potential Change or Change Order Request under Sections 15.1 and 15.2, and includes an alleged breach of contract by the Owner. A Claim under this Section 15.3 shall also constitute a claim for purposes of the California False Claims Act. If there is a conflict between a Claims provision in Division 1 of the Specifications and this Article 15, then this Article 15 shall take precedence.

- .1** The Notice of Potential Change and Change Order Request procedures above are less formal procedures which precede the more formal Claim. A Notice of Potential Change does not constitute a Claim. A Change Order Request does not constitute a Claim; except that if insufficient time remains before the Claim deadline set forth in Section 15.3.3 for Contractor to submit a Change Order Request and for Owner to process and reject the Change Order Request under Section 15.2, then either (1) Contractor may submit a Change Order Request which Owner shall treat as a Claim, but only if the Change Order Request complies with all requirements in this Section 15.3 and Articles 7 and 8 for Change Order Request's and Claims, or (2) a Change Order Request is not required so long as a Claim complying with this Article 15 is timely submitted.
- .2** A Claim does not include vouchers, invoices, payment applications, or other routine or authorized forms of requests for payments on the Contract; however, those documents remain "claims" for purposes of the California False Claims Act. A Claim does not include a Government Code Claim. ("Government Code Claim" means a claim under Government Code Sections 900 et seq. and 910 et seq.)
- .3** A Claim may not include any costs incurred in preparation of the Claim or in preparation of any underlying Change Order Request, including, but not limited to, costs of delay analysis.

15.3.2 Continuing Contract Performance: Pending final resolution of a Claim, except as otherwise agreed in writing or as provided under Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract as directed by Owner, and the Owner shall continue to make any undisputed payments in accordance with the Contract.

15.3.3 Time for Submitting Claim: The Contractor shall submit a Claim to the and Owner on or before the date of the Final Payment. The Owner's rejection, or lack of rejection, of a Change Order Request at any time does not affect the deadline for filing a Claim.

- .1 In addition, before the date of the Final Payment based on 100% completion of the work, Contractor shall submit to Owner, in writing, a summary of all Claims for money or time extensions under or arising out of this Contract which were timely filed and which were fully compliant with the Contract's requirements for Claims. The Owner's making of the Final Payment shall constitute a complete waiver of all Claims against the Owner under or arising out of this Contract, except those identified in the above summary, as the Contractor will not have satisfied a condition precedent or exhausted administrative remedies. This Claim summary requirement shall not extend the time for submitting a Claim.
- .2 Failure to timely submit a Claim, failure to include a Claim in the Claim summary, or failure to comply with any of the Claim requirements in the Contract, including, but not limited to, this Article 15, will act as a complete waiver of Contractor's rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim for the money or time (see Sections 15.4 and 15.5), and (3) initiate any action, proceeding or litigation for the money or time, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. The Owner does not have an obligation to reject the Claim for a failure to comply with any of the Claim requirements in the Contract, including the lack of certification, and any failure by the Owner to reject, or any delay in rejecting, a Claim on that basis does not waive the Owner's right to reject the Claim on that basis at a later time. In no event may the Contractor reserve its rights to assert a Claim for a time extension or additional money beyond the time set forth in Section 15.3.2 unless the Owner agrees in writing to allow the reservation.

15.3.4 Content of Claims: All claims shall be in writing. All claims for additional cost or time shall be stated and itemized in the Claim at the time submitted. The responsibility to substantiate Claims shall rest with the Contractor. Claims shall be submitted with adequate supporting documentation which includes, but is not limited to the following:

- .1 A statement of the reasons for the asserted entitlement, identifying primary, secondary, and indirect claim issues;
- .2 Identification of contract clauses under which the claim is being presented;
- .3 A written analysis as to (1) why the claimed cost was incurred, (2) why Contractor could not mitigate its costs, (3) why the claimed cost is the responsibility of the Owner, and (4) why the claimed cost is a reasonable amount.
- .4 Cost impact statement for each claim issue with an itemized breakdown for any adjustment sought, including copies of the original subcontractor invoices or cost statements, certified payroll, invoices for material, invoices for equipment rental, and other data required to substantiate costs claimed.
- .5 Time impact statement for each claim issue with a written time impact analysis illustrating the influence of each change on the current scheduled completion date in accordance with other scheduling requirements of these Contract Documents.
- .6 The Contractor shall certify, at the time of submission of a claim, as follows:

I, [name of declarant], declare that [Contractor company name] has contracted with [public entity name] for the [name of project] Project. ([Contractor company name]) authorized me to prepare the attached Claim for money and/or time extension) for [public entity name] regarding this Project (dated _____, 20__, entitled _____, and requesting \$_____ and/or ____ additional days), and I prepared the attached Claim. I am the most knowledgeable person at [contractor company name] regarding this Claim.

The attached Claim complies with all laws applicable to submission of a Claim, including, but not limited to, California Penal Code section 72, Government Code sections 12650 et seq. (False Claims Act), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself or [contractor company name].

The attached Claim does not breach the Contract between [contractor company name] and [public entity name] for this Project, is not a false claim, does not violate any applicable law, satisfies all provisions of the Contract applicable to submission of the Claim, only contains truthful and accurate supporting data, and only requests additional costs /or additional time that accurately reflects the adjustments to cost and time for which I believe that [public entity name] is responsible under its Contract with [contractor company name].

While preparing this declaration and Claim I consulted with others (including attorneys, consultants, or others who work for [Contractor company name]) when necessary to ensure that the statements were true and correct.

The Contactor understands and agrees that any Claim submitted without this certification does not meet the terms of the Contract Documents; that the Owner, or Owner's representatives, may reject the Claim on that basis; and that unless the Contractor properly and timely files the Claim with the certification, the Contractor cannot further pursue the Claim in any forum and all rights to additional money or time for the issues covered by the Claim are waived due to a condition precedent not having been satisfied.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed _____, 2____, at _____, California.

By: _____
(Name, title and signature of Declarant)

- .7 Claims submitted without adequate supporting documentation or certification will be rejected.
- .8 Submission of a Claim, properly certified, with all required supporting documentation, and written rejection or denial of all or part of the Claim by the Owner, is a condition precedent to any action, proceeding, litigation, or suit by the Contractor.
- .9 The Contractor's failure to timely submit a certification will constitute a complete waiver of Contractor's rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim (see Section 15.3.8.4) for the money or time, and (3) initiate any action, proceeding or litigation for the money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

15.3.5 Claims for Additional Cost: If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provide herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. In no event will the Contractor be allowed to reserve its rights to assert a Claim for additional cost at a later time, unless the Owner expressly agrees in writing to allow the reservation. Any costs, direct or indirect, not asserted shall be waived.

15.3.6 Claims for Additional Time: If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provide herein shall be given. The Claim shall include, but not be limited to, all facts supporting the Claim, all documentation of such facts, all information required by the Contract Documents, and a current schedule and delay analysis explaining (1) the nature of the delay, (2) the Owner's responsibility for the claimed delay, (3) the claimed delay's impact on the critical path, (4) the claimed delay's impact on completion date (including an analysis of any float still remaining and whether the alleged delay in work exceeds such remaining float), and (5) why Contractor could not mitigate the delay impacts. In the case of a continuing delay, only one initial Claim is necessary that is based on estimates of when the continuing delay will end, but within thirty (30) days of the end of the continuing delay an updated final Claim must be submitted, which shall also be certified. In no event will the Contractor be allowed to reserve its rights to assert a Claim for a time extension, unless the Owner expressly agrees in writing to allow the reservation. Any time extension not asserted shall be waived.

15.3.6.1 Unusually Severe Weather Conditions: If unusually severe weather is the basis for a Claim for additional time, then Contractor must provide Owner data and facts showing that the weather conditions were abnormal for the period of time, could not have been reasonably anticipated or mitigated, and had an adverse effect on the critical path of the scheduled construction.

- .1 The Contractor shall reasonably anticipate that normal weather conditions will be encountered. No extension of time will be granted for normal weather conditions. Normal weather conditions shall be defined as the average days per month in which 0.10" or more of precipitation occurs, based upon the weather data from the Western Regional Climate Center, National Weather Service, for Visalia, Porterville, Hanford, Fresno, Madera, California. Average precipitation days per month are as follows:

Month	Coalinga	Delano	McFarland	Hanford	Lemoore	Visalia	Los Banos	Fresno / Sanger	Madera	Porterville	Lemon Cove	Lindsay	Merced	Three Rivers	Springville
January	4	4	4	4	4	5	5	5	5	5	5	5	6	5	6
February	4	4	4	4	4	5	5	5	5	5	5	5	5	6	6
March	3	3	3	4	4	4	4	5	4	5	5	5	5	6	6
April	2	2	2	2	2	2	2	2	3	3	3	3	3	4	5
May	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
June	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
October	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
November	2	2	2	2	2	2	3	3	3	2	3	3	3	3	5
December	3	3	3	3	3	4	4	4	4	4	4	4	5	5	6
Total:	20	20	20	21	21	24	25	26	26	26	27	27	30	35	40

- .2 Final determination of the final impact of adverse weather may be deferred to the conclusion of the Work. Extensions of time may be requested for any month of construction for days lost, which affect the critical path of construction, due to adverse weather in excess of the normal weather conditions, as defined above.

15.3.7 "Pass Through" Claims: A Subcontractor or supplier to Contractor may not submit a request for additional time or cost directly to the Owner. If a subcontractor or supplier submits a request for additional cost or time to the Contractor and the Contractor wishes to pass it through to Owner, then the Contractor must comply with all requirements of Article 15, including Notices of Potential Change, Change Order Requests, and Claims. The Contractor must prepare and submit its own analysis of the Subcontractor's request, and the Claim must include a copy of the Subcontractor's request along with any other necessary supporting documentation.

- .1 The Contractor's analysis of the Subcontractor's request must include Contractor's detailed explanation as to why the Subcontractor or supplier's request is the Owner's responsibility, including Contractor's analysis of (1) why the amount of damages the Subcontractor or supplier requests is justified and appropriate, (2) how Contractor's breach of the subcontract caused the Subcontractor or supplier to incur these damages, and (3) how the Owner's breach of the Contract caused the Contractor's breach of the subcontract.
- .2 Any Contractor Claim that fails to include the above information, or that states that Owner is responsible for the Subcontractor's request only if that Contractor is found to owe money to Subcontractor, shall act as a complete waiver of Contractor's rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim (see Section 15.4.4) for the money or time, and (3) initiate any action, proceeding or litigation for the money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

15.4 Procedures for Claims Less Than or Equal to \$375,000 (Public Contract Code section 20104.2): Claims less than or equal to \$375,000 are subject to this section 15.4, as well as the separate procedures and substantive provisions of Sections 15.1 through 15.3.7.

15.4.1 Claims for Less Than \$50,000: The Owner shall respond in writing to any written Claim within 45 days of receipt of the Claim, or may request, in writing, within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the claim the Owner may have against the Contractor.

- .1 If additional information is thereafter required, then it shall be requested and provided pursuant to this subsection, upon mutual agreement of the Owner and Contractor.
- .2 If Owner and the Contractor cannot reach mutual agreement, then the Contractor's failure to provide any reasonably-requested information within fifteen (15) days after the request shall act as a complete waiver of the Contractor's rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim (see Section 15.4.4) for the money or time, and (3) initiate any action, proceeding or litigation for such money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.
- .3 The Owner's written response to the Claim, as further documented, shall be submitted to the Contractor within 15 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

15.4.2 Claims Over \$50,000 and Less Than or equal to \$375,000: The Owner shall respond in writing to all written Claims within 60 days of receipt of the Claim, or may request, in writing, within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim the Owner may have against the Contractor.

- .1 If additional information is thereafter required, then it shall be requested and provided pursuant to this subsection, upon mutual agreement of the Owner and the Contractor.
- .2 If the Owner and the Contractor cannot reach mutual agreement, then the Contractor's failure to provide any reasonably-requested information within thirty (30) days after the request shall act as a complete waiver of the Contractor's rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim (see Section 15.4.4) for such money or time, and (3) initiate any action, proceeding or litigation for such money or time, as the Contractor will not have satisfied a condition precedent or exhausted administrative remedies.
- .3 The Owner's written response to the Claim, as further documented, shall be submitted to the Contractor within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

15.4.3 Meet and Confer: If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, then the Contractor may so notify the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Owner shall schedule a meet and confer conference for settlement of the dispute, which shall take place within 30 days of the demand. Upon written agreement of the Owner and the Contractor, the conference may take place during regularly scheduled Project meetings.

- .1 If Contractor fails to timely notify the Owner that it wishes to meet and confer pursuant to the previous Section, then Contractor will have waived all rights to (1) recover money or time on the issues for which a Claim was required, (2) submit a Government Code Claim (see Section 15.4.4) for such cost or time, and (3) initiate any action, proceeding or litigation for such money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.
- .2 If a Claim, or any portion of a Claim, over \$100,000 remains in dispute after the meet and confer and the Contractor wishes to pursue it, then the Contractor must demand non-binding mediation in writing within fifteen (15) days. If the Contractor fails to timely notify the Owner in writing that it wishes to mediate pursuant to this Section, then the Contractor will have waived all right to further pursue the Claim pursuant

to Section 15.3.3. The parties shall reasonably cooperate to schedule and attend a mediation as soon as reasonably possible.

15.4.4 Government Code Claim: If the Claim or any portion remains in dispute after the meet and confer conference and the Contractor wishes to pursue it, then the Contractor must file a timely and proper Government Code Claim. The filing of a Government Code Claim is specifically required in addition to all contractual procedures described in Sections 15.1 through 15.3.7. The above contractual procedures do not act as a substitute for the Government Code Claim process, and the two sets of procedures shall be sequential with the contractual procedures coming first.

- .1 Failure to timely file a Government Code Claim shall act as complete waiver of Contractor's rights to (1) recover money or time on the issues for which a Government Code Claim was required, and (2) initiate any action, proceeding or litigation for such money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.
- .2 The Owner and the Contractor shall proceed with the Government Code Claim according to Government Code, Section 900 et seq., and as otherwise permitted by law. For purposes of the applicable Government Code provisions, and as provided in Public Contract Code section 20104.2(e), the running of the time period within which a Contractor must file a Government Code Claim shall be tolled from the time the Contractor submits a written Claim under Section 15.3 until the time that the Claim is denied, in whole or in part, as a result of the meet and confer process in Section 15.4.3, including any period of time utilized by the meet and confer process.

15.5 Procedures for Claims Over \$375,000: The Contractor and Owner shall proceed with Claims over \$375,000 pursuant to Section 15.4, except as follows: (1) Section 15.4.1 shall not be applicable; (2) for Section 15.4.2, Owner shall respond in writing to all written Claims within 90 days of receipt of the Claim, or may request, in writing, within 45 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim the Owner may have against the Contractor; (3) for Section 15.4.2, the Owner shall respond within 45 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or documentation, whichever is greater; and (4) for Section 15.4.3, following the meet and confer conference, if the Claim or any portion of it remains in dispute and Contractor wishes to pursue it, the Contractor must demand in writing within fifteen (15) days that the parties mediate (non-binding). If the Contractor fails to timely notify the Owner in writing that it wishes to mediate pursuant to this Section, then the Contractor will have waived all rights to further pursue the Claim pursuant to Section 15.3.3. The parties shall reasonably cooperate to schedule and attend a mediation as soon as reasonably possible.

15.6 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

15.6.1 Trenches or Excavations Less Than Four Feet Below the Surface: If Contractor encounters conditions at the Site which are subsurface or otherwise concealed physical conditions, which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then the Contractor shall give notice to the Owner promptly before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. If Contractor believes that such conditions differ materially and will cause an increase in the Contractor's cost of, time required for, or performance of any part of the Work, then Contractor must comply with the provisions above for Notice of Potential Change, Change Order Request, and Claims (beginning with Section 15.1).

15.6.2 Trenches or Excavations Greater Than Four Feet Below the Surface: Pursuant to Public Contract Code section 7104, when any excavation or trenching extends greater than four feet below the surface:

- .1 The Contractor shall promptly, and before the following conditions are disturbed, notify the Owner, in writing, of any (1) material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law; (2) subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids; or (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.

- .2 The Owner shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or 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, then the Owner shall issue a change order under the procedures described in the Contract.

15.6.3 If a dispute arises between the Owner and the Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, then 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.

15.7 Injury or Damage to Person or Property: If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for whose acts such party is legally liable, then written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. For a Notice of Potential Change, Change Order Request and Claim for additional cost or time related to this injury or damage, Contractor shall follow this Article 15.

END OF SECTION 00 7310

SECTION 00 9110 - ADDENDA

- 1.** In accordance with Section 4-338(a) of the California Administrative Code, 2022 Edition, changes or alterations of the approved plans and specifications prior to the letting of a construction contract for the Work shall be made by means of addenda, which shall be submitted to and approved by Division of the State Architect (DSA) prior to distribution to contractors.
- 2.** Addenda shall be stamped and signed by the Architect or Engineer in general responsible charge of preparation of the plans and specifications, and by the Architect or Engineer delegated responsibility for the portion affected by the addenda.
- 3.** Addenda issued during bidding, if any, will be inserted following this page in the Contract Documents sets issued for construction.
- 4.** The provisions of all Addenda shall become part of the Contract Documents and Contractor shall be obligated to construct the Project in accordance with the Contract Documents as modified or supplemented by the addenda provisions.

END OF SECTION 00 9110

SECTION 01 1100 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related Sections: Close coordination between this Section, the General and Supplementary Conditions, and Divisions 1 through 33 is required.
- B. Project Location: 985 Sunset Ave., Coalinga, CA 93210
- C. Project: The Project consists of the total construction of which the Work performed under the Contract Documents is a part and which may include construction by the Owner or by separate contractors, for:

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL

- D. Work: The Work of the Project consists of all labor, material, equipment, and services to perform all selective demolition and construction required by the Contract Documents, including but not limited to 1 single-story wood frame buildings, slab on-grade, total floor area of 9,250 square feet, with related on-site and off-site improvements.
- E. Applicable Codes: All work shall be performed in accordance with the plans, specifications and the following regulations:
 - 1. 2022 Building Standards Administrative Code, Part 1, Title 24 CCR.
 - 2. 2022 California Building Code (CBC), Part 2, Title 24 CCR.
 - 3. 2022 California Electrical Code (CEC), Part 3, Title 24 CCR.
 - 4. 2022 California Mechanical Code (CMC) Part 4, Title 24 CCR.
 - 5. 2022 California Plumbing Code (CPC), Part 5, Title 24 CCR.
 - 6. 2022 California Energy Code (CEC), Part 6, Title 24 CCR.
 - 7. 2022 California Fire Code, Part 9, Title 24 CCR.
 - 8. 2022 California Green Building Standards Code (CALGreen), Part 11, Title 24 CCR.
 - 9. 2022 California Referenced Standards, Part 12, Title 24 CCR.
 - 10. Title 19 CCR, Public Safety, State Fire Marshal Regulations.
 - 11. 2022 NFPA 72 National Fire Alarm Code, as amended.
 - 12. 2022 NFPA 80 Fire Door and Other Opening Protectives.
 - 13. 2022 NFPA 13 Automatic Sprinkler Systems, as amended.
- F. Conflicts in the Drawings and Specifications:
 - 1. When conflicts are noticed prior to bidding, the bidder shall notify the architect immediately in order that an addendum can be issued to all bidders prior to bidding. When the discrepancy is noticed after the bid, the architect shall be notified and will review the discrepancy and interpret the intent. For the purpose of bidding and interpreting, **the most restrictive and potentially most expensive condition may prevail.**
 - 2. In the case of ambiguity, conflict, or lack of information, the Architect shall respond with reasonable promptness and provide additional instructions, by means of drawings and/or written instructions, as may be otherwise necessary for proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof, and reasonably inferable therefrom.

1.2 DIVISION OF THE STATE ARCHITECT REQUIREMENTS

- A. Addenda: Changes or alterations of approved plans or specifications that affect structural, fire/life safety, or accessibility portions of the Project prior to letting a construction contract shall be made by means of addenda submitted to and approved by DSA in accordance with Section 4-338, California Administrative Code, Title 24,

Part 1, California Code of Regulations.

- B. Changes: Changes or alterations of approved plans or specifications that affect structural, fire/life safety, or accessibility portions of the Project after a contract for the work has been let shall be made by means of Construction Change Documents submitted to and approved by DSA in accordance with Section 4-338, California Administrative Code, Title 24, Part 1, California Code of Regulations.
 - 1. Refer to Section 01 2600 for modification procedures.

1.3 CONTRACTS

- A. All work of this project will be let as a single lump sum General Contract.

1.4 FEES AND PERMITS

- A. The Owner will be responsible to obtain and pay for the following:
 - 1. DSA approval and field inspection fee.
 - 2. Storm Water Prevention Pollution Plan filing fee.
 - 3. Dust Control Plan filing fee.
 - 4. Indirect Source Review filing fee.
 - 5. Service connection fees to gas, permanent telephone, and permanent power utilities.
 - 6. City/County engineering review and inspection fee for work performed in the public right-of-way.
 - 7. Transportation mitigation, water system, wastewater system, storm water system, fire protection, and police protection impact fees.
- B. The Contractor shall be responsible to obtain and pay for the following:
 - 1. Permits and licenses required for work performed in the public right-of-way.
 - 2. Permits, licenses, and inspection fees required for execution and completion of the Work which are not the responsibility of the Owner.
- C. The Contractor shall be responsible for requesting all inspections required by the governing jurisdictions.

1.5 FUTURE WORK

- A. Route all underground utilities a minimum of 10'-0" away from all building footprints identified as future construction.
- B. Construct building pads for future buildings as indicated, grading top of pad to provide for drainage.

1.6 WORK SEQUENCE

- A. Refer to Section 00 3100 for preliminary schedule requirements.
- B. Construct the Work within the following constraints:
 - 1. Fire Department Requirements: Maintain access to existing hydrants and maintain existing fire lanes free of obstruction.
 - 2. Finish Flooring Installation: Complete enclosure of interior spaces, make HVAC system operational, and bring interior spaces to design temperature and humidity 48 hours prior to vapor emission control treatment pre-testing as specified in Section 09 6110.
 - 4. Planting Schedule: Complete turf planting and tree planting in turf playfield areas as indicated in the

planting specs.

- a. Coordinate all site improvements of the playfield including site fencing, concrete, storm drain, sprinkler irrigation, electrical, water compaction, soil preparations, site grading, finish grading, pressure testing, water testing, tree planting, turf grass seeding, and all necessary work to meet the planting deadline.
- b. Contractor may be required to furnish, install, and maintain a temporary power supply for the irrigation controllers and booster pump if the proposed site power is not available in order to meet the planting deadline.
- c. Contractor is solely responsible for all costs associated with providing the temporary power.

1.7 CONTRACTOR'S USE OF PREMISES

- A. Limit use of the site to construction activities in the areas indicated.
- B. Confine operations to areas within the Contract Limits indicated. Portions of the site beyond areas in which construction operations are indicated shall not be disturbed.
- C. Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
- D. Keep driveways and entrances serving the premises clear and available at to the Owner, the Owner's employees, and the public at all times.
- E. Keep bus lanes and drop-off zones clear and available to the Owner at all times.
- F. Use of existing toilets within the existing buildings, by the Contractor, shall not be permitted.
- G. Store and stockpile materials on the property, excluding public rights-of-way.

1.8 OWNER OCCUPANCY

- A. Owner intends to occupy the Project by the date stated in the Agreement as the Contract Completion Date.
- B. Owner intends to continue to occupy adjacent portions of the existing site and/or buildings during the entire construction period. Do not interfere with the Owner's and public's use of the site and existing buildings outside of the Contract Limits indicated. Schedule the Work to accommodate Owner occupancy during construction. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

1.9 CONSTRUCTION ACTIVITIES IN THE PUBLIC RIGHT-OF-WAY

- A. Do not obstruct roadways, sidewalks, or other public ways without permit.
- B. Traffic shall be maintained on public streets and roads at all times. Connections of new underground utilities to existing underground utilities shall be conducted in such a manner as to maintain at least one full lane of traffic at all times.
- C. The Contractor shall provide barricades, traffic control devices, and flagmen as needed or as directed by the governing jurisdiction, to control vehicular and pedestrian traffic.
- D. The Contractor shall provide periodic clean-up of deposited dirt, debris, and mud on all streets and roads in a manner acceptable to the governing jurisdiction.

1.10 WORK BY OWNER

- A. Items noted as NIC (Not In Contract) will be furnished and installed by the Owner.
- B. The Owner will furnish and install the following work:
 - 1. Classroom and miscellaneous equipment and furnishings indicated as NIC.

END OF SECTION 01 1110

SECTION 01 2100 - CASH ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. To provide adequate budget and bonding to cover items not precisely determined by the Owner prior to bidding, allow within the proposed Contract Sum the amounts described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Other provisions concerning Cash Allowances are stated in Paragraph 3.8 of the General Conditions.
 - 3. Other provisions concerning Cash Allowances also may be stated in other Sections of these Specifications.

1.2 CASH ALLOWANCE PROVISIONS

- A. Costs Included in Cash Allowances: As defined in the General and Supplementary Conditions.
- B. Architect Responsibilities: Architect shall meet with the Owner, Contractor and product manufacturer to determine the products for use.
- C. Contractor Responsibilities: Cooperate with Owner's testing laboratory to obtain timely information relative to substrate conditions and actual cost of products selected.
- D. Differences between the allowance amount and the actual cost of the Work will be adjusted by Change Order.

1.3 ALLOWANCES SCHEDULE

- A. Moisture Control Treatment for Flooring: Include the sum of **\$60,000.00** for moisture control treatment for flooring in areas indicated in the Contract Documents.
 - 1. Allowance includes use of an alternate flooring adhesive recommended by the floor covering manufacturer as suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present
 - 2. Allowance includes use of a coating intended by its manufacturer to resist water vapor transmission or internal relative humidity to the degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment or with only the addition of a skim coat of patching compound or adhesive.
 - a. Moisture control treatment for flooring is specified in Section 09 6110.
 - 3. Testing for moisture conditions in concrete floor slabs is specified in Section 09 0560.
- B. Electrical Utility Work: Include the sum of **\$25,000.00** for work required by the power utility, according to their Rule 16 or Rule 15 engineering, in addition to that indicated in the Contract Documents.

END OF SECTION 01 2100

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes procedures for securing approval of proposed substitutions.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Make submittals in accordance with pertinent provisions of Section 01 3300.

1.2 SUBSTITUTIONS

- A. Substitutions: Contractors, subcontractors and/or material suppliers shall comply with the requirements set forth in this Section. All requests for material substitutions shall be submitted with all required substantiating data, comparisons to the material specified, including samples and colors as needed to determine their acceptance. Failure to provide the required documentation is justification for rejection.
 - 1. Prior to Bid: Substitution Requests shall be submitted a minimum of 10 days prior to the bid (if material is to be included on the final addendum). Substitutions may be submitted by general contractor or subcontractor bidders directly to the Architect.
 - 2. After Award of Contract. Substitution Requests may be submitted not more than 35 days after the award of the contract. Substitution requests shall only be submitted by the General Contractor.
 - 3. **Substitution Requests received greater than 35 days after the award shall be rejected.**
- B. Required Substitution Submittal Requirements:
 - 1. Submit required substitution information with a completed "Substitution Request Form" found at the end of this Section.
 - 2. Manufacturer's descriptive literature and product specifications for each product, with the proposed products clearly identified.
 - 3. Comparative specification data between the specified item and the proposed substitution, showing compliance with the specified requirements.
 - 4. Test reports indicating compliance with ASTM standards and ICC ES approvals where compliance with such standards is required by the Contract Documents or where compliance is claimed by the Contractor requesting substitution.
 - 5. Samples of actual material and color, where applicable.
 - 6. **Submittal without this information will automatically be rejected.**
- C. Approval of Substitutions:
 - 1. Where the phrase "or equal," or "or equal as approved by the Architect," occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Architect.
 - 2. The burden of proof as to the equivalency of any material, process, or product shall rest with the Contractor. Any or all of the following will be used by the Architect to determine if a proposed substitution is equivalent to the specified products or materials:
 - a. Code and legislative compliance.
 - b. Functional performance and characteristics.
 - c. Industry standard compliance.
 - d. Composition of materials.
 - e. Cost.

- f. Aesthetic characteristics.
 - g. Environmental characteristics.
 - h. Manufacturer characteristics.
 - i. Installation characteristics.
 - j. Maintenance requirements.
 - k. Warranty characteristics.
 - 3. **Approvals shall be at the sole discretion of the Architect and the decision of the Architect shall be final and binding.**
 - 4. The provisions allowing submission of substitutions shall not in any way authorize an extension of time for performance of the Work.
- D. Substitution of any material, system, or product that would normally be reviewed by DSA (Structural Safety, Fire/Life Safety, Access Compliance, or Energy) shall be submitted to and approved by DSA prior to fabrication or use. Such substitutions shall be considered Construction Change Document in accordance with Section 01 2600.

1.3 DELAYS

- A. Delays in construction arising by virtue of the non-availability of a specified material due to late approval and/or ordering of materials will not be considered as justifying an extension of the agreed Time of Completion, or reason for change.
- B. All additional time required by the Architect or his consultants in dealing with such delay will be charged to the Contractor at the rates described in section 01 7700 1.4.B.2.
- C. Equal or better material replacements caused by delay in approvals and/or ordering may cost more than the original material specified. Increased costs shall be absorbed by the Contractor and not the Owner.

END OF SECTION 01 2500

SUBSTITUTION REQUEST FORM

PROJECT: _____
SPECIFICATION SECTION: _____ ARTICLE/PARAGRAPH: _____
SPECIFIED SECTION: _____
PROPOSE SUBSTITUTION: _____

Attach complete technical data including laboratory tests and code approvals, detailed drawings, and other data indicating compliance with the requirements of the Contract Documents. Clearly identify products being proposed for substitution. Include complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

FILL IN BLANKS BELOW:

- A. Does the substitution affect dimensions on Drawings? ☐ Yes ☐ No
- B. Will the undersigned pay for changes to the building design, including building design, engineering and detailing costs caused by the requested substitution? **(Negative response may be cause for rejection)**
☐ Yes ☐ No Explain: _____
- C. What affect does substitution have on other trades? _____
- D. Differences between proposed substitution and specified item? _____
- E. Manufacturer's guarantee of the proposed and specified items are: ☐ Same ☐ Different
Explain: _____
- F. Manufacturer will provide colors that match color selection in finish schedule: ☐ Yes ☐ No

The Undersigned hereby certifies that the function, appearance, and quality are equivalent to or superior to the specified item. The undersigned agrees to waive all claims for additional costs related to accepted substitution, including costs associated with changes to building design, engineering, or details, which may subsequently become apparent.

Submitted by: _____
Signature: _____ Date: _____
Firm: _____
Phone: _____ Address: _____
Fax: _____

ARCHITECT'S REVIEW AND ACTION

- ☐ Accepted – Make submittals in accordance with Section 01 2500. ☐ Rejected – Use specified materials.
☐ Accepted as noted – Make submittals in accordance with Section 01 2500. ☐ Received too late – Use specified materials.

By: _____ Date: _____

MANGINI ASSOCIATES INC.

Remarks: _____

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES AND FORMS (DSA)

PART 1 - GENERAL

1.1 SUMMARY:

- A. This section includes procedural requirements for consideration and execution of modifications to and interpretations of the Contract Documents. This section is intended to supplement requirements set forth in the Agreement and the General and Supplementary Conditions.
- B. Section includes:
 - 1. Documentation of changes in Contract Sum and Contract Time.
 - 2. Interpretation and clarification procedures.
 - 3. Change procedures.
 - 4. Correlation of Contractor submittals based on changes.
- C. Related Sections:
 - 1. Close coordination between this Section, the General and Supplementary Conditions, and Divisions 1 through 33 is required.
 - 2. Section 00 5210: Agreement, Contract Sum, retainage, payment period, values of unit prices.
 - 3. Section 00 7210: Requirements for progress payments, final payment, changes in the Work.
 - 4. Section 00 7310: Percentage allowances for Contractor's overhead and profit.
 - 5. Section 01 2100: Payment procedures relating to allowances.

1.2 DIVISION OF THE STATE ARCHITECT REQUIREMENTS

- A. In addition to the modification requirements of this section, the Agreement, and the General and Supplementary Conditions, the Division of the State Architect (DSA) requires that all changes to the approved construction documents that affect structural, accessibility, or fire/life safety portions of the Project be submitted to and approved by DSA in accordance with the procedure set forth in the current edition of DSA Interpretive Regulation IR A-6.
- B. Definitions:
 - 1. **Approved Construction Documents:** The approved construction documents are the drawings, specifications, addenda, deferred approvals, changes and bulletins approved by the governing code jurisdiction.
 - 2. **Change:** A change is a revision, modification, deletion, addition, or substitution to the approved Construction Documents.
 - 3. **Change Order:** A document defining and memorializing construction changes that result in changes to the Construction Contract, usually changing Contract Sum or Contract Time.
 - 4. **Clarification:** A clarification is a statement that clarifies (but does not change) the requirements of the approved Construction Documents.
 - 5. **Construction Change Directive:** A document defining and memorializing construction changes that result in changes to the Construction Contract, usually changing Contract Sum or Contract Time, specifically when the Owner and Contractor do not agree to the terms surrounding the changed work.
 - 6. **Construction Change Documents (CCD):** The documentation of construction changes for DSA purposes, using DSA Form-140, prepared and submitted by the Architect.
 - 7. **Contract:** A written agreement for construction, alteration, reconstruction, repair, or other construction activities.
 - 8. **DSA:** The Division of the State Architect (DSA) is the Authority Having Jurisdiction over Project for code compliance.
 - 9. **Interpretation:** An interpretation is a statement that interprets (but does not change) the requirements of the approved Construction Documents.

- C. **DSA Changes:** In accordance with the current edition of DSA Interpretation of Regulation IR A-6, changes to the approved construction documents that affect structural, accessibility, or fire/life safety portions of the Project made after a contract for the Work has been let shall be made by means of a Construction Change Document submitted and approved by DSA prior to commencement of the Work shown thereon.
- D. **Non-DSA Changes:** In accordance with the current edition of DSA Interpretation of Regulation IR A-6, changes to the approved construction documents that do not affect structural, accessibility, or fire/life safety portions of the Project are not required to be submitted to or approved by DSA.
- E. **Change Orders:** DSA does not review change orders.

1.3 MODIFICATION PROCEDURES

- A. Definitions:
 - 1. **Bulletin:** A bulletin is a document produced by the Architect to memorialize all changes, clarifications and interpretations to the approved Construction Documents. A bulletin may or may not change the Contract Sum or the Contract Time.
 - a. For the purpose of changes requiring DSA approval, the Architect's Bulletin number will be the same as the DSA CCD number.
 - 2. **Bulletin Log:** The Bulletin Log is an organized method of numbering, logging, cost accounting, and tracking the status of each bulletin issued.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract, the Architect will issue a Bulletin which provides supplementary instructions and information, including a detailed description of the change with supplementary or revised drawings and specifications.
 - 1. Proceeding with the changes described in the Bulletin indicates the Contractor's acknowledgment that there will be no change in Contract Sum or Contract Time.
 - 2. In the event the Contractor believes that such Bulletin constitutes a change to the adjustment to the Contract Sum or Contract Time, the Contractor shall immediately give written notice to the Architect within 10 calendar days of receipt of the Bulletin stating that the Contractor considers the Bulletin to be a Change Order. Failure to give such written notice shall waive the Contractor's right to seek additional time or cost.
- C. For changes involving adjustment to the Contract Sum or Contract Time, Architect will issue a Bulletin which provides a detailed description of the proposed change with supplementary or revised drawings and specifications.
 - 1. Contractor shall prepare and submit a fixed price quotation in the form of a Change Order Request (COR) within 14 calendar days.
 - 2. The Owner shall provide written acceptance of the Contractor's COR prior to the Contractor commencing work described in the COR.
- D. The Contractor may propose a change by submitting a Change Order Request (COR) to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6200.
- E. Execution of Change Orders: Architect will issue Change Orders on the form attached at the end of this Section for signatures of parties as provided in the Conditions of the Contract.

- F. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- G. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- H. Promptly enter changes in Project Record Documents.

1.4 CONTRACT INTERPRETATION AND CLARIFICATION PROCEDURES

- A. **Request for Information (RFI):** A written request from the Contractor to the Architect, seeking an interpretation or a clarification of some requirement of the Contract Documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed from the Architect. The Contractor shall, in the written request, set forth its interpretation or understanding of the contract's requirements along with reasons why it has reached such an understanding.
 - 1. The Architect will review all RFI to determine whether they are RFI within the meaning of this term. Project communications; substitution submittals; product data, shop drawings, or samples submittals, or construction schedule submittals shall not be transmitted by RFI. Project communications shall not be considered RFI.
 - 2. Responses to RFI shall be issued within 10 calendar days of receipt of the request from the Contractor unless the Architect determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Architect, the Architect will, within 10 calendar days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a Request for Information on an activity with 10 calendar days or less of float on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Architect to respond to the request provided that the Architect responds within the 10 calendar days set forth above.
 - 3. In the event the Contractor believes that a response to a Request for Information will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Architect within 10 calendar days of receipt of the request the Architect stating that the Contractor considers the response to be a Change Order. Failure to give such written notice shall waive the Contractor's right to seek additional time or cost under the Changes article of the General Conditions.
 - 4. Failure on the part of the Contractor to provide timely Requests for Information does not constitute a crisis solution from the Architect.
 - 5. Requests for Information that affect structural, accessibility, or fire/life safety portions of the Project made after a contract for the Work has been let shall be submitted to and approved by DSA as a Construction Change Document prior to commencement of the Work shown thereon.

END OF SECTION 01 2600

REQUEST FOR INFORMATION

RFI NO.**TO:** Mangini Associates Inc.
Attn:**DATE:**
ARCHITECT'S RFI NO.:
PROJECT NO.:
DSA APPL. NO.:**PROJECT:****Subject:****Plan/Spec. Ref:****Question:****Suggestion:****Attachments:****Contractor's Contract Status:**

- ☐ No change in contract time of sum required
☐ Change in contract time may be required
☐ Change in contract sum may be required

The undersigned certifies that the Contractor has thoroughly reviewed all Contract Documents and determines that the information requested is not contained in the Contract Documents.

By: _____ **Company:** _____ **Title:** _____
Phone: _____ **Fax:** _____ **Email:** _____

Response:

By: _____ **Date:** _____
MANGINI ASSOCIATES INC.

CC: _____

SECTION 01 2920 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Pay-Off-the-Schedule:
 - 1. In coordination with the CPM schedule activities specified in Section 01 3220, provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
- B. Related Sections:
 - 1. Section 00 7210: General Conditions related to payment procedures.
 - 2. Section 01 3220: CPM construction schedules, schedule updates, and project control reports.

1.2 SCHEDULE OF VALUES

- A. Submittal: One week prior to first application for payment, submit proposed Schedule of Values to Architect.
 - 1. Meet with Architect and determine additional data, if any, required to be submitted.
 - 2. Secure the Architect's approval of the Schedule of Values prior to submitting first application for payment.
 - 3. Without documentation, Architect will value the work and spread the costs throughout the project.
- B. CPM Schedule Correlation: The activities report, as required in Section 01 3220, generated by the CPM schedule software, sorted by building and site quadrant, and by order of earliest start date shall determine the schedule of values line items.
- C. Activity Dollar Value: Assign a dollar value to each activity which includes overhead and profit.
- D. Payment for Stored Materials (Procurement Activities):
 - 1. When the Contractor requests payment for stored materials (on-site or off-site), such materials shall be included in the schedule of values and the CPM schedule as procurement activities.
 - 2. Materials not identified as procurement activities will not be considered for payment as stored materials and will only be considered for payment when incorporated in the Work.
- E. Division 1 Activities: At a minimum, break down Division 1 costs into the following categories:
 - 1. Mobilization.
 - 2. Submittals.
 - 3. Scheduling and schedule updates.
 - 4. Permits and fees.
 - 5. Surveying.
 - 6. Supervision/administration.
 - 7. Bonds and insurance.
 - 8. Temporary offices and utilities
 - 9. Temporary fencing and storage

1.3 QUALITY ASSURANCE

- A. Assure arithmetical accuracy of the sums described.
- B. When so requested by the Architect, provide copies of the subcontracts or other data acceptable to the Architect, substantiating the sums described.

1.4 PAYMENT FOR STORED MATERIALS

- A. The Contractor is encouraged to order materials early in order to prevent delays. Delays arising from the non-availability of a specified material due to late approval and/or ordering of materials will not be considered as justifying an extension of time or reason for change. Refer to Section 01 6200.
- B. The Architect and Owner will consider payment for materials stored properly in accordance with the General Conditions. Payment for materials stored off-site will require, at a minimum:
 - 1. Storage at a bonded or insured yard or warehouse with the stored materials properly tagged and identifiable for the project;
 - 2. Insurance certificate acceptable to the Owner naming the Owner as additional insured, with the stored items specifically described on the certificate;
 - 3. Verification by the Inspector of Record;
 - 4. Manufacturer's invoices for materials and freight.

1.5 APPLICATIONS FOR PAYMENT

- A. **General:** Use AIA Document G702, "Application for Payment" as summary and certification page.
- B. **Initial Application for Payment:** Submittal of the following items is a condition precedent to certification and payment of the first application for payment. The Architect may refuse to certify the Contractor's mobilization payment, and the Owner shall have the right to refuse to pay any certified amount, if the Contractor has not completed or submitted any or all of the following:
 - 1. Listing of subcontractors and principal suppliers and fabricators.
 - 2. Schedule of Values approved by the Architect.
 - 3. Preliminary Network Analysis reviewed and accepted by the Architect as specified in Section 01 3220.
 - 4. Listing of Contractor's staff assignments and principal consultants.
 - 5. Inspector of Record signature on the AIA G702 document.
- C. **Second Application for Payment:** Submittal of the following items is a condition precedent to certification and payment of the second application for payment. The Architect may refuse to certify payment, and the Owner shall have the right to refuse to pay any certified amount, if the Contractor has not completed or submitted any or all of the following:
 - 1. Complete Construction Schedule reviewed and accepted by the Architect as specified in Section 01 3220.
 - 2. Inspector of Record signature on the AIA G702 document.
- D. **Progress Payments:** Submittal of the following items is a condition precedent to certification and payment of each progress application for payment. **The Architect may refuse to certify payment, and the Owner shall have the right to refuse to pay any certified amount, if the Contractor has not completed and submitted any or all of the following:**
 - 1. Current Project Control Report as specified in Section 01 3220.
 - 2. Recovery Schedule where required under the provisions of Section 01 3220.
 - 3. Inspector of Record signature on the AIA G702 document.
- E. **Final Application for Payment:** Submittal of the following items is a condition precedent to certification and payment of the final application for payment. **The Architect may refuse to certify payment, and the Owner shall have the right to refuse to pay any certified amount, if the Contractor has not completed and submitted any or all of the following:**
 - 1. Administrative actions and submittals specified in Section 01 7700 as preliminary procedures for Final Acceptance.
 - 2. As-Built Schedule specified in Section 01 3220.
 - 3. Inspector of Record signature on the AIA G702 document.

END OF SECTION 01 2920

SECTION 01 3110 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Architect will conduct project meetings throughout the construction period. The Contractor's relations with his subcontractors and materials suppliers and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 SUBMITTALS

- A. Agenda Items: To the maximum extent practicable, advise the Architect at least 48 hours in advance of project meetings regarding items to be added to the agenda.
- B. Minutes: The Architect will compile minutes of each project meeting, and will furnish one copy to the Contractor and to the Owner. Recipients of copies may make and distribute such other copies as they wish.

1.3 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.4 MEETING SCHEDULE

- A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly.
- B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

1.5 MEETING LOCATION

- A. The Architect will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

1.6 PRECONSTRUCTION MEETING

- A. Preconstruction Meeting will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed.
 - 1. Mandatory attendance by authorized representatives of the Contractor and major subcontractors, including but not limited to:
 - a. Earthwork.
 - b. Concrete.
 - c. Rough carpentry.
 - d. Roofing.
 - e. Plumbing/mechanical.
 - f. Electrical.
 - g. Data

2. The Architect will advise other interested parties, including the Owner, and request their attendance.

B. Minimum Agenda: Data will be distributed and discussed on at least the following items:

1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and Architect.
2. Channels and procedures for communications.
3. Construction schedule, including sequence of critical work.
4. Contract Documents, including distribution of required copies of original Documents and revisions.
5. Processing of Shop Drawings and other data submitted to the Architect for review.
6. Processing of Requests for Information, Proposal Requests, Change Orders and Payment Requests.
7. Rules and regulations governing performance of the Work; and
8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

1.7 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.
2. Review progress of the Work since last meeting, including status of submittals for approval.
3. Identify problems which impede planned progress.
4. Develop corrective measures and procedures to regain planned schedule.
5. Complete other current business.
6. Verify that Record Drawings are current and accurate.

C. Revisions to Minutes:

1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
3. Challenge to minutes shall be settled as priority portions of "old business" at the next regularly scheduled meeting.

END OF SECTION 01 3110

SECTION 01 3220 - CONSTRUCTION PROGRESS SCHEDULES (CPM)

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare and maintain a construction schedule using the Critical Path Method (CPM), and consisting of the network diagram, mathematical analysis, and associated reports.
 - 1. Submission of progress and revision data will be used to measure work progress, aid in evaluating time extensions.
 - 2. All schedule activities shall be tied to schedule of values activities for progress payments.
- B. Related Sections:
 - 1. Section 00 3100: Preliminary Schedules.
 - 2. Section 01 1110: Work sequences and constraints, Owner occupancy, and Owner furnished items.
 - 3. Section 01 3300: Requirements for shop drawings, product data, and samples.
 - 4. Section 01 2920: Schedule of values and payments.
 - 5. Section 01 7700: Project completion and closeout requirements.

1.2 SUBMITTALS

- A. Schedule Development and Update Submittals: Submit 4 color copies and one electronic copy of network diagram and 4 copies of required schedule reports required by Article 1.11 with each of the following submittals:
 - 1. Preliminary network diagram.
 - 2. Complete network diagram.
 - 3. Construction schedule (baseline schedule).
- B. Project Control Reports: Submit 4 color copies of network diagram and 4 copies of required schedule reports and narrative report required by Article 1.14.A.5 with each application for payment.
- C. Two-Week Rolling Schedules: Submit copies to each participant at each weekly progress meeting.
- D. As-Built Schedule: As a condition precedent to requesting release of retainage, submit an as-built schedule, certified by the Contractor's project manager and project scheduler as representing a true reflection of the way the Work was actually constructed (including actual start and finish dates, activities, sequences, and logic). As-built schedule consists of a CPM network and required schedule reports listed in Article 1.11.

1.3 SCHEDULE DEVELOPMENT

- A. Preliminary Network Analysis: Within 35 calendar days of the date of Owner's Notice of Award and prior to the first application for payment, submit proposed Preliminary Network Diagram for review, defining planned operations for the first 90 days of Work, with a general approach for remainder of Work.
 - 1. Limit level of detail to minimum of 50 activities and maximum of 200 activities.
 - 2. Submit required schedule reports listed in Article 1.11.
 - 3. Submittal and acceptance of the Preliminary Network Analysis is condition precedent to the processing of the Contractor's applications for payment.
 - 4. The activities and relationships of the Preliminary Network Analysis shall coincide and mesh with the activities of the Complete Network Analysis.

- B. Complete Network Analysis: Within 28 days after Architect's review and acceptance of the Preliminary Network Analysis and prior to the second application for payment, submit Complete Network Analysis for review, including:
 - 1. Network diagram defining planned operations for the entire project.
 - 2. Required schedule reports listed in Article 1.11.
 - 3. Listing of input data for each activity which generates reports.
- C. Construction Schedule: Within 14 days after Architect's review of Complete Network Analysis, submit the Construction Schedule consisting of:
 - 1. The complete network diagram defining planned operations for the entire project.
 - 2. Required schedule reports listed in Article 1.11.
 - 3. Bar chart as specified in Article 1.12.
 - 4. Two copies of each major subcontractor's statement certifying their concurrence with the Construction Schedule. Each certifying statement shall be made on the subcontractor's letterhead. Major subcontractors are those whose subcontracts comprise 4% or more of the Contract Sum.
- D. Baseline Schedule: The Construction Schedule, when accepted by the Owner and Architect for compliance with the Contract Documents, shall establish the Baseline Schedule.

1.4 SCHEDULE UPDATES

- A. Update schedule monthly as part of the Project Control Report specified in this Section. Submittal of an acceptable updated schedule to the Architect is a condition precedent to processing of the Contractor's application for payment.
- B. Update schedule as follows:
 - 1. Enter actual start and finish dates for activities started and completed during the previous period.
 - 2. Show estimated duration (in work days) to complete each activity (remaining duration) started but not completed.
 - 3. Graphically indicate progress of each active activity and the estimated remaining duration.
 - 4. Record and report logic changes.
- C. Progress Override: Actual progress and changes in logic directed in the field shall override retained logic in the schedule in all updates.
- D. Default Progress Data Disallowed:
 - 1. Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the scheduling software.
 - 2. Work activities shall be updated by actual work progression rather than being cash flow driven. The updating of the percent complete and the remaining duration shall be independent functions; program features that calculate one of these parameters from the other shall be disabled.
- E. Other Required Updates: In addition to updates required for the Project Control Reports, provide a complete schedule submittal whenever the Contractor's planned sequence of construction is changed, when approved change orders impact critical path activities, or when time extension is approved by change order.

1.5 RESPONSIBILITY FOR THE SCHEDULE

- A. Responsibility for construction planning and the effective and efficient implementation of such to meet the Contract Completion Date and any required milestones are the sole responsibility of the Contractor.

- B. Review of the schedule and subsequent revisions by the Owner or the Architect shall be limited to review for compliance with the requirements of the Contract Documents; review shall not imply agreement of the Owner or Architect to the Contractor's planned procedures, coordination, scheduling, etc., as being appropriate or reasonable. Comments offered by the Owner or Architect relating to schedule logic or sequence which are the Contractor's responsibility are offered as a courtesy and are not conditions of acceptance.
- C. Non-Waiver:
 - 1. If the accepted schedule and subsequent revisions do not include contractually required constraints, review and/or acceptance of the schedule and subsequent revisions by the Owner or the Architect shall not waive such requirements.
 - 2. Review of the schedule and subsequent revisions by the Owner or the Architect shall not constitute a waiver of any contract requirement.
 - 3. Contract requirements shall take precedence in the event of conflicts between the accepted schedule and contract requirements.

1.6 PAY-OFF-THE-SCHEDULE

- A. Schedule of Values Correlation: The CPM schedule shall be the basis for measuring the Contractor's progress for the purposes of payment.
 - 1. The activity report, as required in Article 1.11, sorted by building and site quadrant, and by order of earliest start date shall be the Schedule of Values.
- B. Payment for Stored Materials (Procurement Activities):
 - 1. When the Contractor requests payment for stored materials (on-site or off-site), such materials shall be included in the schedule as procurement activities with a zero-day duration.
 - 2. Materials not identified as procurement activities will not be considered for payment as stored materials and will only be considered for payment when incorporated in the Work.

1.7 PROJECT SCHEDULE

- A. Contract Time: As established by the Agreement Between the Owner and Contractor and as amended by change order.
- B. Progress of the Work:
 - 1. Time is of the essence in the performance of this Contract.
 - 2. Schedule the Work in such a manner as to provide for timely completion.
 - 3. Begin schedule with the Notice to Proceed and conclude with the late-finish date of the critical path on the Contract Completion Date which shall be the date of Notice of Completion.
- C. Plan of the Work: The schedule shall reflect Contractor's actual plan for prosecution of the Work.
- D. DSA Oversight Process: In connection with the DSA Construction Oversight Process, which includes the use of inspection cards and review of changes to the DSA-approved construction documents, the Contractor must (a) include specific tasks in its baseline schedule to take into account these procedures since they are critical path issues; and (b) include a reasonable amount of float in the baseline schedule to accommodate the additional time required by these DSA procedures.
- E. Detail: Time scale network diagram in calendar days and prepare at level of detail and logic which will schedule as separate activities all salient features of the Work. At a minimum, include:
 - 1. Project mobilization.

2. Schedule preparation and updates.
 3. Submittal and shop drawing preparation.
 4. Review and DSA approval of deferred approvals.
 5. Review of submittals and shop drawings for critical materials and equipment.
 6. Procurement, fabrication, delivery, and installation of major equipment and critical materials.
 7. Testing and inspection.
 8. Significant activities of the work of each trade.
 - a. Separate plumbing, mechanical, and electrical into underground, rough-in, and finish activities.
 - b. Separate concrete work activities into footings, exterior walks, interior slabs, curbs/mowstrips.
 9. Separate the following systems from other power and lighting electrical activities:
 - a. Fire alarm system.
 - b. Data, telephone, intercom / clock, intrusion alarm, audio visual systems.
 10. Power shut-downs.
 11. All milestone dates.
 12. Testing of concrete floor slabs for moisture and pH.
 13. Remediation of concrete floor slabs due to unsatisfactory moisture or pH conditions.
 14. Final clean-up.
 15. Start-up and testing.
 16. Commissioning.
 17. Correction list work.
 18. Building flush out (100% outside air for 14 days).
 19. Demobilization.
 20. Closeout documentation.
- F. Activity / Event Constraints: Day / time constraints other than those required by the Contract Documents are not permitted.
- G. Leads and Lags: Lead or lags shall not be used when the creation of an activity will perform the same function (e.g., concrete cure time). Lag durations contained in the schedule shall not have a negative value. The use of any lead or lag will be explained in the Narrative Report.
- H. Provide for schedule, logic, and operating constraints of the Work as specified in Section 01 1100.

1.8 NETWORK DIAGRAM

- A. Format:
1. Precedence format time-scaled in calendar days.
 2. Read from right to left, in ascending order for each activity.
 3. Allow space for notations and revisions.
 4. 30" by 42" maximum sheet size. If multiple sheets are required, keep activities of a building or site quadrant on the same sheet.
 5. Include abbreviations legends, sheet numbers, revision numbers, codes, and date of run.
 6. Network diagram shall be printed in color to clearly identify planned work, completed work, and critical path activities.
- B. Organization:
1. Graphically illustrate order and interdependence of all activities and sequence of work; how start of a given activity depends on completion of preceding activities; and how completion of the activity may restrict or restrain start of following activities.
 2. Organize diagram by early start date and show a continuous flow from left to right with no logic (relationship lines) from right to left. With the exception of start project and end project milestone activities, no activities shall be open-ended; each activity shall have predecessor and successor ties.

3. Graphically group activities of separate stages and buildings, **do not use a random (or scattered) format.**
4. Keep groups of activities defining a building or site quadrant on the same sheet.

C. Critical Path:

1. Clearly indicate the critical path in a graphic manner (by color difference) on the network diagram.
2. **The Critical Path is the longest continuous path on the network diagram from start to finish of the Work.**

1.9 SCHEDULE ACTIVITIES

A. Schedule Activities:

1. 30 day maximum duration.
2. Limit activities to a single floor level.
3. Separate vertical activities from horizontal activities.
4. Separate site work into quadrants.
5. Separate on-site work from off-site work.
6. Separate off-site work into areas designated by street name.

B. Activity Information: Indicate the following information for each activity on network diagram:

1. Activity description.
2. Activity number.
3. Original duration in work days.
4. Actual duration in work days.
5. Early start date.
6. Early finish date.
7. Total float.
8. Status indicator (started or complete).
9. Responsibility code.

C. Work Breakdown Structure (WBS): Assign WBS codes to each activity including, but not limited to:

1. CSI section number corresponding to project manual table of contents.
2. Submittal.
3. Submittal review and approval.
4. Procurement.
5. Fabrication.
6. Delivery.
7. Construction.
8. Bulletin number; activities shall not belong to more than one bulletin.
9. Responsibility.
10. Work area.
11. Project phase.

D. Milestone Activities: Indicate date on the diagram for each of the following milestone activities:

1. Start project: Start schedule no earlier than the contract award date and the project duration shall start on the Notice to Proceed date. Include activities named "contract award" and "start project," both with zero duration and constrained start dates equal to the contract award and Notice to Proceed dates.
2. Interim phase start dates: Include as the first activity for each project phase, an activity named "start phase X" with a zero duration and an unconstrained start date equal to the contract phase start date. This unconstrained start date is not a waiver of a contractually required start date, but is left unconstrained to allow the schedule logic to calculate without hindrance.
3. Interim phase completion dates: Include as the last activity for each project phase, an activity named "end phase X" with a zero duration and an unconstrained late finish date equal to the contract phase

completion date. This unconstrained completion date is not a waiver of a contractually required completion date, but is left unconstrained to allow the schedule logic to calculate without hindrance.

4. Early completion: If the Contractor's schedule shows completion of the project prior to the Contract Completion Date, the Contractor shall include an activity named "contractor early completion" with a zero duration and an unconstrained date representing the Contractor's early completion date.
5. End project: Include as the last activity an activity named "end project" with zero duration and a constrained late finish date equal to the Contract Completion Date. Calculation on project updates shall be such that if the late finish of the last activity falls after the Contract Completion Date, then the float calculation shall reflect a negative float on the critical path.

1.10 MATHEMATICAL ANALYSIS:

- A. Tabulate each activity using calendar dates, and identify for each activity:
 1. Preceding and succeeding activity numbers.
 2. Activity description.
 3. Estimated duration of activity.
 4. Earliest start date.
 5. Latest start date.
 6. Earliest finish date.
 7. Latest finish date.
 8. Actual start date.
 9. Actual finish date.
 10. Percentage of activity completed.
 11. Responsibility.
 12. Original duration.
 13. Remaining duration.
 14. Total float.
 15. Constraints.
 16. WBS codes.
- B. Analysis Program:
 1. Shall be capable of compiling completion status of completed and partially completed procurement and construction activities, and of accepting revised completion dates, and recomputation of all dates and float.
 2. Do not automatically update start and finish dates by default mechanisms in the scheduling software. Actual start and finish dates shall be based on the actual progress of the Work.
- C. Activity Reports: Generate activity reports as required by this Section based on mathematical analysis of the project schedule.

1.11 REQUIRED SCHEDULE REPORTS

- A. Provide the following reports with each schedule submittal:
 1. Activity report: List of all activities sorted by building and site quadrant, and by order of earliest start date. Use actual start date for completed activities.
 2. Logic report: List of preceding and succeeding activities for every activity in ascending order by activity number. Use actual start and finish dates for started or completed activities.
 3. Float report: List of all activities sorted in ascending order of total float. List activities with the same amount of float in ascending order of early start date.
 4. Critical path report: Listing of activities on critical path in order of early start.
 5. Schedule change report: Identify all changes made to schedule since the previous monthly update including:

- a. Changes in logic, relations, and lag / leads.
- b. Changes in duration.
- c. Activity additions / deletions.
- d. Actual start/finish dates.
- e. Changes in completion status of activities by percentage of completion.
- f. Changes in critical status.

1.12 BAR CHART

- A. Bar chart submittals shall graphically indicate schedule activities in a time-scaled bar chart format. Bar charts shall include the following information for each activity:
 - 1. Description.
 - 2. Number.
 - 3. Duration.
 - 4. Early and late start dates.
 - 5. Early and late finish dates.
 - 6. Total float.
 - 7. Status indicator (started or complete).

1.13 TWO-WEEK ROLLING SCHEDULES

- A. On a weekly basis, review with the Owner and Architect the planned schedule of each active trade for the following two weeks.
 - 1. Two-week rolling schedule shall be part of the CPM schedule.
 - 2. Identify critical path activities.
 - 3. Provide bar chart type format on 8-1/2" by 11" sheets.

1.14 PROJECT CONTROL REPORTS

- A. Prepare, as basis for each application for payment, and as method of reporting pertinent project information, project control reports for the Owner's and Architect's information including:
 - 1. Current Schedule of Values: The cost-loaded schedule of values report, sorted by building and site quadrant, and then by order of earliest start date shall be the Schedule of Values.
 - 2. Updated Network Diagram, to graphically depict current status of Work, including change orders and time extensions.
 - 3. Updated bar chart.
 - 4. Updated activity reports for all reports required by Article 1.11.
 - 5. Narrative Report describing:
 - a. Changes in activities, original durations, logic interdependencies, milestones, planned sequence, and critical path.
 - b. Pending items and status thereof, including permits, change orders and time extensions.
 - c. Status of current Contract Completion Date and interim milestones.
 - d. Description of current and future schedule problem areas.
 - e. Current and anticipate delays (describe cause and corrective actions).

1.15 CONTRACT MODIFICATIONS

- A. When a contract modification is required, submit proposed schedule revisions reflecting the proposed change impact.
 - 1. Submit three copies of the float report, schedule change report and a time impact analysis, with the cost proposal.
 - 2. Only approved contract modifications will be added into the subsequent monthly updates.

3. Changes shall be added to the schedule by adding new activities and relationships.

- B. Time Impact Analysis: Time impact analysis shall be provided as support of a time extension, claim or request for equitable adjustment by the Contractor.
 1. Submit a time impact analysis illustrating the influence of each change or delay on the Contract Completion Date or milestones. The current monthly updated schedule accepted by the Architect shall be used to display the impacts of the change. No other non-approved modifications shall be incorporated into the schedule being used to justify the change impact.
 2. Each time impact analysis shall include a fragmentary network demonstrating how the Contractor proposes to incorporate the impact into the schedule. The fragmentary network shall identify the predecessors to the new activities and demonstrate the impact to successor activities.
 3. Include a narrative report describing the effects of new activities and relationships to interim and Contract Completion Dates.
 4. Include written certification signed by the major subcontractors that they have reviewed and accepted proposed schedule revisions.
- C. Determination of contract time extension shall be based on the schedule updates in effect for the time period in question, and other factual information. Actual delays found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be cause for time extension to the Contract Completion Date.

1.16 TIME EXTENSIONS

- A. Extension of time for performance will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total float or slack along the network paths involved at the time the change was approved.
- B. The Contractor acknowledges and agrees that delays in activities which, according to the schedule, does not in fact actually affect any milestone completion or the Contract Completion Date shown on the schedule at the time of delay, will not be a basis for a time extension.

1.17 SCHEDULE RECOVERY

- A. The Contractor shall take action to put the Project back on schedule, at no additional cost to the Owner, when it becomes apparent from the current schedule that, through no fault of the Owner:
 1. Any non-critical activity is delayed beyond its total float time and changes the critical path.
 2. Any milestone required by the Contract Documents may not be met.
 3. Any schedule update reveals that the Work will complete later than the Contract Completion Date.
- B. Action by the Contractor to put the Work back on schedule may include any or all of the following:
 1. Increase construction manpower;
 2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination of the foregoing;
 3. Reschedule activities to achieve maximum practical concurrency of activities;
 4. Expedite delivery of materials.
- C. Schedule Revisions:

1. Notify the Architect of the specific measures taken or planned to increase the rate of progress together with an estimate of when scheduled progress will be regained.
2. Submit revised CPM network and activity reports showing implementation of planned recovery measures and schedule revisions.

1.18 FLOAT

- A. Definition of Float:
 1. Free Float: The length of time the start of any activity can be delayed without delaying the start of a successor activity.
 2. Total Float: The length of time along a given network path that the actual start and finish of activity(s) can be delayed without delaying the Contract Completion Date.
 3. Project Float: The length of time between the Contractor's early completion date and the Contract Completion Date.
- B. Ownership of Float: Schedule float available within the construction schedule at any time is not for the exclusive use or benefit of either the Owner or the Contractor but is a jointly owned, expiring project resource available to both parties as needed to meet contract milestones and the Contract Completion Date.
- C. The Owner may require various changes in the Work. Pursuant to the float sharing provisions of this Section, no time extensions will be granted nor delay damages paid unless a delay occurs that impacts activities currently on the critical path, consumes all available float, and extends completion of the Work beyond the current Contract Completion Date.
- D. Non-Sequestering of Float:
 1. The use of float suppression techniques such as preferential sequencing or logic (arranging critical path activities more susceptible to Owner caused delay), special lead/lag logic restraints, zero total or free float constraints, extended activity times, or imposing constraint dates other than as required by the Contract are prohibited,
 2. The use of resource leveling (or similar software features) used for the purpose of artificially adjusting activity durations to consume float and influence the critical path is prohibited.
 3. Sequestering of float shall be cause for rejection of the Contractor's schedule submittal.
- E. Negative Float: Negative float will not be the basis for requesting time extensions. Scheduled completion date(s) that extend beyond the Contract Completion Date may be used in computations for assessment of liquidated damages withholdings.

1.19 VOLUNTARY ACCELERATION

- A. Early completion or voluntary acceleration of the schedule by the Contractor is acceptable provided that:
 1. The Owner is agreeable to such acceleration and so notifies the Contractor in writing;
 2. At the time of submission of the Preliminary Network Analysis, such acceleration is clearly indicated and the Owner is notified of actions on the Owner's part necessary to accommodate the change or acceleration;
 3. The Owner is compensated for any inconvenience or expense associated with such acceleration.
 4. The time between early completion date and the Contract Completion date is identified as a schedule activity as "contractor early completion" and shall be considered as project float.

- B. The Owner may require various changes in the Work. Pursuant to the voluntary acceleration provisions of this Section, no time extensions will be granted nor delay damages paid until a delay occurs that impacts activities currently on the critical path, consumes all available float, and extends completion of the Work beyond the current Contract Completion Date.

END OF SECTION 01 3220

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section.
 - 1. **The section includes requirements for building systems described as Deferred Approval Items on the drawings or in the specifications.**
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Other requirements for submittals may be described in pertinent Sections of these Specifications.
 - 3. Section 01 3560: High Performance Criteria Summary.
- C. Work not Included:
 - 1. Submittals not required by the Contract Documents will not be reviewed by the Architect.
 - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Architect unless specifically called for within the Contract Documents.

1.2 SUBMITTALS

- A. Make submittals of Shop Drawings, Samples, substitution requests, and other items in accordance with the provisions of this Section.
- B. Substitutions shall comply with the procedures for substitutions specified in Section 01 2500.
- C. High Performance Criteria: Submit in accordance with Section 01 3560 - High Performance Criteria Summary under Submittals.

1.3 QUALITY ASSURANCE

- A. Coordination of Submittals:
 - 1. Prior to each submittal to the Architect, the **General Contractor shall** carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.
- B. Accuracy of Submittals:
 - 1. By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements, and field construction criteria relate thereto, or will so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

2. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review or approval of Shop Drawings, Product Data, Samples, or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal requesting a substitution and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals by the Architect's review thereof.

1.4 USE OF ARCHITECT'S CAD DRAWINGS

- A. General:
 1. Electronic CAD files of the Contract Drawings may be provided for Contractor's convenience and use in preparing submittals, subject to the requirements of this Section.
 2. All requests by subcontractors for CAD drawings shall be transmitted through the Contractor and CAD files released by the Architect shall only be released to the Contractor.
- B. Requirements for Release of Architect's Electronic CAD Files:
 1. Release of CAD files is subject to Contractor's acceptance of Architect's "Waiver of Liability for Electronic CAD Files", a copy of which is attached at the end of this section.
 2. Receipt of executed liability waiver agreement is a condition precedent to releasing architectural CAD files.
- C. Requirements for Release of Civil Engineer's Electronic CAD Files:
 1. Cost of Civil Engineer's preparation of civil CAD files shall be borne by the Contractor and is in addition to the Contract Sum.
 2. Release of civil CAD files is subject to Contractor's acceptance of Civil Engineer's "Waiver of Liability for Electronic CAD Files". Contact the Civil Engineer to obtain the waiver form.
 3. Receipt of executed liability waiver agreement is a condition precedent to releasing civil CAD files.
- D. The Contractor assumes all liability and risk for use of electronic CAD files. Architectural / engineering drawings are essentially diagrammatic in terms of graphics and are not intended to provide scalable dimensional accuracy. Electronic CAD files are an incomplete representation of the Contract Documents which may not include addendum information or hand drawn additions or modifications. In the event of a conflict between the signed and approved Construction Documents and the electronic CAD files, the signed and approved Construction Documents shall govern.
- E. The transfer of CAD files to the Contractor is for the Contractor's convenience only, and does not in any way release the Contractor from the requirement to produce its own shop drawings by the normal method of preparing plans and details by drafting. Delays in the release of CAD files shall not relieve the Contractor of preparing submittals in a timely fashion and such delays shall not provide a basis for claims of delay and damages.

PART 2 - PRODUCTS

2.1 TYPES OF SUBMITTALS

- A. Shop Drawings:
 1. Scale and Measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
 2. Types of Prints Required: Submit Shop Drawings in the form of blackline prints of each sheet.
 3. Review comments of the Architect will be shown on the sepia transparency when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

- B. Manufacturer's Literature:
 - 1. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show and highlight the portion of the contents being submitted for review.
 - 2. Submit seven copies of each item.
- C. Samples:
 - 1. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.
 - 2. Provide three samples; one to be retained by the Architect, one to be returned to the Contractor, and one to be retained by the Inspector of Record.
- D. Colors and Patterns: Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

2.2 ELECTRONIC SUBMITTALS

- A. Electronic submittal are acceptable in lieu of hard copies providing the following requirements are met:
 - 1. Submittal shall be in PDF format, with book marks for table of contents and each tab, and sub-bookmarks for each item.
 - 2. All text shall be searchable, except text that is part of a graphic.
 - 3. Submittal shall include all items required by the Contract Documents, except a binder is not required.
 - 4. Electronic submittals shall be processed through normal channels. Do not submit directly to the Architect's consultants.
 - 5. Contractor shall provide Owner and Inspector with hard copies of the final Submittal. Coordinate exact number required with the Architect.
 - 6. One hard copy of any submittal may be required upon the Architect's request for use during review.
- B. Electronic submittals which do not comply with the above requirements will be rejected.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
 - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On resubmittals, cite the original submittal number for reference.
- B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - 1. Partial submittals may be rejected as not complying with the provisions of the Contract.
 - 2. The Contractor may be held liable for delays so occasioned.

3.3 TIMING AND REVIEW OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- B. In scheduling, allow at least 30 calendar days for review by the Architect following the Architect's receipt of the submittal, unless mutually agreed otherwise in writing by the Architect and the Contractor.
- C. Resubmittal Costs: The Architect and the Architect's consultants will review the original submittal only as part of their services to the Owner. If the time expended in resubmittal reviews exceeds normal resubmittal review time, the costs of resubmittal reviews by the Architect or the Architect's consultants will be paid to the Architect by the Owner as additional services on an hourly basis.
 - 1. The Architect will bill the Owner for the additional services required by the Architect and/or the Architect's consultants for such resubmittal reviews, time expended, and reimbursable expenses incurred, and the Owner shall be reimbursed by deducting the same amount from the Contractor's subsequent Application for Payment.

3.4 REQUIRED SUBMITTALS

- A. Provide Submittals as required by each Specification Section.

END OF SECTION 01 3300

WAIVER OF LIABILITY FOR ELECTRONIC CAD FILES

Electronic CAD files for [Project Name and Location], have been requested by CONTRACTOR. These files are being provided, subject to the following terms and conditions, pursuant to the acceptance and execution of this agreement. For the purposes of this agreement the term ARCHITECT shall mean the Architect and all of its Consultants.

Electronic files provided are compatible with AutoCAD. ARCHITECT makes no representation as to the compatibility of these files with CONTRACTOR'S hardware or software. Due to the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, ARCHITECT has the right to remove all indicia of ownership and or all involvement from electronic display.

Data contained on these electronic files are part of ARCHITECT'S instruments of service which are copyrighted and proprietary in nature and shall not be used by CONTRACTOR or any other entity receiving this data through or from CONTRACTOR for any purpose other than as a convenience in the preparation of shop drawings and field engineering for the referenced project. The CONTRACTOR agrees that the use of digital information provided by the ARCHITECT for any purpose or activity that constitutes the practice of Land Surveying and/or Civil Engineering, as defined by the California Business and Professions Code, will be by or under the direct supervision of a Land Surveyor or Civil Engineer licensed to practice in the State of California. Such practices include, but are not limited to creating a GPS model for earthwork. Any use or reuse by CONTRACTOR or by others will be at CONTRACTOR'S sole risk and without liability or legal exposure to ARCHITECT.

The transfer of electronic files to CONTRACTOR is for the CONTRACTOR'S convenience only, and does not in any way relieve CONTRACTOR from the requirement to produce shop drawings by the normal method of preparing plans and details by drafting. Delays in release of CAD files shall not relieve CONTRACTOR of responsibility for preparing shop drawings or providing field engineering in a timely fashion and such delays shall not provide a basis for claims of delay and damages.

The CONTRACTOR agrees to reciprocate with the ARCHITECT, upon request, relative to drawing files produced by it or its subcontractors for the subject project, under the same conditions as we have received digital files from the ARCHITECT.

The CONTRACTOR assumes all liability and risk for use of architectural / engineering electronic CAD files and agrees these electronic files are not construction documents and that differences may exist between these electronic files and corresponding hard copy construction documents. Electronic CAD files are an incomplete representation of the Contract Documents which may not include addendum information or hand drawn additions or modifications. In the event a conflict arises, signed and sealed hard copy construction documents will govern. By using these electronic files the CONTRACTOR is in no way relieved of its duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other CONTRACTORS on the project.

CONTRACTOR recognizes the instability of electronic storage media and that the transfer of electronic data may not be total or accurate, because of equipment and/or software incompatibility, or changes that may be made by CONTRACTOR and/or other entities receiving this data through or from CONTRACTOR during the editing of the information provided.

CONTRACTOR agrees to make no claim, and hereby waives, to the fullest extent permitted by law, any claim or cause of action against ARCHITECT, ARCHITECT'S officers, directors, employees, agents, or consultants that may arise out of or in connection with CONTRACTOR'S use of the electronic files. CONTRACTOR agrees to the fullest extent permitted by law, to indemnify and hold ARCHITECT and OWNER harmless from any damage, liability, or cost, including reasonable attorneys' fees and costs of defense, arising from any reuse or modification of the plans and specifications by CONTRACTOR or any person or entity which acquires or obtains the plans and specifications. In no event shall ARCHITECT or OWNER be liable for any loss of profit or any damages. It is understood that CONTRACTOR shall be solely responsible for verification of conditions and coordination of their work into the work product.

Under no circumstances shall delivery of the electronic files to CONTRACTOR be deemed a sale by ARCHITECT, and ARCHITECT makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.

CONTRACTOR Name

Printed Name and Title

CONTRACTOR Address

Authorized Signature

Date

List drawing sheets requested below or attach separate list:

SECTION 01 4130 - OFFSITE DEVELOPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all labor, materials and equipment necessary to provide, construct and install off-site development and improvements
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Standards: Comply with the Standard Drawings and Specifications of the Authority Having Jurisdiction.
- B. All work shall comply with the rules and regulations of the Division of Industrial Safety and all other local, state and federal agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations and codes.
- C. Full compensation for all costs involved in worker protection from caving ground in excavating shall be included in the lump sum price bid for the work under this contract.

1.3 SUBMITTALS

- A. Comply with all requirements of the Authority Having Jurisdiction regarding submittals.
- B. Submit all test reports for compaction.

1.4 SCOPE OF WORK

- A. Street Improvements: Construct street improvements as indicated on the Drawings, as specified, and in conformance with the Standard Plans and Specifications of the Authority Having Jurisdiction.
- B. Sewer and Water Facilities: Construct sewer and water facilities as indicated on the Drawings, as specified, and in conformance with the Standard Plans and Specifications of the Authority Having Jurisdiction.
- C. Storm Drain Facilities: Construct storm drain facilities as indicated on the Drawings, as specified, and in conformance with the Standard Plans and Specifications of the Authority Having Jurisdiction.
- D. Power and Telephone Utilities: Coordinate with and schedule the work of utility providers regarding their work of relocating and/or undergrounding their facilities within the street right of ways adjacent to the school site.
 - 1. Contractor shall establish and maintain communication with the utility companies regarding his schedule and that of the utility companies.
 - 2. Prepare street and sidewalk subgrade so that the utility providers can trench for their underground facilities.
 - 3. Establish surveyed street curb grades and alignments for the utility providers so that they may accurately locate their facilities; and the possible requirement to schedule his work around existing utility poles until such time as the utility companies complete their relocation or installations.
- E. **Multiple move-ins of equipment and personnel may be required and will not be considered additional cost.**

1.5 EXISTING CONDITIONS

- A. Contractor shall be held to have visited the site prior to submitting proposal to determine existing conditions, nature of materials to be encountered and to evaluate other information concerning or affecting the work to be performed under the contract.
- B. Before commencing excavation, the Contractor shall notify all utility authorities or utility companies having possible interest in the work of the Contractor's intention to excavate proximate to existing facilities and Contractor shall verify the location of any utilities within the work area.
- C. Engineer has made a diligent attempt to show on the Drawings all pertinent intersecting utilities which may affect the work. Utilities shown in profile view are shown at their most probable locations, based upon available as-built drawings and known construction custom. The Contractor shall exercise caution while performing excavation for this project and shall protect existing utilities from damage, inasmuch as their exact location is unknown until exposed by the excavation.
- D. Because of the close proximity of certain existing parallel or intersecting utilities and the depth of the proposed facilities, it may be necessary for the Contractor to provide special protection for the existing utility, and/or provide for its temporary and/or permanent relocation in order to construct the facilities shown on the Drawings. Bracing of power poles may be necessary. The Contractor shall coordinate said work and shall be responsible for complying with the requirements of the utility authority involved. Full compensation for all costs involved in such special protection and/or relocation, including all appurtenances and incidentals, shall be included in the amount bid, and no separate payment shall be made therefor.
- E. All existing utility mains and service lines shall be kept in constant service during the construction of this project. Hand excavating shall be employed where necessary to safely expose existing utilities.
- F. Full compensation for all costs involved in locating, verifying, protecting, exposing, relocating, reconstruction and otherwise providing for utilities shall be included in the amount bid for the various items of work and no separate payment shall be made therefor.

1.6 DUST AND TRAFFIC CONTROL

- A. Dust Control: The Contractor shall maintain dust control about the site of the work, including any haul roads to or from the site, by whatever means are necessary, such as watering, sweeping or oiling, so as to cause the least possible dust nuisance to the public. Any dust control measure ordered by the Architect shall be promptly and immediately carried out.
- B. Traffic Control:
 - 1. Traffic control measures shall be fully and completely carried out at all times to the satisfaction of the Authority Having Jurisdiction. If the Contractor fails to provide satisfactory traffic control the Owner may obtain services from other sources and deduct from the contract the cost thereof.
 - 2. Through traffic shall be provided for during non-working hours including, but not limited to, weekends, holidays and at night.
 - 3. The Contractor shall comply with all requirements of the Street Encroachment Permit.

1.7 PROTECTIVE MEASURES

- A. Furnish, place, and maintain all supports, shoring, and sheet piling which may be required for the sides of excavation or for protection of adjacent existing improvements. The adequacy of such systems is the sole responsibility of the Contractor.

- B. Maintain all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed.
- C. 48 hours prior to beginning construction, the Contractor shall notify the owners of all properties adjacent to the proposed construction. The Contractor shall also provide the property owners with an estimate of the length of time that their properties will be affected by his construction activities.

1.8 PERMITS

- A. The Contractor shall secure and pay for all permits required for work under this contract including, but not limited to, the Authority Having Jurisdiction's Encroachment Permit.
- B. All costs associated with obtaining permits as required by construction and as indicated herein shall be included in the price bid for the various items of work and no separate payment will be made therefor.
- C. The Contractor shall pay all inspection fees required by governmental agencies.

1.9 FINISH ELEVATIONS AND LINES

- A. Surveying for offsite improvements shall be provided by the Contractor.
- B. Carefully preserve all data and monuments and, if displaced or lost, immediately replace such monuments to the satisfaction of the Architect and at no additional cost to the Owner.

1.10 REPRESENTATION ON PLANS

- A. The basic topographic ground feature information shown on the Drawings was obtained by field survey. The Contractor shall carefully examine the site of work and shall satisfy himself as to the conditions to be encountered, any changes thereto which have occurred, and any condition or feature which needs additional investigation.

1.11 MONITORING OF CONSTRUCTION SITE

- A. Contractor shall monitor the construction site on a regular basis during non-working hours, including weekends and holidays to ensure that no situations arising, relating to the condition of the work site, which could pose a threat to public safety. In addition the contractor shall furnish to the Owner, to the Authority Having Jurisdiction prior to the issuance of the "Notice to Proceed", a list of persons, together with their addresses and home telephone numbers, who are authorized to act on behalf of the Contractor in an emergency arising out of conditions at the work site after normal working hours.
- B. Safe pedestrian crossings shall be maintained at all existing crosswalks and intersections.
- C. The Contractor shall secure the site of work at all times. Children shall not be allowed in or along the excavation, on spoil piles or at other undesirable locations within the work. The Contractor shall provide suitable traffic and pedestrian warning devices and signs necessary at or near the work as required by safety considerations and/or jurisdictional authorities. Convenient pedestrian detours and/or flagmen and/or safe temporary bridges over excavations, complete with adequate safety rails, shall be provided as necessary.

1.12 COMPACTION AND COMPACTION TESTS

- A. The Contractor shall be fully responsible for timely compaction and suitability of material for compaction. Where necessary, wet and pumping material shall be removed from the trench or excavation by the Contractor and replaced with suitable approved material as necessary to complete operations within the times allowed.

- B. Compaction requirements for all excavations within public streets shall be in accordance with the Encroachment Permit and in accordance with the Standard Specifications of the Authority Having Jurisdiction.
- C. Initial compaction testing shall be provided by the Owner. The Contractor shall file adequate notice to the engineer when he desires compaction testing. All required compaction retesting of backfill because of failure to pass the initial compaction test shall be at the expense of the Contractor.
- D. Full compensation for all costs involved in meeting and satisfying the above requirements shall be included in the amount bid for the various items of work and no separate payment will be made therefor.

1.13 FEES

- A. Fees for the offsite street improvements are clarified as follows:
 - 1. Fees to be paid by Contractor and to be included as part of his bid:
 - a. Inspection Fees
 - b. Encroachment Permit Fees
 - 2. Fees to be paid by Owner:
 - a. Deed Check Fee
 - b. Plan Review Fee
- B. Contractor shall also be responsible to secure and pay for the Encroachment Permit, as well as all the required bonds and insurance. All references made by the "General Notes for Street Construction" to the "Developer" shall be interpreted to mean "Contractor", except "The Owner shall pay for all initial compaction tests". Contractor shall pay for all required retests.

1.14 RECORD DRAWINGS

- A. Comply with all requirements of Section 01 7840 of these Specifications.
- B. These records drawings required for the storm drainage facilities shall contain all of the information and shall fulfill all of the requirements outlined in Section 01 7840 of these Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials incorporated in street, water, sewer and storm drain facilities construction shall conform with the Standard Plans and Specifications of the Authority Having Jurisdiction.

PART 3 - EXECUTION

3.1 EXECUTION

- A. Construction of water and street facilities shall be performed in accordance with the Standard Plans and Specifications of the Authority Having Jurisdiction.
- B. Contractor shall be responsible to protect all other existing and proposed utilities and improvements affected by his work.
- C. Contractor shall cooperate with all other contractors on the job to insure that his activities do not delay or hinder the construction activities of others.

- D. All excess earth from trenching and offsite grading may be deposited within the boundaries of the Elementary School development at a location specified by the Architect for incorporation in site grading activities. All such earth shall be free of organic material, large rocks, hardpan, asphaltic paving and other deleterious materials.
- E. The Contractor shall be aware that the work of this contract is a portion of the total work required for the construction of the Project. The Contractor shall coordinate his work and his schedule fully with other forces performing work relating to the construction of the above stated site development. Included in these "other forces" are utility providers, the forces constructing on-site improvements for the above stated site development and any other forces performing work within the project area which requires coordination with the work of this contract.
- F. The Contractor shall coordinate his efforts with other forces performing on-site work such that said forces are provided with adequate access to the site.
- G. The Contractor shall notify the Authority Having Jurisdiction forty-eight hours prior to beginning construction.

END OF SECTION 01 4130

SECTION 01 4320 - DSA CONSTRUCTION OVERSIGHT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes the oversight provided by the Division of the State Owner (DSA) for projects under its jurisdiction.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 1. Section 01 2600: Contract modification procedures and forms.
 - 2. Section 01 4520: Testing and inspection services.

1.2 DEFINITIONS

- A. The following definitions apply to terms used in this Section:
 - 1. DSA Approved Construction Documents: Portions of plans, specifications, addenda, deferred submittals, revisions, and construction change documents (CCDs) duly approved by DSA that contain information related to, and affecting Structural Safety, Fire/Life Safety, and Accessibility. While all portions of the construction documents may contain a DSA identification stamp, this stamp is not the approval. The DSA approval is indicated by a letter to the District. This letter clarifies that the approval is limited to Structural Safety, Fire/Life Safety and Accessibility.

1.3 DSA PROCEDURES, INTERPRETATION OF REGULATIONS, AND FORMS

- A. The requirements of the following DSA procedural documents shall apply to this Section:
 - 1. DSA Procedure PR 13-01: Construction Oversight Process.
- B. The requirements of the following DSA Interpretation of Regulations documents shall apply to this Section:
 - 1. DSA IR A-8: Project Inspector and Assistant Inspector Duties and Performance.
 - 2. DSA IR A-13: Stop Work and Order to Comply.
- C. The Project Inspector, assistant inspectors, Laboratory of Record, Architect, other design professionals, and the Owner shall communicate project information and make certain reports pertaining to the status of construction compliance using the following DSA forms:
 - 1. DSA 1 Application for Approval of Plans and Specifications
 - 2. DSA 5 Project/Special Inspector Qualification Record
 - 3. DSA 6-AE Architect/Engineer Verified Report
 - 4. DSA 6-C Contractor Verified Report
 - 5. DSA 6-PI Project Inspector Verified Report
 - 6. DSA 102-IC Construction Start Notice/Inspection Card Request
 - 7. DSA 103 Statement of Structural Tests and Special Inspections
 - 8. DSA 130 Certificate of Compliance - Approved Bleacher/Grandstand Fabricator
 - 9. DSA 140 Application for Approval of Construction Change Document.
 - 10. DSA 151 Project Inspector Notifications
 - 11. DSA 152 Project Inspector Card
 - 12. DSA 154 Notice of Deviations/Resolution of Deviations
 - 13. DSA 155 Project Inspector Semi-Monthly Report
 - 14. DSA 156 Commencement/Completion of Work Notification
 - 15. DSA 291 Laboratory of Record Verified Report

16. DSA 292 Special Inspectors Employed Directly by the District Verified Report
17. DSA 293 Geotechnical Verified Report

1.4 QUALITY ASSURANCE

- A. Project Inspector: The Owner shall employ a DSA approved Project Inspector in accordance with the requirements of the California Code of Regulations, Title 24. The Inspector's duties are specifically defined in Title 24, Part 1, Section 4-342.
 1. The work of construction in all stages of progress shall be subject to the personal continuous inspection of the Inspector.
 2. The Inspector shall have free access to any or all parts of the work at any time.
 3. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep the Inspector fully informed respecting the progress and manner of the work and character of the materials.
 4. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.
- B. DSA Construction Oversight: California Code of Regulations (CCR), Title 24, Part 1, Chapter 4, Article 1 (Sections 4-201 through 4-222) and Group 1, Articles 5 and 6 (Sections 4-330 through 4-344) provide regulations governing the construction process for projects under the jurisdiction of DSA.
 1. Observation of Construction by DSA: The DSA District Engineer conducts occasional site walks to make observations as necessary to ascertain that inspections have been completed diligently. During the site visit, the DSA District Engineer may provide guidance to the Project Inspector, as needed, to ensure enforcement of construction documents.
 2. DSA Field Trip Notes: At the conclusion of the site visit, the DSA Field Engineer issues a Field Trip Note (form DSA 135 or comparable) to the Project Inspector, who shall distribute the field trip note to the school Owner and the responsible design professional.
 - a. The field trip note indicates any findings by the Field Engineer that require action by the Project Inspector and/or the Architect and other responsible design professionals to ensure project compliance with Field Act requirements.
 - b. The field trip note may include informational comments, including construction status and guidance given to the Project Inspector.
 - c. The field trip note becomes a part of the DSA project records.
- C. Testing and Special Inspection: Testing required for the project is specified in Section 01 4520 - Testing and Special Inspection Services.
 1. Form DSA-103 is attached to Section 01 4520.
 2. Testing may be required by other Sections that is not specifically noted on Form DSA -103.

1.5 PROJECT INSPECTOR

- A. General: The Project Inspector shall perform specific duties in accordance with Title 24, Part 1 (Sections 4-333 and 4-342).
 1. The Project Inspector acts under the direction of the Architect and is subject to supervision by DSA.
 2. The Project Inspector does not have the authority, under Title 24, to direct the Contractor in the execution of the work, nor to stop the work of construction.
- B. Code Prescribed Duties:
 1. Maintain Job File: The Inspector shall maintain Project records.
 2. Comprehend of the Construction Documents: The Project Inspector shall study and fully comprehend the requirements of the construction documents in order to provide competent inspection of the work. The Inspector shall:
 - a. Consult Architect and other responsible design professionals to resolve uncertainties in the Inspector's comprehension of the plans and specifications prior to construction of that portion of

- the work.
- b. Review requirements for each phase of the construction with the Contractor prior to commencing that phase of the work.
- c. Readily identify non-compliant work as the construction progresses to facilitate prompt corrective action.
- d. Verify code-compliant implementation of the materials testing and special inspection program.
- e. Be involved in the Contractor's interpretation of the construction documents in accordance with Title 24, Part 1, Section 4-343.
- 3. Continuous Inspection of the Work:
 - a. Provide complete and timely inspection of every part of the work.
 - b. Provide prompt verbal notification to the Contractor of any deviation so that the deviation can be immediately corrected.
 - c. The Project Inspector shall have personal knowledge of the construction, obtained through the Project Inspector's own physical inspection of the work in all stages of its progress.
- 4. Maintain Records of Inspections: The Inspector shall maintain detailed records of all inspections.
- 5. Communications Required of the Inspector: The Inspector shall during the course of construction, provide specific code-prescribed notices and reports to the Architect, other responsible design professionals, DSA, the Owner, and the Contractor.
- 6. Inspector's Monitoring of the Materials Testing and Special Inspection Program: The Inspector is responsible, under the direction of the Architect, for monitoring the work of the laboratory of record (LOR) any Special Inspectors hired directly by the Owner to ensure that all materials testing and special inspections required for the project are satisfactorily completed in accordance with the DSA approved documents. The Project Inspector shall monitor the following aspects of the structural testing and special inspection program:
 - a. When DSA approval for special inspectors is required for Owner-employed special inspectors, the Project Inspector shall identify and report any special inspectors on the job site that are not DSA approved.
 - b. The Project Inspector shall verify that the Laboratory of Record (LOR) is included on the List of DSA Accepted Testing Laboratories on the DSA website.
 - c. The Project Inspector shall verify that the LOR and special inspectors have received sufficient advance notification to perform the required material sampling or special inspection.
 - d. The Project Inspector is responsible for verifying that all required material sampling and special inspections have been performed. The Project Inspector is also responsible to observe any special Inspector's on-site presence, performance of duties, the special inspector's documentation of complying and non-complying work, and issuance of deviation notices.
 - e. The Project Inspector shall report on DSA 155 the status and resolution of deviations reported by any LOR or special inspector.
- 7. Monitoring of Assistant Inspectors: The Project Inspector shall provide technical guidance to assistant Inspectors and shall verify the assistant inspectors' comprehension of the construction documents.
 - a. The Project Inspector shall also monitor the assistant Inspectors' performance, verifying that the assistant inspectors are properly checking the construction, recording inspections, and performing other assigned duties.
 - b. The Project Inspector shall ensure that any assistant inspector is performing the duties indicated on the assistant Inspector's approved form DSA 5-AI.
 - c. The Project Inspector shall provide continuous on-site supervision of all assistant Inspectors.
- C. Prohibited Duties: The Project Inspector is prohibited from performing functions associated with actual construction work such as:
 - 1. Performing construction work.
 - 2. Ordering or purchasing materials.
 - 3. Directing the work of the Contractor, Sub-Contractors, volunteer labor, or any entity performing construction work.
 - 4. Coordinating or scheduling the construction work.

5. Performing "quality control" of construction.
 - a. Quality control is the responsibility of the Contractor.
 - b. Quality assurance is the responsibility of the Project Inspector.
- D. Ancillary Duties: The Project Inspector may perform duties for the Owner that are not code-prescribed as long as such duties do not interfere with inspection duties.
 1. It is the Inspector's responsibility to report all ancillary duties to DSA, the Architect, and the structural engineer.
 2. The Inspector shall also report unforeseen time demands that are impacting, or will impact, his or her ability to perform code-prescribed duties.
 3. DSA may approve a Project Inspector when (in the opinion of DSA) these ancillary duties would not create a conflict of interest. DSA may withhold approval of a Project Inspector or withdraw approval at any time if the appearance of a conflict of interest arises.

1.6 DSA CONSTRUCTION OVERSIGHT PROCESS

- A. Project Inspection Card (Form DSA 152): DSA will issue Project Inspection Cards for each project.
 1. The number of inspection cards issued varies by project types. In general, one inspection card is required for each separate building and one for the site work, which includes non-building site structures.
 2. The project inspection cards are issued electronically by upload to DSA Box.
- B. Use of Project Inspection Card:
 1. The Project Inspection Card is considered to be an interim verified report by the project inspector.
 2. The Project Inspector signs off the applicable blocks and sections on the form as the work progresses. When signing off the blocks and sections of the form, the Project Inspector is verifying that:
 - a. Identified areas are determined to be in compliance with the DSA approved construction documents,
 - b. Required testing and inspections are complete, and
 - c. Required documentation has been received by the Project Inspector.
- C. Project Posting of Forms DSA 152: The Project Inspector shall post the forms in his Job File and shall electronically upload the forms to DSA Box.
 1. The information in the forms shall always be current. Each time the form is updated, a new electronic posting is required such that the electronically posted form is always kept current.
 2. The Project Inspector shall:
 - a. Immediately, upon request, make the form available for review by any parties involved in the construction.
 - b. Include a current copy of the forms any time a Verified Report (form DSA 6-PI) is submitted.
 - c. Upon request, provide a current copy of the forms to DSA, the Owner, or the Architect.
- D. Duties of the Inspector of Record: The Inspector shall provide notifications to DSA, Inspector's Semi-monthly Reports, deviation notices, record of communications to the Architect and other responsible design professionals, report the following communications during the course of a construction project which include:
 - a. Notifications to DSA: Start of work, minimum 48 hours prior to completion of foundation trenches, minimum 48 hours prior to first concrete placement, and when work is suspended for more than one month.
 - b. Semi-monthly Reports: Make semi-monthly reports (on the 1st and 16th of every month) on the progress of construction, on the form DSA 155 and submitted to the Architect and structural engineer, with a copy sent to DSA and the Owner.
 - c. Deviation Notices: When the Inspector identifies deviations from the DSA approved plans and specifications, the Inspector shall verbally notify the Contractor. If the deviation is not immediately corrected, the Inspector shall promptly issue a written notice of deviation on form DSA 154 to the Contractor, with a copy sent to the Architect and DSA. The status and resolution of all deviations shall be

- documented on semi-monthly reports.
- d. Record of Communications to the Architect and other Responsible Design Professionals: All uncertainties in the Inspector's or Contractor's comprehension of the documents shall be reported in writing to the Architect and other responsible design professionals.
 - e. Reporting for Projects with Work Stoppage: This may be required in cases where DSA issues a Stop Work Order, Order to Comply or a request for Owner to stop work.
 - f. Verified Reports: Submit verified reports on form DSA 6-PI directly to DSA, with copies to the Architect, other responsible design professionals, and the Owner upon any of the following:
 - 1) Work on the project is suspended for a period of more than one-month.
 - 2) The services of the Inspector are terminated for any reason prior to completion of the project and such termination is not a result of work stoppage.
 - 3) DSA requests a verified report.
 - 4) At the time of occupancy of any building involved in a project prior to completion of the entire DSA approved scope of work.
 - 5) The entire project is substantially complete. DSA considers the project to be complete when the construction is sufficiently complete in accordance with the DSA approved construction documents so that the Owner can occupy or utilize the project for its intended use, as determined by the Owner and the Architect.
- D. Duties of the Laboratory of Record:
- 1. Meet with the project inspector, design professionals, and the Contractor as needed to mutually communicate and understand the testing and inspection program, and the methods of communication appropriate for the project.
 - 2. Obtain a copy of the DSA approved construction documents from the Architect prior to the commencement of construction.
 - 3. Obtain a copy of the DSA approved Statement of Structural Tests and Special Inspections (form DSA 103) from the Architect prior to the commencement of construction.
 - 4. Report all project related activities to the project inspector. The Project Inspector is responsible for monitoring the work of the Laboratory of Record and Special Inspectors to ensure the testing and special inspection program is satisfactorily completed.
 - 5. Provide material testing as identified in the DSA approved construction documents.
 - 6. Submit test reports to the project inspector on the day the tests were performed for any tests performed on-site.
 - 7. Submit material test reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the material tests were performed to DSA, the Architect, structural engineer, project inspector and the Owner.
 - 8. Immediately submit reports of material tests not conforming to the requirements of the DSA approved construction documents to DSA, the Architect, structural engineer, project inspector and the Owner.
 - 9. The Engineering Manager shall submit an interim Laboratory of Record Verified Report (form DSA 291) and the Geotechnical Engineer shall submit an interim Geotechnical Verified Report (form DSA 293) to DSA, the project inspector, Owner and the Architect upon any of the following events occurring:
 - a. Within 14 days of the completion of the material testing/special inspection program.
 - b. Work on the project is suspended for a period of more than one month.
 - c. The services of the Laboratory of Record are terminated for any reason prior to completion of the project.
 - d. DSA requests a verified report.
 - e. The Engineering Manager shall submit an interim verified report (form DSA 291) and the Geotechnical Engineer shall submit form DSA 293 to DSA and a copy to the Project Inspector for each of the applicable sections of the form DSA 152, prior to the Project Inspector signing off that section of the project inspection card, if that section required material testing.

- E. Duties of Special Inspectors Employed by the Laboratory of Record:
1. Meet with the Project Inspector, Architect, and the Contractor as needed to mutually communicate and understand the testing and inspection program, and the methods of communication appropriate for the project.
 2. Report all project related activities to the Project Inspector. The Project Inspector is responsible for monitoring the work of the Laboratory of Record and special inspectors to ensure the testing and special inspection program is satisfactorily completed.
 3. Perform work under the supervision of the Engineering Manager for the Laboratory of Record.
 4. Perform inspections in conformance with the DSA approved construction documents, applicable codes and code reference standards.
 5. Prepare detailed daily inspection reports outlining the work inspected and provide the Project Inspector a copy of the reports on the same day the inspections were performed.
 6. Immediately submit reports of materials or work not conforming to the requirements of the DSA approved construction documents to DSA, the Architect, structural engineer, Project Inspector and the Owner.
 7. Submit daily special inspection reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the special inspections were performed to DSA, the Architect, structural engineer, Project Inspector and the Owner.
 8. The Engineering Manager for the Laboratory of Record shall submit verified report form DSA 291 to DSA, the Project Inspector, the Owner and the Architect.
 9. The reports are required to be submitted upon any of the following events occurring:
 - a. Within 14 days of the completion of the special inspection work.
 - b. Work on the project is suspended for a period of more than one month.
 - c. The services of the special inspector are terminated for any reason prior to completion of the project.
 - d. DSA requests a verified report.
 - e. The Engineering Manager for the Laboratory of Record shall submit an interim verified report to DSA and a copy to the Project Inspector for each of the applicable sections of the form DSA 152, prior to the signing off that section of the project inspection card, if that section required special inspections.
- F. Duties of Special Inspectors Not Employed by the Laboratory of Record:
1. Meet with the Project Inspector, Laboratory of Record, the design professionals, and the Contractors as needed to mutually communicate and understand the testing and inspection program, and the methods of communication appropriate for the project.
 2. Report all project related activities to the Project Inspector. The Project Inspector is responsible for monitoring the work of the Laboratory of Record and special inspectors to ensure the testing and special inspection program is satisfactorily completed.
 3. Perform work under the direction of the Architect, as defined in Section 4-335(f)1.B of the 2022 California Administrative Code (Title 24, Part 1).
 4. Perform inspections in conformance with the DSA approved construction documents, applicable codes and code reference standards.
 5. Prepare detailed daily inspection reports outlining the work inspected and provide the Project Inspector a copy of the reports on the same day the inspections were performed.
 6. Immediately submit reports of materials or work not conforming to the requirements of the DSA approved construction documents to DSA, the Architect, structural engineer, Project Inspector and the Owner.
 7. Submit daily special inspection reports in a timely manner such that construction is not delayed and not to exceed 14 days from the date the special inspections were performed to submitted to DSA, the Architect, structural engineer, Project Inspector and the Owner.
 8. Submit Special Inspection Verified Report forms DSA 292 to DSA, the project inspector, the Owner and the Architect upon any of the following events occurring:
 - a. Within 14 days of the completion of the special inspection work.

- b. Work on the project is suspended for a period of more than one month.
 - c. The services of the special inspector are terminated for any reason prior to completion of the project.
 - d. DSA requests a verified report.
 - e. Submit an interim Special Inspection Verified Report (form DSA 292) to DSA and a copy to the Project Inspector for each of the applicable sections of the form DSA 152, prior to the Project Inspector signing off that section of the project inspection card, if that section required special inspections.
- G. Duties of the Architect:
- 1. Responsible to the Owner and to DSA to see that the completed work conforms in every material respect to the DSA approved construction documents.
 - 2. Ensure the Project Inspector is approved by DSA for the project by submitting form DSA 5 PI to and obtaining approval from DSA prior to the start of construction, and prior to requesting issuance of form DSA 152.
 - 3. Provide a copy of the DSA approved construction documents to the project inspector and Laboratory of Record prior to the commencement of construction.
 - 4. Provide a copy of the DSA approved Statement of Structural Tests and Special Inspections (form DSA 103) to the Project Inspector and Laboratory of Record prior to the commencement of construction.
 - 5. Provide general direction of the work of the Project Inspector.
 - 6. Issue specific instructions to the testing facility and the special inspectors prior to start of construction.
 - 7. Direct and monitor the work of special inspectors who are not provided by the Laboratory of Record, as defined in Section 4-335(f)1B of the 2022 California Administrative Code (Title 24, Part 1).
 - 8. Notify DSA as to the disposition of materials noted on laboratory testing, and/or special inspection reports as not conforming to the DSA approved construction documents.
 - 9. Respond to DSA Field Trip Notes (form DSA 135 or comparable) as necessary.
 - 10. Provide observation of the construction and maintain such personal contact with the project as is necessary to assure themselves of compliance, in every material respect, with the DSA approved construction documents.
 - 11. Submit Architect Verified Reports (form DSA 6-AE) to DSA and to the Project Inspector upon any of the following events occurring:
 - a. The project is substantially complete. DSA considers the project to be complete when the construction is sufficiently complete in accordance with the DSA approved construction documents so that the Owner can occupy or utilize the project.
 - b. Work on the project is suspended for a period of more than one month.
 - c. The services of the Architect or engineer are terminated for any reason prior to completion of the project.
 - d. DSA requests a verified report.
 - e. The Architect or engineer shall submit an interim Architect Verified Report (form DSA 6-AE) to DSA and a copy to the Project Inspector for each of the applicable sections of the form DSA 152 prior to the Project Inspector signing off that section of the project inspection card.
- H. Duties of the Other Responsible Design Professionals:
- 1. Responsible to the school board and to DSA to see that the completed work for which they are delegated responsibility conforms in every material respect to the DSA approved construction documents.
 - 2. Provide observation of the construction and maintain such personal contact with the project as is necessary to assure themselves of compliance, in every material respect, with the DSA approved construction documents.
 - 3. Submit an Architect/Engineer Verified Report (form DSA 6-AE) to the Architect, who in turn will submit to DSA and the project inspector, upon any of the following events occurring:
 - a. The project is substantially complete. DSA considers the project to be complete when the construction is sufficiently complete in accordance with the DSA approved construction documents so that the Owner can occupy or utilize the project.

- b. Work on the project is suspended for a period of more than one month.
 - c. The services of the Architect or engineer are terminated for any reason prior to completion of the project.
 - d. DSA requests a verified report.
 - e. The Architect shall submit to DSA and the Project Inspector an Interim Architect/Engineer Verified Report (form DSA 6-AE), signed by all Architects and engineers having delegated responsibility for each of the sections of the form DSA 152 applicable to the areas of delegated responsibility, prior to the Project Inspector signing that section off on the project inspection card.
- I. Duties of Contractor:
 - 1. The Contractor shall carefully study the DSA approved documents and shall plan a schedule of operations well ahead of time.
 - 2. If at any time it is discovered that work is being done which is not in accordance with the DSA approved construction documents, the Contractor shall correct the work immediately.
 - 3. Verify that DSA 152 forms were issued for the project prior to the commencement of construction.
 - 4. Meet with the Architect, the Laboratory of Record and the Project Inspector to mutually communicate and understand the testing and inspection program, and the methods of communication appropriate for the project.
 - 5. Notify the Project Inspector, in writing, of the commencement of construction of each and every aspect of the work at least 48 hours in advance by submitting form DSA 156, or other agreed upon written documents, to the Project Inspector.
 - 6. Notify the Project Inspector of the completion of construction of each and every aspect of the work by submitting form DSA 156 (or other agreed upon written documents) to the Project Inspector.
 - 7. Consider the relationship of the signed off blocks and sections of the form DSA 152 and the commencement of subsequent work.
 - a. Until the Project Inspector has signed off applicable blocks and sections of the form DSA 152, the Contractor may be prohibited from proceeding with subsequent construction activities that cover up the unapproved work.
 - b. Any subsequent construction activities, that cover up the unapproved work, will be subject to a "Stop Work Order" from DSA or the Owner, and are subject to removal and remediation if found to be in non-compliance with the DSA approved construction documents.
 - 8. Submit the final Contractor Verified Reports (form DSA 6-C) to DSA and the Project Inspector upon any of the following events occurring:
 - a. The project is substantially complete. DSA considers the project to be complete when the construction is sufficiently complete in accordance with the DSA approved construction documents so that the Owner can occupy or utilize the project.
 - b. Work on the project is suspended for a period of more than one month.
 - c. The services of the Contractor are terminated for any reason prior to the completion of the project.
 - d. DSA requests a verified report.
- J. Duties of the Owner:
 - 1. Provide for competent, adequate and continuous construction inspections and material testing for the project by employing an appropriate DSA certified approved Project Inspector and Laboratory of Record.
 - 2. Contractually provide for and ensure that the design team is fulfilling their code required duty to observe the construction by making periodic visits of reasonable frequency.
 - 3. Ensure that the Project Inspector is approved by DSA for the project by submitting form DSA 5 to and obtaining approval from DSA prior to the start of construction and prior to requesting issuance of project inspection cards (DSA 152 forms).
 - 4. Ensure the Laboratory of Record is LEA approved and employed prior to the start of construction and prior to requesting issuance of project inspection cards (DSA 152 forms).
 - 5. Ensure that the project inspection cards (DSA 152 forms) are issued prior to commencement of construction.
 - 6. Submit Statement of Final Actual Project Cost (form DSA 168) to DSA when the project is substantially

complete.

1.7 CONTRACTOR COOPERATION WITH PROJECT INSPECTOR AND DSA

- A. The Inspector and DSA shall have access to the Work at all times and at all locations where the Work or parts of the Work is in progress. The Contractor shall provide facilities for such access to enable the Inspector and DSA to perform their functions properly and safely.

END OF SECTION 01 4320

SECTION 01 4520 - TESTING AND SPECIAL INSPECTION SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes testing and inspection to be provided by the Owner and cooperation required from the Contractor with the Owner's selected testing agency and others responsible for testing and inspecting the Work. For detailed testing requirements, refer to the quality control requirements of the following sections:
 - 1. Section 01 4320: DSA Construction Oversight.
 - 2. Section 03 1510: Concrete expansion anchor testing.
 - 3. Section 03 3000: Concrete testing and inspection.
 - 4. Section 05 1200: Structural steel testing and inspection.
 - 5. Section 05 5000: Metal fabrications testing and inspection.
 - 6. Section 06 1730: Wood I-joist testing and inspection.
 - 7. Section 06 1800: Glued-laminated timber inspection.
 - 8. Section 09 0560: Testing of concrete floor slabs for moisture and pH.
 - 9. Section 31 2000: Soils inspection and testing, import soil toxic testing.
 - 10. Section 32 1210: Asphaltic concrete paving testing.
- B. Testing may be required per the Specification Sections noted above that is not specifically noted on Form DSA-103, Statement of Structural Tests and Special Inspections.
- C. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 1. Section 01 4320: DSA construction oversight.
- D. Work Not Included:
 - 1. Selection of testing laboratory: The Owner will select a prequalified independent testing laboratory.
 - 2. Payment for initial testing: The Owner will pay all services of the DSA approved testing laboratory as further described in Part 2 of this Section.

1.2 SUBMITTALS

- A. Test Reports:
 - 1. The testing laboratory will provide test and inspection reports for all testing and inspection required by this Section and the Division of the State Architect in accordance with DSA Procedure 13-1.
 - 2. One copy of all test and inspection reports shall be forwarded by the testing laboratory to DSA, the Owner, the Architect, the Engineer, the Inspector, and the Contractor.
 - 3. Reports shall include all tests made regardless of whether such tests indicate that the material is satisfactory or unsatisfactory.
 - 4. Samples taken but not tested shall also be reported.
 - 5. Reports shall indicate that the material or materials were sampled and tested in accordance with the requirements of Title 24, California Code of Regulations, and the Contract Documents.
 - 6. Reports shall indicate the specified design strength and state definitely whether or not the material or materials tested comply with the requirements.
- B. Contractor's Statement of Responsibility: In accordance with CBC Section 1704A.4, Contractor shall submit a statement of responsibility to the Architect, the Owner, and DSA prior to the commencement of work of the main wind or seismic force resisting systems or component. Statement of responsibility shall contain

acknowledgment of awareness of the special inspection requirements contained in the statement of special inspections.

- C. Verified Reports: The testing laboratory will provide interim and final verified reports in accordance with Section 01 4320 and DSA Procedure PR 13-1.

1.3 QUALITY ASSURANCE

- A. The Owner will select an independent testing laboratory to conduct tests. Testing laboratory shall be approved by the Architect, Structural Engineer, and the Division of the State Architect.
- B. Selection of material required for testing shall be by the laboratory or the Owner's representative and not by the Contractor.
- C. Testing, when required, will be in accordance with all pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials.
- D. Division of the State Architect Testing & Inspection: At a minimum, the testing required for the project is indicated in the Form DSA-103, Statement of Structural Tests and Special Inspections attached at the end of this Section.
 - 1. Where no testing requirements are described, but the Owner or DSA decides that testing is required, the Owner or DSA may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.
 - 2. Testing may be required by other Specification Sections that is not specifically noted on Form DSA-103, Statement of Structural Tests and Special Inspections.

1.4 MATERIALS, TESTING, AND INSPECTION STANDARDS

- A. Comply with the California Building Code, 2022 Edition.
- B. Concrete - Section 03 3000:
 - 1. Material Standards:
 - a. Portland cement: CBC Section 1903A.1, ACI 318, Table 26.4.1.1.1(a).
 - b. Fly ash: ACI 318, Table 26.4.1.1.1(a).
 - c. Concrete aggregates: CBC Section 1903A.5; ACI 318, Section 26.4.1.2.1(a)(1).
 - 2. Material Tests:
 - a. Reinforcing bar test: CBC Section 1910A.2.
 - b. Waiver of reinforcing bar testing: CBC Section 1910A.2.
 - c. Concrete strength: ACI 318, Section 26.12.
 - d. Drilled expansion / epoxy bolt: CBC Section 1910A.5.
 - e. Composite construction cores: CBC Section 1910A.4.
 - 3. Special Inspections:
 - a. Job site inspection: CBC Section 1704A.3, Table 1705A.3.
 - b. Batch plant inspection: CBC Section 1705A.3.3.
 - c. Waiver of batch plant inspection: CBC Section 1705A.3.3.1.
 - d. Post-installed anchors: CBC Table 1705A.3, Type 4, Section 1910A.5.
- C. Structural Steel - Section 05 1200:
 - 1. Material Standards:
 - a. Structural steel: CBC Sections 2203A.1.
 - b. Material identification: CBC Section 2203A.1 and AISC 360-16 Section A3.1.
 - 2. Material Tests:
 - a. Structural steel: CBC Section 2203A.1.

- b. High strength bolts, nuts, washers: CBC Section 2213A.1.
 - c. End welded studs: CBC Section 2213A.2.
 - 3. Special Inspection: CBC Table 1705A.2.1.
 - a. Shop fabrication: CBC Section 1705A.2.1.
 - b. Welding: CBC Section 1705A.2.5, Table 1705A.2.1.
 - c. Steel frame special inspection: CBC Table 1705A.2.1.
 - d. End welded stud welding: CBC Table 1705A.2.1.
 - e. High strength bolts: CBC Table 1705A.2.1.
- D. Wood - Section 06 1100:
 - 1. Material Standards:
 - a. Sawn Lumber Material Standards: CBC Section 2303.1.1.
 - b. Plywood Material Standards: CBC Section 2303.1.5.
 - c. Structural Composite Lumber Material Standards: CBC Sections 2303.1.4 and 2303.1.3.1.
- E. Prefabricated Wood I-Joists - Section 06 1730:
 - 1. Material Standards: CBC Section 2303.1.2.
 - 2. Fabrication Special Inspection: ASTM D5055, Sections 8, 9, and 10.
- F. Structural Glued-Laminated Timber - Section 06 1800:
 - 1. Materials Standards: CBC Section 2303.1.3.
 - 2. Fabrication Special Inspection: CBC Section 1705A.5.4.
- G. Moisture Control Treatment Testing:
 - 1. Testing and Inspection: Refer to Section 09 0650.
- H. Earth Fill, Foundations, and Excavations - Section 31 2000:
 - 1. Special Inspection:
 - a. Fill and Compaction: CBC Section 1705A.6 and Table 1705A.6.
 - b. Pier Foundations: CBC Section 1704A.8.
- I. Toxic Testing of Import Fill Material - Section 31 2000:
 - 1. Testing and Inspection: Refer to Section 31 2000.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Promptly process and distribute required copies of test reports and related instructions to assure necessary re-testing and replacement of materials with the least possible delay in progress of the Work.

PART 2 - PRODUCTS

2.1 PAYMENT FOR TESTING

- A. Initial Testing: The Owner will pay for services requested by the Owner.
- B. Retesting: When initial tests indicate non-compliance with the Contract Documents, subsequent retesting occasioned by the non-compliance shall be performed by the same testing agency and the costs thereof will be paid by the Contractor.

2.2 CONTRACTOR'S CONVENIENCE TESTING

- A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of

the Contractor.

2.3 OWNER'S INSPECTOR

- A. The Owner shall employ a DSA approved Inspector in accordance with the requirements of the California Code of Regulations, Title 24. The Inspector's duties are specifically defined in Title 24, Part 1, Section 4-342.
 - 1. Refer to Section 01 4320 - DSA Construction Oversight.
- B. The work of construction in all stages of progress shall be subject to the personal continuous inspection of the Inspector. The Inspector shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep the Inspector fully informed respecting the progress and manner of the work and character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.

PART 3 - EXECUTION

3.1 COOPERATION WITH TESTING LABORATORY

- A. Representatives of the Owner and the testing laboratory shall have access to the Work at all times and at all locations where the Work or parts of the Work is in progress. The Contractor shall facilities for such access to enable the laboratory to perform its functions properly and safely.

3.2 TAKING SPECIMENS

- A. Test specimens and prisms required for concrete, grout and mortar shall be taken by the testing laboratory and delivered directly to the testing laboratory as required by the California Building Code, 2022 Edition.
- B. The testing laboratory shall be responsible for testing the samples.
- C. Miscellaneous materials to be tested shall be tagged by the Project Inspector and delivered to the testing laboratory for testing. The testing laboratory shall provide specimen containers for the Project Inspector for the required tests.

3.3 SCHEDULES FOR TESTING

- A. Establishing Schedule:
 - 1. The Contractor shall notify the Project 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 be tested, in order that the Inspector may arrange for testing of the material at the source of supply.
 - 2. The Contractor shall provide time within the construction schedule required for the laboratory to perform its tests and to issue each of its findings.
 - 3. Contractor shall coordinate times for testing of materials and/or installations with the testing laboratory not less than 48 hours prior to the need for testing.
- B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.
- C. Adherence to Schedule: When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back charged to the Contractor and shall not be borne by the Owner.
- D. Tests and Inspections Required:

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2022 CBC

General

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
DSA File Number: 10-28	Increment Number:	Date Created: 2025-01-08 09:47:47

IMPORTANT: This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2022 CBC).

****NOTE:** Undefined section and table references found in this document are from the CBC, or California Building Code.

KEY TO COLUMNS

1. TYPE	2. PERFORMED BY
Continuous – Indicates that a continuous special inspection is required	GE (Geotechnical Engineer) – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.
Periodic – Indicates that a periodic special inspection is required	LOR (Laboratory of Record) – Indicates that the test or special inspection shall be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See CAC Section 4-335.
Test – Indicates that a test is required	PI (Project Inspector) – Indicates that the special inspection may be performed by a project inspector when specifically approved by DSA.
	SI (Special Inspection) – Indicates that the special inspection shall be performed by an appropriately qualified/approved special inspector.

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
DSA File Number: 10-28	Increment Number:	Date Created: 2025-01-08 09:47:47

Geotechnical Reports: Project has a geotechnical report, or CDs indicate soils special inspection is required by GE

S1. GENERAL:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Verify that: •Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations. •Foundation excavations are extended to proper depth and have reached proper material. •Materials below footings are adequate to achieve the design bearing capacity.	Periodic	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) form for exemptions.)

S2. SOIL COMPACTION AND FILL:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Perform classification and testing of fill materials.	Test	LOR*	* Under the supervision of the geotechnical engineer.
☒	b. Verify use of proper materials, densities and inspect lift thicknesses, placement and compaction during placement of fill.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (Refer to specific items identified in the Appendix (end of this form) form for exemptions where soils SI and testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil SI and test reporting requirements for the exempt items.)
☒	c. Compaction testing.	Test	LOR*	* Under the supervision of the geotechnical engineer. (Refer to specific items identified in the Appendix (end of this form) for exemptions where soils testing may be conducted under the supervision of a geotechnical engineer or LOR's engineering manager. In such cases, the LOR's form DSA 291 shall satisfy the soil test reporting requirements for the exempt items.)

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
DSA File Number: 10-28	Increment Number:	Date Created: 2025-01-08 09:47:47

S3. DRIVEN DEEP FOUNDATIONS (PILES):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Verify pile materials, sizes and lengths comply with the requirements.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
☐	b. Determine capacities of test piles and conduct additional load tests as required.	Test	LOR*	* Under the supervision of the geotechnical engineer.
☐	c. Inspect driving operations and maintain complete and accurate records for each pile.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
☐	d. Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
☐	e. Steel piles.	Provide tests and inspections per STEEL section below.		
☐	f. Concrete piles and concrete filled piles.	Provide tests and inspections per CONCRETE section below.		
☐	g. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	*	*	* As defined on drawings or specifications.

S4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):				
	Test or Special Inspection	Type	Performed By	Code References and Note
☐	a. Inspect drilling operations and maintain complete and accurate records for each pier.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
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	Test or Special Inspection	Type	Performed By	Code References and Note
☐	b. Verify pier locations, diameters, plumbness, bell diameters (if applicable), lengths and embedment into bedrock (if applicable); record concrete or grout volumes.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)
☐	c. Confirm adequate end strata bearing capacity.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. (See Appendix (end of this form) for exemptions.)
☐	d. Concrete piers.	Provide tests and inspections per CONCRETE section below.		

	S5. RETAINING WALLS:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Placement, compaction and inspection of backfill.	Continuous	GE*	1705A.6.1. * By geotechnical engineer or his or her qualified representative. (See section S2 above).
☐	b. Placement of soil reinforcement and/or drainage devices.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
☐	c. Segmental retaining walls; inspect placement of units, dowels, connectors, etc.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative. See DSA IR 18-2.
☐	d. Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
☐	e. Masonry retaining walls.	Provide tests and inspections per MASONRY section below.		

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2022 CBC

Table 1705A.6, Table 1705A.7, Table 1705A.8

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
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S6. OTHER SOILS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Soil Improvements	Test	GE*	Submit a comprehensive report documenting final soil improvements constructed, construction observation and the results of the confirmation testing and analysis to CGS (California Geological Survey) for final acceptance. * By geotechnical engineer or his or her qualified representative.
☐	b. Inspection of Soil Improvements	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
☐	c.			

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (CONCRETE), 2022 CBC

Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

Application Number: 02-122658	School Name: Sunset Elementary School	School District: Coalinga-Huron Unified School District
DSA File Number: 10-28	Increment Number:	Date Created: 2025-01-08 09:47:47

C1. CAST-IN-PLACE CONCRETE				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Verify use of required design mix.	Continuous	SI	Table 1705A.3 Item 5, 1910A.1.
☒	b. Identify, sample, and test reinforcing steel.	Test	LOR	1910A.2; ACI 318-19 Ch.20 and Section 26.6.1.2; DSA IR 17-10. (See Appendix (end of this form) for exemptions.)
☒	c. During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR	Table 1705A.3 Item 6; ACI 318-19 Sections 26.5 & 26.12.
☒	d. Test concrete (f' _c).	Test	LOR	1905A.1.17; ACI 318-19 Section 26.12.
☒	e. Batch plant inspection: Continuous	See Notes	SI	Default of 'Continuous' per 1705A.3.3. If approved by DSA, batch plant inspection may be reduced to 'Periodic' subject to requirements in Section 1705A.3.3.1, or not required per 1705A.3.3.2. See IR 17-13. (See Appendix (end of this form) for exemptions.)
☐	f. Welding of reinforcing steel.	Provide special inspection per STEEL, Category S/A4(d) & (e) and/or S/A5(g) & (h) below.		

C2. PRESTRESSED / POST-TENSIONED CONCRETE (IN ADDITION TO SECTION C1):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Sample and test prestressing tendons and anchorages.	Test	LOR	1705A.3.4, 1910A.3
☐	b. Inspect placement of prestressing tendons.	Periodic	SI	1705A.3.4, Table 1705A.3 Items 1 & 9.

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Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

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	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	c. Verify in-situ concrete strength prior to stressing of post-tensioning tendons.	Periodic	SI	Table 1705A.3 Item 13. Special inspector to verify specified concrete strength test prior to stressing.
☐	d. Inspect application of post-tensioning or prestressing forces and grouting of bonded prestressing tendons.	Continuous	SI	1705A.3.4, Table 1705A.3 Item 9; ACI 318-19 Section 26.13

	C3. PRECAST CONCRETE (IN ADDITION TO SECTION C1):			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Inspect fabrication of precast concrete members.	Continuous	SI	ACI 318-19 Section 26.13, and PCI MNL-128 and -130.
☐	b. Inspect erection of precast concrete members.	Periodic	SI*	Table 1705A.3 Item 10. * May be performed by PI when specifically approved by DSA.
☐	c. For precast concrete diaphragm connections or reinforcement at joints classified as moderate or high deformability elements (MDE or HDE) in structures assigned to Seismic Design Category D, E or F, inspect such connections and reinforcement in the field for: 1. Installation of the embedded parts 2. Completion of the continuity of reinforcement across joints. 3. Completion of connections in the field.	Continuous	SI	Table 1705A.3; ACI 318-19 Section 26.13.1.3; ACI 550.5
☐	d. Inspect installation tolerances of precast concrete diaphragm connections for compliance with ACI 550.5.	Periodic	SI	Table 1705A.3; ACI 318-19 Section 26.13.1.3; ACI 550.5

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Table 1705A.3; ACI 318-19 Sections 26.12 & 26.13

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C4. SHOTCRETE (IN ADDITION TO SECTION C1):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Inspect shotcrete placement for proper application techniques.	Continuous	SI	1705A.3.9, Table 1705A.3 Item 7, 1908A.1, 1908A.2, 1908A.3. See ACI 506.2-13 Section 3.4, ACI 506R-16.
☐	b. Sample and test shotcrete (f'c).	Test	LOR	1908A.2, 1705A.3.9

C5. POST-INSTALLED ANCHORS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic), 1705A.3.8 (See Appendix (end of this form) for exemptions). ACI 318-19 Section 26.13. * May be performed by the project inspector when specifically approved by DSA.
☒	b. Test post-installed anchors.	Test	LOR	1910A.5. (See Appendix (end of this form) for exemptions.)

C6. OTHER CONCRETE:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a.			

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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S/A1. STRUCTURAL STEEL, COLD-FORMED STEEL AND ALUMINUM USED FOR STRUCTURAL PURPOSES				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Verify identification of all materials and: • Mill certificates indicate material properties that comply with requirements. • Material sizes, types and grades comply with requirements.	Periodic	*	Table 1705A.2.1 Item 3a–3c. 2202A.1; AISI S100-20 Section A3.1 & A3.2, AISI S240-20 Section A3 & A5, AISI S220-20 Sections A4 & A6. * By special inspector or qualified technician when performed off-site.
☒	b. Test unidentified materials	Test	LOR	2202A.1.
☒	c. Examine seam welds of HSS shapes	Periodic	SI	DSA IR 17-3.
☒	d. Verify and document steel fabrication per DSA-approved construction documents.	Periodic	SI	Not applicable to cold-formed steel light-frame construction, except for trusses (1705A.2.4).
☐	e. Buckling restrained braces.	Test	LOR	Testing and special inspections in accordance with IR 22-4.

S/A2. HIGH-STRENGTH BOLTS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Verify identification markings and manufacturer's certificates of compliance conform to ASTM standards specified in the DSA-approved documents.	Periodic	SI	Table 1705A.2.1 Items 1a & 1b, 2202A.1; AISC 360-16 Section A3.3, J3.1, and N3.2; RCSC 2014 Section 1.5 & 2.1; DSA IR 17-8 & DSA IR 17-9.
☐	b. Test high-strength bolts, nuts and washers.	Test	LOR	Table 1705A.2.1 Item 1c, 2213A.1; RCSC 2014 Section 7.2; DSA IR 17-8.
☐	c. Bearing-type ("snug tight") connections.	Periodic	SI	Table 1705A.2.1 Item 2a, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 & N5.6; RCSC 2014 Section 9.1; DSA IR 17-9.
☐	d. Pretensioned and slip-critical connections.	*	SI	Table 1705A.2.1 Items 2b & 2c, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 & N5.6; RCSC 2014 Sections 9.2 & 9.3; DSA IR 17-9. **"Continuous" or "Periodic" depends on the tightening method used.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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S/A3. WELDING:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.	Periodic	SI	1705A.2.5, Table 1705A.2.1 Items 4 & 5; AWS D1.1 and AWS D1.8 for structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-formed steel; AWS D1.4 for reinforcing steel; DSA IR 17-3.
☒	b. Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	DSA IR 17-3.
☒	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	DSA IR 17-3.

S/A4. SHOP WELDING (IN ADDITION TO SECTION S/A3):				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1–4; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
☒	b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
☐	c. Inspect welding of stairs and railing systems.	Periodic	SI	1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3.
☐	d. Verification of reinforcing steel weldability other than ASTM A706.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
☐	e. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
	S/A5. FIELD WELDING (IN ADDITION TO SECTION S/A3):			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1–4; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.
☒	b. Inspect single-pass fillet welds ≤ 5/16".	Periodic	SI	Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.
☐	c. Inspect end-welded studs (ASTM A-108) installation (including bend test).	Periodic	SI	2213A.2; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1; DSA IR 17-3.
☐	d. Inspect floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Item 5a.6; AISC 360-16 (AISC 341-16 as applicable); AWS D1.3; DSA IR 17-3.
☐	e. Inspect welding of structural cold-formed steel.	Periodic	SI*	1705A.2.5; AWS D1.3; DSA IR 17-3. The quality control provisions of AISI S240-20 Chapter D shall also apply. * May be performed by the project inspector when specifically approved by DSA.
☐	f. Inspect welding of stairs and railing systems.	Periodic	SI*	1705A.2.1; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3. * May be performed by the project inspector when specifically approved by DSA.
☐	g. Verification of reinforcing steel weldability.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
☐	h. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
	S/A6. NONDESTRUCTIVE TESTING:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Ultrasonic	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.
☐	b. Magnetic Particle	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; AWS D1.1, AWS D1.8; DSA IR 17-2.
☐	c.	Test	LOR	

	S/A7. STEEL JOISTS AND TRUSSES:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Verify size, type and grade for all chord and web members as well as connectors and weld filler material; verify joist profile, dimensions and camber (if applicable); verify all weld locations, lengths and profiles; mark or tag each joist.	Continuous	SI	1705A.2.3, Table 1705A.2.3; AWS D1.1; DSA IR 22-3 for steel joists only. 1705A.2.4; AWS D1.3 for cold-formed steel trusses.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
	S/A8. SPRAYED FIRE-RESISTANT MATERIALS:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Examine structural steel surface conditions, inspect application, take samples, measure thickness and verify compliance of all aspects of application with DSA-approved documents.	Periodic	SI	1705A.15, 1705A.15.1, 1705A.15.2, 1705A.15.3, 1705A.15.4, 1705A.15.5, 1705A.15.6.
☐	b. Test density.	Test	LOR	1705A.15.1, 1705A.15.5, ASTM E605
☐	c. Bond strength adhesion/cohesion.	Test	LOR	1705A.15.1, 1705A.15.6, ASTM E736

	S/A9. ANCHOR BOLTS AND ANCHOR RODS:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Anchor Bolts and Anchor Rods	Test	LOR	Identify, sample and test anchor bolts and anchor rods not meeting exemptions identified in Section 1 of IR 17-11.
☐	b. Threaded rod not used for foundation anchorage.	Test	LOR	Identify, sample and test threaded rods not meeting exemptions identified in Section 1 of IR 17-11.

	S/A10. STORAGE RACK SYSTEMS:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Materials used, to verify compliance with one or more of the material test reports in accordance with the approved construction documents.	Periodic	SI	Table 1705A.13.7
☐	b. Fabricated storage rack elements.	Periodic	SI	1704A.2.5; Table 1705A.13.7

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-20; RCSC 2014; AWS D1.1, AWS D1.2, AWS D1.3, AWS D1.4, AWS D1.8

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	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	c. Storage rack anchorage installation.	Periodic	SI	ANSI/MH16.1 Section 7.3.2; Table 1705A.13.7
☐	d. Completed storage rack system to indicate compliance with the approved construction documents.	Periodic	SI*	Table 1705A.13.7; * May be preformed by the project inspector when specifically approved by DSA.

	S/A11. Other Steel			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a.			

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (WOOD), 2022 CBC

1705A.5, Table 1705A.5.7

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W1. PREFABRICATED WOOD TRUSSES:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Inspect fabrication of manufactured open-web trusses.	Continuous	SI	1705A.5.6; DSA IR 23-8.
☐	b. Inspect fabrication of manufactured metal-plate-connected trusses.	Continuous	SI	1705A.5.6, 1705A.5.7; DSA IR 23-4.

W2. MANUFACTURED WOOD STRUCTURAL ELEMENTS:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☒	a. Inspect fabrication of structural glued-laminated timber.*	Continuous	SI	* See 1705A.5.5 for exceptions
☐	b. Inspect fabrication of cross-laminated timber.	Continuous	SI	1705A.5.5
☐	c. Inspect erection of mass timber.	Periodic	SI	Table 1705A.5.3, Item 2
☐	d. Inspect mass timber connections with threaded fasteners, bolts, and/or adhesive anchors other than described in item e below. Inspect concealed mass timber connections.	Periodic	SI	Table 1705A.5.3, Items 3.1, 3.3, 3.4, 3.5. For threaded fasteners: Verify use of proper installation equipment. Verify use of pre-drilled holes where required. Inspect screws, including diameter, length, head type, spacing, installation angle, and depth.
☐	e. Inspect mass timber connections with adhesive anchors installed in a horizontal or upward orientation.	Continuous	SI	Table 1705A.5.3, Item 3.2
☐	f. Inspect application of sealants or adhesives applied to mass timber elements.	Periodic	SI	1705A.20

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1705A.5, Table 1705A.5.7

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	W3. OTHER Wood:			
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a.			

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (OTHER), 2022 CBC

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X1. OTHER:				
	Test or Special Inspection	Type	Performed By	Code References and Notes
☐	a. Load test for identified product(s):	Test	LOR	1709A.2, 1709A.3. Testing is not required for: 1) a product with a valid evaluation service report per DSA IR A-5, or 2) a product that can be justified by structural calculation.
☐	b. Installation torque for non-HS bolts	Continuous	SI*	Applicable to communication towers identified as Essential Service Facility Projects (ESFP). Calibrated wrench use required, verified by SI during installation. DSA Policy PL 18-01: Communication Towers, Poles and Buildings Utilized by State Agencies for Essential Services Communications.*EXCEPTION: Non-ESFP may use PI without need for notification to DSA.
☒	c. Installation of seam connecting device to standing seam metal roof.	Continuous	PI	DSA IR 16-8, 5.1.3.1
☒	d. Load test of seam connecting device to standing seam metal roof.	Test	LOR	DSA IR 16-8, 5.1.3.1r

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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Exempt items given in DSA IR A-22 or the 2022 CBC (including DSA amendments) and those items identified below with a check mark by the design professional are NOT subject to DSA requirements for the structural tests / special inspections noted. **Items marked as exempt shall be identified on the approved construction documents.** The project inspector shall verify all construction complies with the approved construction documents.

	SOILS:
☐	1. Deep foundations acting as a cantilever footing with a design based on minimum allowable pressures per CBC Table 1806A.2 and without a geotechnical report for the following cases: A) free standing sign or scoreboard, B) cell or antenna towers and poles less than 35'-0" tall (e.g., lighting poles, flag poles, poles supporting open mesh fences, etc.), C) single-story structure with dead load less than 5 psf (e.g., open fabric shade structure), or D) covered walkway structure with an apex height less than 10'-0" above adjacent grade.
☐	2. Shallow foundations, etc. are exempt from special inspections and testing by a Geotechnical Engineer for the following cases: A) buildings without a geotechnical report and meeting the exception item #1 criteria in CBC Section 1803A.2 supported by native soil (any excavation depth) or fill soil (not exceeding 12" depth per CBC Section 1804A.6), B) soil scarification/recompaction not exceeding 12" depth, C) native or fill soil supporting exterior non-structural flatwork (e.g., sidewalks, site concrete ramps, site stairs, parking lots, driveways, etc.), D) unpaved landscaping and playground areas, or E) utility trench backfill with depth not exceeding 12".

	CONCRETE/MASONRY:
☐	1. Post-installed anchors for the following: A) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see item 7 for "Welding" in the Appendix below) given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) or B) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding" in the Appendix below
☐	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.
☐	3. Non-bearing non-shear masonry walls may be exempt from certain DSA masonry testing and special inspection items as allowed per DSA IR 21-1. Refer to construction documents for specific exemptions accordingly for each applicable wall condition shown in Appendix A of IR 21-1.
☐	4. Epoxy shear dowels in site flatwork and/or other non-structural concrete.

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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	CONCRETE/MASONRY:
☐	5. Testing of reinforcing bars is not required for items given in CBC Section 1910A.2 subject to the requirements and limitations in that section.

	WELDING:
☐	1. Solid-clad and open-mesh fences, gates with maximum leaf span of 10', and gates with a maximum rolling section of 10' all having an apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates/fences are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
☐	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds shall not be ground flush.
☐	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
☐	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections S/A3, S/A4 and/or S/A5 of listing above).
☐	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections S/A3, S/A4 and/or S/A5 of listing above).
☐	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for sections S/A3, S/A4 and/or S/A5 located in the Steel/Aluminum category of listing above).

Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

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	WELDING:
☐	7. Any support for exempt non-structural components given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) meeting the following: A) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) $\leq 4'$ above supporting floor/roof, B) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.

DSA 103-22: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS(SIGNATURE), 2022 CBC

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Name of Architect or Engineer in general responsible charge:

Michael J. Scott

Name of Structural Engineer (When structural design has been delegated):

Jack D. Brewer, SE

Signature of Architect or Structural Engineer:

Date:

1.8.25

Note: To facilitate DSA electronic mark-ups and identification stamp application, DSA recommends against using secured electronic or digital signatures.

DSA STAMP

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 02-122658 INC:
REVIEWED FOR
SS ☒ FLS ☒ ACS ☒
DATE: 03/03/2025

DSA 103-22: LIST OF REQUIRED VERIFIED REPORTS, CBC 2022

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02-122658
DSA File Number:
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School Name:
Sunset Elementary School
Increment Number:

School District:
Coalinga-Huron Unified School District
Date Created:
2025-01-08 09:47:47

1. Soils Testing and Inspection: Geotechnical Verified Report Form DSA 293

2. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

3. Concrete Batch Plant Inspection: Laboratory Verified Report Form DSA 291

4. Post-installed Anchors: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

5. Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

6. Field Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

7. Mass Timber Inspection: Laboratory Verified Report Form DSA 291 , or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

1. Refer to attached Form DSA 103.
2. Testing may be required by other Specification Sections that is not specifically noted on Form DSA-103, Statement of Structural Tests and Special Inspections.

3.4 UNTESTED MATERIALS

- A. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed any required testing and inspection, or prior to receipt of notice from the Architect that testing and inspection will not be required, shall not be incorporated into the Work.
- B. If such non-inspected and non-tested material is incorporated into the project, it shall be removed at the Contractor's expense and no consideration will be given for delays or additional cost caused by this action.

END OF SECTION 01 4520

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
 - 1. Temporary utilities such as heat, water, electricity, and telephone;
 - 2. Field offices;
 - 3. Sanitary facilities;
 - 4. Enclosures such as tarpaulins, barricades, safety devices, and canopies;
 - 5. Temporary fencing of the construction site and/or buildings as required to secure the project;
 - 6. Temporary protect of new and existing work;
 - 7. Project sign.
 - 8. Temporary protection of existing buildings and site.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work is not part of this Section.
 - 3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.2 QUALITY ASSURANCE

- A. Comply with governing regulations and rules/recommendations of utility companies and governmental agencies having jurisdiction.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 - PRODUCTS

2.1 TEMPORARY UTILITIES

- A. Water:
 - 1. Provide necessary temporary piping and water supply and, upon completion of the Work, remove such temporary facilities.
 - 2. Provide and pay for water used in construction.
 - 3. Provide fire hydrants in working order and approved by the local fire agency having jurisdiction and fire access roads as indicated prior to delivering combustible materials to the job site.
- B. Electricity:
 - 1. Provide all necessary temporary poles and wiring and, upon completion of the Work, remove such temporary facility.
 - 2. Provide area distribution boxes so located that the individual trades may furnish and use 100 ft maximum length extension cords to obtain power and lighting at points where needed for work, inspection, and safety.

3. Provide lighting as needed to permit safe and reasonable lighted working conditions.
 4. Provide and pay for electricity used in construction.
- C. Fire Protection: Provide for and maintain fire safety during construction per Chapter 33 of the 2022 California Fire Code and DSA Bulletin 24-05. Within 7 calendar days of the Notice of Award, the Contractor shall meet with the Owner, develop a Site Safety Plan (SSP) and submit the SSP in .pdf format to the Architect who will submit the SSP to DSA for review. Additional contract time will not be granted for failure of DSA to approve the Contractor's plan. At a minimum, the SSP shall include the following information required in CFC Section 3303.1.1:
1. Name and contact information of site safety director.
 2. Documentation of training of the site safety director and fire watch personnel.
 3. Procedures for reporting emergencies.
 4. Fire department vehicle access routes.
 5. Locations of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
 6. Smoking and cooking policies, designated area to be used where approved, and signage locations in accordance with CFC Section 3305.8.
 7. Location and safety considerations for temporary heating equipment.
 8. Hot work (welding, roofing, etc.) plan.
 9. Plans for control of combustible waste.
 10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
 11. Provisions for site security.
 12. Changes that affect this plan.
 13. Other site specific information requested by the local fire authority (LFA).
- D. Safeguards During Construction: Provide for and maintain safeguards during construction and/or alteration of a building per Chapter 33 of the 2022 California Building Code.
- E. Heating: Provide and maintain heat necessary for proper conduct of operations and temperature conditions needed for the Work.
- F. Ventilation: Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and prevent accumulation of dust, fumes, vapors, or gases.
- G. Telephone/Fax:
1. Make necessary arrangements and pay costs for installation and operation of telephone, FAX, internet service and copier service in the Contractor's office at the site.
 2. Provide telephone and fax lines in the office of the Project Inspector for use in connection with the Work.
 3. Costs of telephone and fax calls in the Inspector's office are not in contract.

2.2 FIELD OFFICES AND SHEDS

- A. Office Facilities:
1. Contractor's Office: Provide a field office (8' by 12' minimum size) and sheds adequate in size and accommodation for Contractor's offices, supply, and storage.
 2. Secure portable or mobile buildings when used. Provide steps and landings at each doorway. Meet all applicable codes and regulations.
 3. Remove all facilities when they are no longer needed, but only after approval of the Architect.
 4. Inspector's Office: Provide a private space within the field office (8' by 16' minimum size), or a separate job trailer with adequate heating and cooling, power, and telephone outlets for the Project Inspector and for holding project meetings.

- a. Provide 30"x84" table and 8 chairs.
- b. Provide windows (approximately 10% of floor area) oriented to the construction areas.
- c. Provide plan table and stool for inspector.

B. Sanitary Facilities:

- 1. Provide temporary sanitary facilities in the quantity required for use by all personnel per local and state health and sanitary regulations.
- 2. Maintain in a sanitary condition at all times and in reasonable proximity of the work.

2.3 TEMPORARY ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, lighting, and other temporary construction necessary for the safe and proper completion of the Work in compliance with pertinent safety and other regulations.
- B. Provide and maintain suitable temporary sidewalks, closed passageways, fences, and other structures required by law so as not to obstruct or interfere with traffic in public streets, alley ways, or private right-of-way. Leave an unobstructed way along public and private places for pedestrians and vehicles.
- C. Provide temporary partitions and ceilings as needed to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

2.4 TEMPORARY FENCING

- A. Provide and maintain temporary fencing for the duration of construction to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Minimum fence height shall be 6'-0" high. Fence panels shall be stretched over 4-sided pipe frames.

2.5 VEHICULAR ACCESS AND PARKING

- A. Access the site as indicated on the Drawings, or as directed by the Owner.
- B. Do not use existing parking areas for the Contractor's parking or storage of materials.
- C. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on the site.
- D. Construct and maintain temporary roads accessing public thoroughfares to serve construction area. Extend and relocate as the Work requires.
- E. Provide and maintain access to fire hydrants, free of obstructions, with an all-weather hard surface able to support 50,000 pounds minimum fire apparatus. Fire hydrants shall be charged and accessible by local fire authorities prior to loading the site with combustible materials.
- F. Employees vehicles not required for the direct construction of the Work shall be parked offsite unless otherwise authorized by the Owner.

2.6 DUST PROTECTION

- A. Provide dust suppression measures, including watering of all graded or excavated material at least twice a day, stopping grading and excavation activities when the wind speed exceeds 20 mph for one hour, watering or covering all material transported off-site, and minimizing the area disturbed by grading and excavation activities.
- B. Maintain adequate water and trucks to be used throughout the progress of the project to mitigate airborne dust. Maintain the site in a damp condition, not allowing excessive powdering of soil.

2.7 PROTECTION

- A. Landscaping: Protect all existing trees, shrubs, lawns, and landscape work from damage, providing guards and coverings. Maintain by irrigation any existing trees, shrubs, lawns, and landscape work through-out the Contract which are within the Contractor's temporary fencing. Damaged landscaping shall be repaired or replaced at the Contractor's expense.
- B. Public and Private Streets, Curbs, and Walks:
 - 1. Protect all existing streets, curbs, walks, and other street improvements and immediately make all necessary repairs for damage occurring thereto during the course of the Work at the Contractor's expense.
 - 2. Keep all public and private streets and ways clean of debris, spilled materials and products, and wet and dry earth at all times and clean at the end of each working day. Clean wet earth from vehicles prior to their leaving the site.
- C. Weather: Provide protection at all times against weather--rain, winds, storms, frost, or heat--so as to maintain all work, materials, apparatus, and fixtures free from injury or damage. At the end of the day's work, cover all work likely to be damaged.
 - 1. Water Protection: Protect excavations, trenches, and/or building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water at all times. Provide pumps and equipment and enclosure necessary to provide this protection.
 - 2. Drainage: Construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations free of water.
 - 3. Cold Weather: During cold weather, protect all work from damage.
 - 4. Snow and Ice: Remove all snow and ice as may be required for proper protection and/or prosecution of the Work.
- D. Installed Roofing Materials: Provide means for protection of roofing materials during construction activities. Provide a minimum of 3/4" plywood as protection for storage or materials, walking areas, and working areas. Protect from solvents, oils, or other materials harmful to the installed roofing material.
- E. Existing Utilities and Services: Maintain in operation through-out the Contract all existing utilities and services serving the existing facilities occupied by the Owner or by others.
- F. Existing Structures and Improvements: The Contractor shall be responsible for all existing structures and improvements within the work area, and shall provide adequate protection. Any existing structure or improvement damaged during construction shall be repaired or replaced with materials, fixtures, or equipment of the same kind, quality, and size. Any materials, and/or equipment temporarily removed for protection and not damaged, shall be reinstalled.
- G. Adjacent Property: Provide necessary protection for adjacent property and the lateral support therefor in conformance with the 2022 California Building Code.

2.8 SECURITY

- A. The Contractor shall be responsible for security and protection of his equipment and the site-stored and installed products whether paid for by the Owner or not, until the Owner accepts the Project.
- B. On-site security lighting shall be hooded and adjusted to reduce or eliminate illumination of surrounding properties and roadways.

2.9 DEBRIS CONTROL

- A. Keep site clean and orderly in appearance at all times. Do not allow debris to accumulate over the site.
- B. Collect debris daily and store in a central location or container. Remove from the site monthly prior to review of payment request.

2.10 PROJECT SIGN

- A. Provide a project sign bearing the project name and the names of the Owner, Architect, consulting engineers (structural, mechanical, electrical, and civil), and Contractor, company logo's, and other information as directed by the Architect and as indicated on the exhibit attached to the end of this Section.
 - 1. Submit sign drawing for review and approval by the Architect.
 - 2. Place sign in a prominent location as directed by the Architect.
 - 3. **Sign shall be in place prior to approval of first payment request.**
 - 4. Maintain sign in place during construction; remove and dispose of sign after project acceptance.

PART 3 - EXECUTION

3.1 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION 01 5000

SECTION 01 5710 - EROSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. In accordance with pertinent provisions of this Section, install erosion control straw mat, straw wattles, and/or straw bales as needed to meet the requirements of the construction shown in the Contract Documents.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 01 5725: Storm Water Pollution Prevention Plan.
 - 3. Section 31 1000: Site clearing.
 - 4. Section 33 4000: Storm drainage.

1.2 QUALITY ASSURANCE

- A. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- B. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the geotechnical engineer.
- C. Install erosion control materials prior to expected rainfall and maintain throughout the construction period.
- D. Comply with storm water pollution prevention plan.

1.3 SLOPE PROTECTION

- A. Minor Slopes: Provide continuous straw mat protection over all soils disturbed by construction operations. Minor slopes shall be slope with finish grade less than 10 horizontal to 1 vertical, up to 6.5 horizontal to 1 vertical.
- B. Major Slopes: Provide continuous straw mat protection plus horizontal trench with continuous straw wattles at 4' on center over all soils disturbed by construction operations. Major slopes shall be slope with finish grade equal to or greater than 6.5 horizontal to 1 vertical.

1.4 EXISTING UTILITIES

- A. Field verify the location of all existing underground utilities prior to beginning any earthwork. Work around and protect all existing utilities during the course of the Work.
- B. Where existing utilities are indicated on the drawings, extreme care shall be exercised in excavating near these utilities to avoid damage, and the Contractor will be held responsible for any damage caused by construction operations.

PART 2 - PRODUCTS

2.1 EROSION CONTROL MATTING

- A. Erosion control matting shall be straw blanket of 100% agricultural straw fiber matrix with a functional longevity of 6 months or greater. Evenly distribute straw fiber over the entire area of the mat. The blanket shall be covered on the top and bottom with a lightweight photodegradable polypropylene net with mesh size of approximately ½" by ½". Sew blanket together on 1.5" centers with degradable thread.
- B. Acceptable Products:
 - 1. North American Green, S150 straw erosion control blanket.
 - 2. Cascade Geotechnical Inc., S-31 LD straw erosion control blanket.
 - 3. Erosion Control Systems, ProGuard SS straw erosion control blanket.
 - 4. Other equal product approved by the Architect.

2.2 STRAW WATTLES

- A. Straw wattles are intended to capture and keep sediment on the slopes. Wattles shall be manufactured from 100% agricultural rice straw and wrapped in tubular black plastic netting or hemp. They are approximately 8" in diameter or larger by 25'-30' in length.
- B. Acceptable Products:
 - 1. California Straw Works,
 - 2. Other equal product approved by the Architect

2.3 STRAW BALES

- A. Provide Straw Bales continuously around all drainage inlets and maintain them to prevent silt build-up in storm drainage pipe. Clean storm drain pipes prior to acceptance of the project and verify there are no obstructions.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 EROSION CONTROL MATTING

- A. Provide straw bales as required for loose spreading straw over native disturbed soil during grading operations and foundation and stem wall construction. Fine grade soil as soon after floor and wall framing is complete but before anticipated rainfall.
- B. Install erosion control matting at the top of the slope by anchoring the mat into an earthen trench and anchor as recommended by the manufacturer.
- C. Roll mats downhill and then horizontally with laps and staples as recommended by the manufacturer.

3.3 STRAW WATTLES

- A. Prepare slope with Erosion Control Matting prior to laying the wattling material.

- B. Dig and smooth trenches across the slope on contour, to place rolls. Provide trench depth as recommended by the manufacturer, but not less than $\frac{1}{2}$ the diameter of the roll.
- C. Trenches shall be placed 4' on center and perpendicular to water flow.
- D. Anchor wattles in place with stakes driven and spaced as recommended by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Inspect the erosion control blanket and wattles immediately following the first significant storm. Make sure all rolls are in full contact with soils.
- B. Repair any gullies or washouts immediately.
- C. Provide gravel or river rock in areas of excessive erosion acceptable to the Architect and at no additional cost to the Owner.

END OF SECTION 01 5710

SECTION 01 5725 - STORM WATER POLLUTION PREVENTION PLAN

PART 1 - GENERAL

1.1 SUMMARY

- A. The State Water Resources Control Board (SWRCB) regulates storm water discharges associated with construction and land disturbance activities. Certain projects are required to obtain permit coverage under California's Construction General Permit (GCP), Order 2022-0057-DWQ. A site-specific Storm Water Pollution Prevention Plan (SWPPP) is required to obtain permit coverage under the CGP.
- B. The Central Valley Regional Water Quality Control Board, Region 5F (RWQCB) is the Regional Board responsible for inspections, if any, and enforcing the CGP.
- C. Related Sections
 - 1. Section 01 5710: Erosion Control
- D. The Owner or Owner's agent will be responsible for filing the Notice of Intent (NOI) and obtaining permit coverage, and developing a site-specific SWPPP.
 - 1. The Contractor shall assist the owner in completing the NOI by providing information requested by the owner or the owner's agent.
 - 2. The Owner has prepared and paid for the Storm Water Pollution Prevention Plan (SWPPP) and this plan is issued with these Contract Documents as an attachment. The entire SWPPP document can be made available either in draft format or final format at the request of the Contractor. The entire SWPPP will be made available for the Contractor to retain on the construction site prior to the scheduled commencement of construction activities.
 - 3. This project is a Risk Level 1 project. All provisions of Attachment C of the CGP shall apply to this project.
- E. Nothing in this section shall preclude the Contractor, the Contractor's QSP, or other subcontractors from fully complying with applicable provisions of the CGP.

1.2 REFERENCES

- A. National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2022-0057-DWQ, NPDES No. CAS000002.
- B. Applicable amendments and/or modifications to Order No. 2022-0057-DWQ
- C. California Stormwater Quality Association (CASQA) BMP Handbook, August 2023

1.3 QUALITY ASSURANCE

- A. The individual responsible for implementing the SWPPP in accordance with the CGP must be a Qualified SWPPP Practitioner (QSP) for this project and hold such certification from CASQA.
- B. The Contractor's QSP shall have an active online account on the State Water Resources Control Board's Storm Water Multiple Application & Report Tracking System (SMARTS).
- C. Install BMPs as directed on the Water Pollution Control Drawing at the appropriate time, and maintain during construction. Remove and replace any damaged or ineffective BMPs.

- D. The QSP should use his or her discretion to implement additional BMPs as necessary that may or may not be called out specifically in the SWPPP, and to ensure the construction site complies with the CGP.
- E. The QSP shall be responsible for notifying the Qualified SWPPP Developer (QSD) of any significant discrepancies between the Drawing(s) and the actual site conditions. The QSD will make revisions to the SWPPP and issue amendments as applicable. Upon receiving amendments or other revised documents, the QSP shall be responsible for inserting these documents into the SWPPP and keeping them through the life of the Construction project.
- F. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

1.4 SUBMITTALS

- A. The Contractor shall submit a copy of the QSP's certificate no later than 1 week prior to the commencement of construction activities.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Erosion control products shall comply with those products named in Section 01 5710
- B. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor, subject to approval of the Architect.
- C. Specific materials shall comply with the Erosion Control Plan/Water Pollution Control Drawings and should comply with the applicable BMP Fact Sheets in the CASQA BMP Handbook.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the site and the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

3.2 IMPLEMENTATION

- A. The QSP shall implement the SWPPP in accordance with the Contract Documents and as required in the CGP.
- B. The SWPPP Binder(s) and other Storm Water Pollution Prevention Documents shall be kept on the construction site at all times. It shall be made readily available for a RWQCB inspector.
- C. The construction schedule shall be inserted into the SWPPP Binder and any subsequent revisions to the construction schedule.
- D. The QSP shall be responsible for conducting and documenting all training activities in accordance with the CGP.

The documentation of the training activities shall be inserted and kept in the project SWPPP. The training activities shall consist of:

1. Training for individuals responsible for all activities associated with the CGP (i.e. general contractor, site superintendents and subcontractors)
 2. Training for all individuals responsible for BMP installation, inspection, maintenance and repair
- E. The QSP shall be responsible for coordinating with the Legally Responsible Person (LRP), or Owner to be added to as a Data Entry Person on the LRP's SMARTS account.
- F. The Contractor's QSP shall be responsible for completing and filing all annual reports on SMARTS and shall coordinate with the LRP for necessary certifications. Annual Reports shall be submitted no later than September 1st of each compliance year. The QSP shall complete and file all annual reports as required by the CGP.
- G. The QSP shall be responsible for responding to any Notice of Violations (NOVs) or Staff Enforcement Letters (SELs) that may be issued by the RWQCB for non-compliance. The Contractor's QSP shall also be responsible for responding to the RWQCB and preparing any technical reports or other documents that may be requested by the RWQCB.
- H. The QSP shall file a Notice of Termination on the SMARTS website no later than 30 days from the completion of the project.
- I. If delays in construction occur that cause construction to continue beyond the contracted end date, that are solely the responsibility of the Contractor, the Contractor shall be held responsible for additional costs associated with implementing the SWPPP in accordance with the CGP, and any fines levied by the Regional Water Quality Control Board.
- J. At the termination of construction activities and after the Notice of Termination has been approved by the SWRCB, the Contractor shall be responsible for delivering the SWPPP, including all amendments, inspections forms and any other documents added during the course of construction to the Architect.

3.3 FIELD QUALITY CONTROL

- A. The Contractor and the Contractor's QSP shall be responsible for ensuring all subcontractors on the site comply with the SWPPP and the CGP and their individual actions do not result in any enforcement actions. The Contractor shall be liable for non-compliance fines from the RWQCB or SWRCB.
- B. All construction trades, including their supplies who enter the construction site shall comply with the Good Housekeeping Measures named in Section B of Attachment C of the CGP.
- C. Upon commencement of construction, a rain gauge shall be installed on the site in a prominent location where it will not be shielded from rainfall.
- D. Install BMPs where noted on the Drawing(s) and maintain as required by the CGP throughout the life of the construction project. BMPs shall be replaced at the discretion of the QSP to comply with the CGP.
- E. At the end of each workday all stockpiles shall be covered and protected around their perimeter.
- F. All trash and debris shall be cleaned up and properly disposed of at the end of each work day.
- G. The QSP or an individual under the direct supervision of the QSP shall conduct all inspections, maintenance repair and sampling activities. Records of inspections shall be kept using a form provided by the SWRCQ, RWQCB,

CASQA, or another alternative format.

- H. Upon identification of BMP failures or shortcomings during inspections, effective remedies shall be implemented within 72 hours of identification.

END OF SECTION 01 5725

SECTION 01 6200 - PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes product options available to bidders and the Contractor.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 01 2500: Substitution procedures.
 - 3. Section 01 3300: Submittal procedures.

1.2 PRODUCT OPTIONS

- A. The Contract shall be based on standards of quality established in the Contract Documents.
 - 1. In agreeing to the terms and conditions of the Contract, the Contractor has accepted a responsibility to verify that the specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
 - 2. Neither the Owner nor the Architect has agreed to the substitution of materials or methods called for in the Contract Documents, except as they may specifically otherwise state in writing.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.3 DELAYS

- A. Delays in construction arising by virtue of the non-availability of a specified material due to late approval and/or ordering of materials will not be considered as justifying an extension of the agreed Time of Completion, or reason for change.
- B. All additional time required by the Architect or his consultants in dealing with such delay will be charged to the Contractor at the rates described in section 01 7700 1.4.B.2.
- C. Equal or better material replacements caused by delay in approvals and/or ordering may cost more than the original material specified. Increased costs shall be absorbed by the Contractor and not the Owner.

END OF SECTION 01 6200

SECTION 01 6600 - STORAGE AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.
- B. **Materials not properly stored will not be paid for by the owner. Materials previously paid for but not properly stored at time of payment request will be deducted from the request.**

1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Architect, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

1.4 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Architect may reject as noncomplying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

1.5 PROTECTION

- A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.
- B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS

- A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION 01 6600

SECTION 01 7120 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide such field engineering, staking services, and required certifications as required for proper completion of the Work including, but not necessarily limited to establishing and maintaining lines and levels.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Additional requirements for field engineering also may be described in other Sections of these Specifications.
 - 3. As described in the General Conditions, the Owner will furnish survey describing the physical characteristics, legal limitations, utility locations, and legal description of the site.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 3300.
- B. Submit the following:
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
 - 2. Documentation verifying accuracy of field engineering work

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 PROCEDURES

- A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:
 - 1. Locate and protect control points before starting work on the site.
 - 2. Preserve permanent reference points during progress of the Work.
 - 3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
 - 4. Promptly advise the Architect when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.
 - a. Upon direction of the Architect, require the field engineer to replace reference stakes or markers.
 - b. Locate such replacements according to the original survey control.

END OF SECTION 01 7120

SECTION 01 7300 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section establishes administrative and supervisory requirements pertaining to project coordination and general installation provisions.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 COORDINATION

- A. Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- G. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement. Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract Documents.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.
- F. Provide attachment and connection devices and methods necessary for securing Work. Allow for expansion and building movement.
- G. Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

- H. Recheck measurements and dimensions prior to starting installation.
- I. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- J. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- K. Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.4 SITE CONDITIONS

- A. Where existing utilities are indicated on the drawings, extreme care shall be exercised in excavating near these utilities to avoid damage, and the Contractor will be held responsible for any damage caused by construction operations.
- B. Should utilities not indicated on the drawings be found during construction, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from construction operations after discovery of these utilities.

3.5 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration until Notice of Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 01 7300

SECTION 01 7330 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work.
- B. Provide boring, fitting, and patching of the Work, as specified, as indicated, and as needed to:
 - 1. Make the several parts fit properly;
 - 2. **Install new work into existing construction.**
 - 3. Uncover work to provide for installing, inspecting, or both, of ill-timed work;
 - 4. Remove and replace work not conforming to requirements of the Contract Documents;
 - 5. Remove and replace defective work; and
 - 6. Remove samples of installed work for testing.
- C. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
- D. Special Requirements:
 - 1. In addition to other requirements specified, upon the Architect's request uncover work to provide for inspection by the Architect of covered work, and remove samples of installed materials for testing.
 - 2. Prior to cutting, notching, or boring of any structural elements, including bearing/shear walls, footings, beams, etc., not specifically detailed in the drawings, obtain approval from the Architect and DSA prior to commencement of work.
 - 3. Do not cut or alter work performed under separate contracts without the Architect's written permission.
 - 4. The Contractor shall provide all encroachment permits or others as required in the right-of-way of any adjacent jurisdiction.

1.2 SUBMITTALS

- A. Request for Architect's Consent:
 - 1. Prior to cutting which effects structural safety, submit written request to the Architect for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Architect and secure his written permission and the required Change Order prior to proceeding.
- B. Notices to Architect:
 - 1. Prior to cutting and patching performed pursuant to the Architect's instructions, submit cost estimate to the Architect. Secure the Architect's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
 - 2. Submit written notice to the Architect designating the time the Work will be uncovered, to provide for the Architect's observation.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to a written Change Order, after claim for such reimbursement is submitted by the Contractor. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.
- B. For uncovering work and replacement of work for inspection by the Architect:
 - 1. If work is not compliant, Contractor shall pay all costs,
 - 2. If work is compliant, Owner shall pay for removal and replacement as a Change Order.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection: Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies: If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions. Do not proceed until unsatisfactory conditions are corrected.

3.2 BORING

- A. Provide mechanical boring equipment to bore under existing asphalt, concrete, or other surfaces or objects as noted on the drawings. All borings shall be a minimum of 24" under the substrate material unless otherwise authorized by the Architect.
- B. Holes shall be bored not to exceed 1" larger diameter than the largest component remaining in the excavation.
- C. **Water or air pressure jetting** are not permitted, unless they comply with the following requirements.
 - 1. All surfaces of the hole can be visually inspected with 6' maximum length and,
 - 2. all objects shall be supported continuously to prevent sagging and,
 - 3. the hole shall be filled with compacted damp sand and inspected by the Project Inspector or Materials Testing lab technician.

3.3 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.
- B. Provide protection for other portions of the work which may be affected.
- C. Provide protection from the elements when needed.

3.4 CUTTING AND REMOVAL - GENERAL

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
 - 1. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
 - 2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
- B. Remove existing work indicated to be removed, or as needed for installation of new work.

3.5 MATCHING AND PATCHING

- A. Where items are removed from existing walls, ceilings, floors, partitions, or roofs to remain, repair walls, ceilings, floors, partitions, roofs, etc., disturbed by removal.
- B. Where existing construction is removed, repair abutting walls, ceilings, floors, partitions, or roofs disturbed by removal.
- C. Where existing construction is cut or otherwise disturbed to permit installation of new work, match and patch existing disturbed construction.
- D. Use methods similar in appearance, and equal in quality to areas and surfaces being repaired.
- E. Remove and replace areas, surfaces, or items which cannot be satisfactorily matched or patched.

END OF SECTION 01 7330

SECTION 01 7400 - CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction, including the SWPPP requirements.
- C. Contractor shall include the costs of cleaning and trash disposal in his/her bid designate it in the Schedule of Values.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

3.2 FINAL CLEANING

- A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.
- C. Site: Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site. Completely remove resultant debris.
- D. Structures:
 - 1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter visible from 5'.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
 - 2. Interior:
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter visible from 5'.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
 - 3. Glass: Clean inside and outside.
 - 4. Polished surfaces: Apply polish to surfaces requiring routine application of buffed polish as recommended by the manufacturer of the material.
- E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION 01 7400

SECTION 01 7425 - CONSTRUCTION WASTE MANAGEMENT AND CONTROL

PART 1 - GENERAL

1.1 SUMMARY:

- A. This section specifies diversion of construction and demolition waste from the landfill. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 01 3110: Additional requirements for project meetings and reports.
 - 3. Section 01 3300: Additional requirements for submittal procedures and project documentation.
 - 4. Section 01 5000: Additional requirements related to trash and waste collection and removal facilities and services.
 - 5. Section 01 6600: Waste prevention requirements related to delivery, storage, and handling.
 - 6. Section 01 7330: Trash/waste prevention procedures related to cutting and patching, installation, protection, and cleaning.
 - 7. Section 31 1000: Handling and disposal of excavated soils and land clearing debris.
- C. The following sources may be useful in developing the Waste Management Plan:
 - 1. County engineering or building departments.
 - 2. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at www.bsc.ca.gov/Home/CALGreen.aspx may be used to assist in documenting compliance with the waste management plan.
 - 3. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

1.2 SCOPE OF CONSTRUCTION WASTE MANAGEMENT AND CONTROL

- A. Intent: Construction waste management and control is intended to achieve the following specific objectives:
 - 1. Generate the least amount of trash and waste possible.
 - 2. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
 - 3. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- B. Construction Waste Management Requirement: Recycle and/or salvage for reuse a minimum of **65 percent** of the nonhazardous construction and demolition waste in accordance with Option 1, 2 or 3 listed below; or meet a local construction and demolition waste management ordinance, whichever is more stringent.
 - 1. Option 1 - Construction waste management plan. (Cal Green Code 5.408.1.1) Where a local jurisdiction 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. Determines if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
 - c. Identifies diversion facilities where construction and demolition waste material collected will be taken.
 - d. Specifies that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

2. Option 2 - Waste Management Company. (Cal Green Code 5.408.1.2) Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section.
 3. Option 3 - Waste Stream Reduction Alternative. (Cal Green Code 5.408.1.3) The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65 percent minimum requirement as approved by the enforcing agency.
 4. Documentation: Documentation shall be provided to the enforcing agency which demonstrates compliance with option 1, 2 or 3 above. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.
- C. Recycling Incentive programs are mandatory for this project; Contractor is responsible for implementation:
1. Any revenue or savings shall accrue to Contractor.
 2. Any rebates and credits shall be applied for by Owner and shall accrue to Owner.
- D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.
- E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
1. Aluminum and plastic beverage containers.
 2. Corrugated cardboard.
 3. Wood pallets.
 4. Clean dimensional wood.
 5. Excavated soils and land clearing debris, including brush, branches, logs, and stumps.
 6. Concrete.
 7. Concrete masonry units.
 8. Asphalt paving.
 9. Metals, including packaging banding, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 10. Glass.
 11. Gypsum board and plaster.
 12. Plastic buckets.
 13. Carpet, carpet cushion, carpet tile, and carpet remnants.
 14. Asphalt roofing shingles.
 15. Paint.
 16. Plastic sheeting.
 17. Windows, doors, and door hardware.
 18. Plumbing fixtures.
 19. Mechanical and electrical equipment.
 20. Fluorescent lamps (light bulbs).
 21. Acoustical ceiling tile and panels.
- F. Methods of trash/waste disposal that are not acceptable are:
1. Burning on the project site.
 2. Burying on the project site.
 3. Dumping or burying on other property, public or private.
 4. Other Illegal dumping or burying.
 5. Incineration either on- or off-site.
- G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.3 DEFINITIONS:

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations. Excavated soils and land clearing debris and hazardous or toxic waste are excluded from construction and demolition waste.
- C. Hazardous: Exhibiting the characteristics of hazardous substances (i.e., ignitibility, corrosivity, toxicity or reactivity).
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS:

- A. General: Submit in accordance with Section 01 3300.
- B. Landfill Alternatives Proposal: Within 10 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner, submit a projection of trash/waste that will require disposal and alternatives to landfilling, with net costs.
 - 1. Submit to Architect for Owner's review and approval.

2. If Owner wishes to implement any cost alternatives, the Contract Sum will be adjusted as specified elsewhere.
 3. Include an analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
 4. Describe as many alternatives to landfilling as possible:
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. List the proposed local market for each material.
 - c. State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.
 5. Provide alternatives to landfilling for at least the materials that cannot be recycled, salvaged, or reused as stated under Waste Management Requirements above.
 6. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Architect.
- D. Submit Waste Management Plan within 10 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to land filling.
- E. Waste Management Plan: Include the following information:
1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
 - a. Identify construction waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
 2. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
 - a. Indicate if construction waste materials will be sorted on-site (source separated) or bulk mixed (single stream).
 - b. Indicate how the amount of construction waste materials diverted shall be calculated; by weight or volume, but not both.
 - c. Indicate deconstruction, salvage, and recycling strategies and processes.
 3. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
 4. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. List the local market for each material.
 - c. State the estimated net cost versus landfill disposal.
 5. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
 7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.
- F. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 2. Submit Report on a form acceptable to Owner.

3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and Invoices as evidence of quantity and cost.
 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards of trash/waste material from the project delivered to Incinerators.
 - c. State the identity of Incinerators, total amount of fees paid to Incinerator, and total disposal cost.
 - d. Include manifests weight tickets, receipts, and invoices as evidence of quantity and cost.
 5. Recycled and Salvaged Materials: Include the following Information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 6. Material Reused on Project: include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
 7. Other Disposal Methods: include information similar to that described above, as appropriate to disposal method.
- G. Recycling Incentive Programs:
1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
 2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

PART 2 - PRODUCTS

2.1 PRODUCT SUBSTITUTIONS:

- A. See Section 01 6200 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6200:
 1. Relative amount of waste produced, compared to specified product.
 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
 3. Proposed disposal method for waste product.
 4. Markets for recycled waste product.

PART 3 - EXECUTION

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION:

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings; particularly at:
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.
 - 4. Job safety meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal for use by all contractors and installers.
 - 1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 - c. Recycling bins at worker lunch area.
 - 2. Provide containers as required.
 - 3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
 - 4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
 - 5. Locate enclosures out of the way of construction traffic.
 - 6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
 - 8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Excavated Soils and Land Clearing Debris: 100% of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled, except for reuse, either on site or off site of vegetation or soil contaminated by disease or pest infestation.
 - 1. For a phased project, such material may be stockpiled on site until the storage site is developed.
 - 2. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material.
 - 3. See www.cdfa.ca.gov/exec/county/county_contacts.html.
- G. Hazardous or Toxic Waste: Separate, store, and dispose of hazardous waste according to applicable regulations.
- H. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- I. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- J. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION 01 7425

SECTION 01 7700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for an orderly and efficient transfer of the completed Work to the Owner.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 01 3300: Submittal procedures.
 - 3. Section 01 4520: Payment procedures for retesting.
 - 4. Section 01 7400: Final cleaning.
 - 5. Section 01 7820: Operation and maintenance data.
 - 6. Section 01 7840: Project record documents.
 - 7. Certifications and Warranties as noted in each specification section.

1.2 QUALITY ASSURANCE

- A. Prior to requesting inspection by the Architect, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Complete the following prior to requesting inspection for substantial completion.
 - 1. Prepare and submit the list of items to be completed or corrected required by the General Conditions.
 - 2. Closeout Submittals:
 - a. Prepare and submit an electronic submittal of each closeout submittals including, but not limited to, the following:
 - i. In-Service Certifications required by Divisions 1 through 33 of the specifications executed by the appropriate persons on form provided in this Section.
 - ii. Project Asbestos Certification executed by Contractor on form provided in this Section;
 - iii. Project record documents complying with the requirements of Section 01 7840;
 - iv. Project Warranty executed by the Contractor on form provided in this Section.
 - v. Special warranties as specified in Divisions 1 through 33 of the specifications.
 - vi. Maintenance agreements required by Divisions 1 through 33 of the specifications;
 - vii. Operation and maintenance manuals required by Divisions 1 through 33 of the specifications complying with the requirements of Section 01 7820;
 - viii. Manufacturer's recommended cleaning procedures required by Divisions 1 through 33;
 - ix. Certifications required by Divisions 1 through 33 of the specifications.
 - x. Test reports required by Divisions 1 through 33 of the specifications.
 - xi. Final versions of all: submittals, RFIs, bulletins, change order requests and change orders.
 - b. Upon the Architect's acceptance of the Closeout Submittal, provide one complete hard copy in 3-ring binders, including "wet-signature" original documents for the Owner's record.
 - 3. Advise Owner of pending insurance change over requirements.
 - 4. Obtain and submit releases from governmental agencies having jurisdiction enabling the Owner unrestricted use of the Work and access to service and utilities; include occupancy permits, operating certificates, and similar releases.
 - 5. Deliver special tools, spare parts, extra materials, and similar items.
 - 6. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of

change-over in security provisions.

7. Complete start-up testing and balancing of systems, and instruction and demonstration of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
8. Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
9. Submit a list of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
10. In the presence of the Owner and the Inspector of Record, locate all utility devices required for control, manipulation, or shut-off of building and site utility systems including, but not limited to cleanouts, valves, dampers, valve boxes, pull boxes, handholes, manholes, etc., whether exposed, concealed, or in-ground.

B. Inspection Procedures:

1. Within 5 days of receipt of Contractor's list of items to be completed or corrected, the Architect will make an "initial inspection" and provide the Contractor with an additional list of discrepancies. When the Contractor corrects the items indicated by the Architect and any other, the Contractor shall notify the Architect for the Final Acceptance Inspection.
2. All closeout submittal items as listed in paragraph 1.3.A above shall be completed prior to Notice of Completion being submitted to the Owner for acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Prior to requesting final inspection for certification of final acceptance and final payment, prepare and submit the following:

1. Final application for payment with release of liens/stop notices and supporting documentation not previously submitted and accepted.
2. Updated final statement, accounting for final additional changes to the Contract Sum;
3. Final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
4. Final liquidated damages settlement statement, where applicable.
5. Payment by the Contractor of all backcharge items, including but not limited to utilities, materials retesting, and reinspections.
6. Contractor's final verified report, DSA-6C.
7. Contractor shall coordinate switch-over of utilities following Substantial Completion and approval of the Architect. Provide proof of payment for electricity, water, gas and other utilities that are a part of this contract.

B. Inspection Procedures:

1. Within 5 days of receipt of Contractor's written request for Final Acceptance Inspection, the Architect will make a "final inspection" to review the "initial inspection" list of discrepancies and identify any additional discrepancies discovered.
2. Reinspection: Should the Contractor not have completed the Work as required by the Contract Documents, not have completed the items identified on the list of discrepancies, or should the Architect reject portions of the Work, all further inspections, time expended, and reimbursable expenses incurred by the Architect, his representatives, or consultants for final acceptance will be considered additional services and will be charged at the following rates:
 - a. Project Architect: \$265/hr or \$530.00 per inspection minimum.
 - b. Architect's Representative: \$185/hr or \$370.00 per inspection minimum.
 - c. Consultants: The direct cost to the Architect plus 10% or \$400.00 per inspection minimum.
3. The Architect will bill Owner for additional services required by the Architect and/or consulting engineers for such additional inspections, time expended, and reimbursable expenses incurred, and Owner shall be reimbursed by deducting the same amount from the final payment.

4. Determination of necessity for such reinspections will be made by consultation between the Owner and the Architect.

END OF SECTION 01 7700

Specification Section No. _____

IN-SERVICE CERTIFICATIONPROJECT: PROJECT NAME
Project Address

DATE:

OWNER:
ARCHITECT: Mangini Associates Inc.
CONTRACTOR:
INSPECTOR:PROJECT NO.:
DSA FILE NO.:
DSA APPL. NO.:

IN-SERVICE CONDUCTED BY: _____

MATERIALS REVIEWED (Check applicable boxes)

☐ RECORD DRAWINGS	☐ SAFETY PROCEDURES	☐ SHUT DOWN
☐ WARRANTIES	☐ CLEANING PROCEDURES	☐ CONTROLS MANIPULATION
☐ MAINTENANCE AGREEMENT	☐ IDENTIFICATION SYSTEMS	☐ EMERGENCY PROCEDURES
☐ OPERATION & MAINTENANCE MANUALS	☐ START-UP	☐ NOISE/VIBRATION ADJUSTMENT
☐ SPECIAL TOOLS AND PARTS	☐ CONTROL SEQUENCES	☐ EFFECTIVE ENERGY UTILIZATION

ATTENDEES (Please print name and sign below)

1. DISTRICT FACILITIES REPRESENTATIVE

2. SITE REPRESENTATIVE

3. DISTRICT MAINTENANCE REPRESENTATIVES

(Plumbing)

(Mechanical)

(Electrical)

(Grounds)

4. OTHERS PRESENT (FOR GENERAL
CONTRACTOR, ETC.)

MEETING DATE: _____ TIME OF START: _____ TIME OF COMPLETION: _____

I CERTIFY THAT THE ABOVE NAMED IN-SERVICE COVERED ALL ASPECTS OF THE SPECIALTY FOR WHICH IT WAS CONVENED.

Signature _____ Date _____

PROJECT ASBESTOS CERTIFICATION

PROJECT: **PROJECT NAME**

Project Address

DATE:**OWNER:****PROJECT NO.:****ARCHITECT:**

Mangini Associates Inc.

DSA FILE NO.:**CONTRACTOR:****DSA APPL. NO.:****INSPECTOR:****TO:****FROM:****SUBJECT: Asbestos Containing Building Materials Letter**

I hereby certify that, to the best of my knowledge, the materials furnished and/or installed by

(General Contractor) _____

or its subcontractors on the (Name of Project) _____

located at (Street Address, City, State) _____

do not contain Asbestos Containing Building Materials.

Date_____
Contractor_____
Address

Telephone_____
Signature of Contractor_____
Title

PROJECT WARRANTY

PROJECT:**PROJECT NAME****DATE:**

Project Address

OWNER:**PROJECT NO.:****ARCHITECT:** Mangini Associates Inc.**DSA FILE NO.:****CONTRACTOR:****DSA APPL. NO.:****INSPECTOR:**

_____(Contractor) hereby warrants to the Owner that materials and equipment furnished under the Contract in the (Name of Project) _____

are of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work is free from defects not inherent in the quality required or permitted, and that the Work conforms with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. This warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

If, within 1 year after the date of Substantial Completion of the Work or designated portion thereof, or by terms of an applicable special warranty required by the Contract Documents extending this time period, any of the Work is found to be not in accordance with the requirements of the Contract Documents or proves to be defective in materials or workmanship, the Contractor expressly agrees to correct it, without expense to the Owner, promptly after receipt of written notice from the Owner or his agent to do so unless the Owner has previously given the Contractor written acceptance of the condition. This period of 1 year shall be extended with respect to portions of the Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation of the Contractor to correct the Work shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

Nothing contained in this warranty shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of 1 year, or special extended time periods required by the Contract Documents, for correction of the Work as described above relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

In the event of the Contractor's failure to comply with the conditions of this warranty within 10 days after being notified in writing by the Owner or his agent, the Contractor hereby authorizes the Owner to proceed to have said defects repaired and made good at the Contractor's expense and the Contractor will honor and pay the costs and charges therefor upon demand.

The term "Work" means the construction and services required by the Contract Documents and includes all other labor, materials, equipment and services provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or part of the total construction performed under the Contract Documents.

Date_____
Telephone_____
Contractor_____
Signature of Contractor_____
Address_____
Title

SECTION 01 7820 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 3300.
- B. Submit an Electronic Submittal preliminary draft of the proposed Manual or Manuals to the Architect for review and comments.
- C. Unless otherwise directed in other Sections, or in writing by the Architect, submit one original set of binders of the final Manual to the Architect prior to indoctrination of operation and maintenance personnel.

1.3 QUALITY ASSURANCE

- A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

- A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format (Preliminary Electronic Submittal):
 - 1. Comply with pertinent provisions of Section 01 3300.
 - 2. Minimum components:
 - a. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.
 - i. Bookmark all .pdf files to match the table of contents.
 - b. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
 - c. Complete nomenclature of all parts of the equipment.
 - d. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
 - e. All guarantees and warranties issued.

- f. Manufacturers' bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
 - g. Such other data as required in pertinent other Sections of these Specifications.
- C. Format (Final Hard Copy):
 - 1. Size: 8-1/2" x 11"
 - 2. Paper: White bond, at least 20 lb weight
 - 3. Text: Neatly written or printed
 - 4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
 - 5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
 - 6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to the Architect's approval.
 - 7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formulae, provide additional measurements in the "International System of Units" (SI).
- D. Provide front and back covers for each Manual, using durable material approved by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

(name and address of Work)

(name of Contractor)

(general subject of this Manual)

(space for signature of)
(the Architect, and approval date)

PART 3 - EXECUTION

3.1 OPERATION AND MAINTENANCE MANUALS

- A. Preliminary:
 - 1. Prepare a preliminary electronic submittal of each proposed Manual.
 - 2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.
 - 3. Secure the Architect's approval prior to proceeding.
- B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.
- C. Revisions:
 - 1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Architect.
 - 2. Following the indoctrination meeting, complete the "In-Service Certification" form and include it as part of the Operation and Maintenance Manual.

3. If the Contractor is required by the Architect to revise previously approved Manuals, compensation will be made as provided for under "Changes" in the General Conditions.

END OF SECTION 01 7820

SECTION 01 7840 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below and, upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in Article 3.2 below.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 3300.
- B. The Architect's approval of the current status of Project Record Documents may be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting each request for progress payment, secure the Architect's approval of the current status of the Project Record Documents.
- D. Prior to submitting request for final payment, submit the final Project Record Documents to the Architect and secure his approval.

1.3 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Architect.
- B. Accuracy of Records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future searches for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to secure data to the Architect's approval.
 - 1. Such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials.

2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS

- A. Record Documents:
 1. Job Set: Promptly following receipt of the Owner's Notice to Proceed, secure from Architect, at no charge to Contractor, one complete set of all Documents comprising the Contract, and post all addenda.
 2. Post all requests for information, bulletins, and change orders as they occur.
 3. Show all underground utility locations and routings by horizontal and vertical dimension.
 - a. Record width of trenches in cases where multiple pipes or conduits are installed.
 - b. Record the number and sizes of pipes and conduit where trench combines power, fire alarm, and communications.
 4. Show all overhead utility locations and routings by horizontal and vertical dimension.
 5. At a time nearing completion of the Work, submit the Job Set to the Architect for review.
- B. Preliminary Record Documents Submittal:
 1. Make an electronic PDF format color copy of the Job Set and submit to the Architect for review.
 - a. Bookmark each sheet with sheet number and title to match the sheet index on the cover sheet of the drawings.
- C. Final Record Documents:
 1. Upon the Architect's acceptance of the Job Set, make one complete copy of all sheets, including copies of the backs of sheets used to post record information, and including added sheets used to post record information. This copy shall be submitted to the Architect for distribution to the Owner.
 2. Include an electronic PDF format color copy of the accepted Job Set.

PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1.A above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET", and post all addenda.
- B. Preservation:
 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the Job Set to the approval of the Architect.
 2. Do not use the Job Set for any purpose except entry of new data and for review by the Architect.
 3. Maintain the Job Set at the site of Work as designated by the Architect.
- C. Making Entries on Drawings:
 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
 2. Date all entries.
 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Architect.
- E. Conversion of Schematic Layouts:
 1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.

- a. Final physical arrangement is determined by the Contractor, subject to Architect's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
2. Show on the Job Set, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.1.E.1 above.
 - a. Clearly identify the item by accurate note such as "cast iron drain", "galv. water", and the like.
 - b. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed", and the like).
 - c. Make all identification so descriptive that it may be related reliably to the Specifications.
3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

3.2 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Method of Showing Changes:
 1. Carefully record change data, coordinating the changes as required.
 2. Clearly indicate at each affected detail and other Drawings a full description of changes made during construction, and actual location of underground and overhead utility locations and routes.
 3. Call attention to each entry by drawing a "cloud" around the area or areas affected.
 4. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION 01 7840

SECTION 02 3100 - SUBSURFACE UTILITY INVESTIGATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes investigation and identification of location of overhead, surface, and underground utilities by the Contractor using firm specializing in underground utility verification.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Divisions 1 through 16 of these Specifications.
 - 2. Section 02 4100: Demolition.
 - 3. Section 31 2000: Earthwork.

PART 2 - PRODUCTS

2.1 UTILITY VERIFICATION COMPANIES

- A. Use utility verification firm specializing in underground utility location.
 - 1. Off-site utility verification: Underground Service Alert (USA), 800/642-2444.
 - 2. On-site utility verification:
 - a. MDR Utility, (559) 827-3713.
 - 3. Verify and stake all on-site utilities with Owner and on-site investigation prior to excavation.

PART 3 - EXECUTION

3.1 INVESTIGATION

- A. Prior to demolition, trenching, and earthwork operations, identify location, routing, and elevation of underground utilities in the construction area and along utility trench routings with the Owner.
- B. Verify existing utilities with the service providers (i.e., power, telephone, water, sewer, cable TV, etc.) to the point of connection on site (meter, transformer, etc.)
- C. Locate underground utilities using electronic detection when available, utility map analysis, and on-site survey.
- D. Underground utilities include but are not limited to gas, water, sewer, storm drain, electrical power and signals (fire alarm, telephone, computer, intercom, data), and sprinkler irrigation and controls.
- E. Where non-metallic utilities such as storm drain lines are in the work site, snake metallic trace lines through the line prior to electronic detection.

3.2 IDENTIFICATION

- A. Identify underground utilities by stakes, flags, and painted lines.
- B. Document the invert elevation of all cleanouts, manholes, and drainage structures.
- C. Maintain staking and marking of such utilities throughout the duration of the Work.

3.3 COORDINATION

- A. Coordinate the proposed routing and elevation of pipes, conduits, and trenches that are part of the Work with existing utilities.
- B. Coordinate the routing and elevation of new underground utilities with existing underground utilities. Notify the Architect immediately of any conflicts, prior to proceeding with demolition, trenching, or earthwork operations.

3.4 SITE CONDITIONS

- A. Where existing utilities are indicated on the drawings, extreme care shall be exercised in excavating near these utilities to avoid damage, and the Contractor will be held responsible for any damage caused by construction operations.
- B. Should utilities not indicated on the drawings be found during construction, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from construction operations after discovery of these utilities.

3.5 UNFORSEEN CONDITIONS

- A. Utilities and obstructions not traceable or noted on the Drawings will be considered unforeseen. Should such lines be encountered and damaged, the Contractor shall repair such condition immediately. The cost of repairs will be compensated to the Contractor on a time-and-materials basis by change order.

END OF SECTION 02 3100

SECTION 02 4100 - BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. In accordance with pertinent provisions of this Section, carefully demolish and remove from the site those items scheduled to be so demolished and removed. Section includes:
 - 1. Building demolition excluding removal of hazardous materials and toxic substances.
 - 2. Removal of designated construction.
 - 3. Disposal of materials.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 1. Section 00 3100: Information about known hazardous materials.
 - 2. Section 01 1110: Work sequence, continued occupancy of the building, limitations on Contractor's use of site and premises, description of items to be removed by Owner, description of items to be salvaged or removed for re-use by Contractor.
 - 3. Section 01 5000: Temporary enclosures, dust control barricades, security at occupied areas, waste removal, and cleanup during construction.
 - 4. Section 01 5720: Temporary erosion and sedimentation control.
 - 5. Section 01 6600: Handling and storage of items removed for salvage and relocation.
 - 6. Section 01 7300: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
 - 7. Section 01 7330: Cutting and patching.
 - 8. Section 02 0160: Relocation of existing trees, shrubs, and other plants, pruning of existing trees to remain.
 - 9. Section 07 0150: Removal of existing roofing, roof insulation, flashing, trim, and accessories.
 - 10. Section 31 2000: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.2 REFERENCES

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022.

1.3 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
 - 2. Identify demolition firm and submit qualifications.
 - 3. Include a summary of safety procedures.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.4 QUALITY ASSURANCE

- A. Demolition Firm: Company specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.
- B. Applicable Codes: Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection. Perform demolition work in accordance with Chapter 33, 2022 California Fire Code.
- C. Obtain required permits from authorities. and comply with the requirements of the governing jurisdictions.
- D. Do not close or obstruct egress from any building exit or site exit.
- E. Do not disable or disrupt building fire or life safety systems without 3 days' prior written notice to Owner.
- F. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

1.5 SEQUENCING

- A. Sequence work under the provisions of Section 01 1110.

1.6 PROJECT CONDITIONS

- A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- B. Comply with other requirements specified in Section 01 7300.
- C. Conduct demolition to minimize interference with adjacent and occupied building areas.
- D. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fill Material: As specified in Section 31 2000 - Earthwork.

PART 3 - EXECUTION

3.1 SCOPE

- A. Remove the entire building indicated.
- B. Within area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.
- C. Outside area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.

- D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 7. Do not close or obstruct roadways or sidewalks without permit.
 - 8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Demolished material shall be considered property of the Contractor and shall be completely removed from the job site except where specifically noted otherwise. Do not burn or bury materials on site.
- C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- D. Do not begin removal until receipt of notification to proceed from Owner.
- E. Do not begin removal until built elements to be salvaged or relocated have been removed.
- F. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
- G. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
- H. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- I. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.3 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.

- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.4 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100

SECTION 02 4210 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. In accordance with pertinent provisions of this Section, carefully demolish and remove from the site those items scheduled to be so demolished and removed. Section includes:
 - 1. Selective demolition of built site elements.
 - 2. Selective demolition of building elements for alterations purposes.
 - 3. Abandonment and removal of existing utilities and utility structures.
 - 4. Removal and/or relocation of designated building equipment and fixtures.
 - 5. Removal of designated construction.
 - 6. Disposal of materials.
 - 7. Storage of removed materials where indicated.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 1. Section 00 3100: Information about known hazardous materials.
 - 2. Section 01 1100: Work sequence, continued occupancy of the building, limitations on Contractor's use of site and premises, description of items to be removed by Owner, description of items to be salvaged or removed for re-use by Contractor.
 - 3. Section 01 5000: Temporary enclosures, dust control barricades, security at occupied areas, waste removal, and cleanup during construction.
 - 4. Section 01 5720: Temporary erosion and sedimentation control.
 - 5. Section 01 6600: Handling and storage of items removed for salvage and relocation.
 - 6. Section 01 7300: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
 - 7. Section 01 7330: Cutting and patching.
 - 8. Section 02 0160: Relocation of existing trees, shrubs, and other plants, pruning of existing trees to remain.
 - 9. Section 03 3540: Demolition of existing flooring to be polished and dyed.
 - 10. Section 07 0150: Removal of existing roofing, roof insulation, flashing, trim, and accessories.
 - 11. Section 31 1000: Vegetation and existing debris removal.
 - 12. Section 31 2000: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.2 REFERENCES

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022.

1.3 QUALITY ASSURANCE

- A. Applicable Codes: Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection. Perform demolition work in accordance with Chapter 33, 2022 California Fire Code.
- B. Obtain required permits from authorities and comply with the requirements of the governing jurisdictions.
- C. Do not close or obstruct egress from any building exit or site exit.

- D. Do not disable or disrupt building fire or life safety systems without 3 days' prior written notice to Owner.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

1.4 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied properties in the general area of the project site.
- B. Cease operations immediately if operations appear to be causing any detrimental effect to adjacent properties and notify Architect. Do not resume operations until directed.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide, erect, and maintain temporary barriers as required for the work.
- B. Protect any existing improvements noted to remain or not noted for demolition.
- C. Mark location and termination of utilities.

3.2 EXAMINATION

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only. By careful study of the Contract Documents, determine the location and extent of selective demolition to be performed. Visit the site and verify the extent and location of selective demolition required.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Carefully identify limits of selective demolition.
 - 3. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
 - 4. Report discrepancies to Architect before disturbing existing installation.
 - 5. Beginning of alterations work constitutes acceptance of existing conditions.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 7. Do not close or obstruct roadways or sidewalks without permit.

8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Demolished material shall be considered property of the Contractor and shall be completely removed from the job site except where specifically noted otherwise. Do not burn or bury materials on site.
 - C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
 - D. Do not begin removal until receipt of notification to proceed from Owner.
 - E. Do not begin removal until built elements to be salvaged or relocated have been removed.
 - F. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
 - G. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
 - H. Protect existing structures and other elements that are not to be removed.
 1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.

3.3 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of demolition work constitutes acceptance of existing conditions.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
 2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
- E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.
- F. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and Intrusion Alarm): Remove existing systems and equipment as indicated.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. See Section 01 1110 for other limitations on outages and required notifications.
 4. Verify that abandoned services serve only abandoned facilities before removal.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

3.5 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

3.6 REPLACEMENTS

- A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Architect and at no additional cost to the Owner.

END OF SECTION 02 4210

SECTION 03 1510 - POST-INSTALLED ANCHORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide post-installed anchors where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
 - 1. Definition: Post-installed anchors are concrete anchors installed in drilled holes after concrete has hardened and includes expansion anchors, screw anchors, and epoxy-type (adhesive) anchors.
- B. Related Sections:
 - 1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to work of this section.
 - 2. Section 03 3000: Cast-in-place concrete.
 - 3. Section 05 5000: Metal fabrications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
- B. Product Data:
 - 1. Submit manufacturer's descriptive literature and product specifications for each product.
 - 2. Include data to indicate compliance with the specified requirements.
 - 3. Submit manufacturer's recommended installation procedures.
 - 4. Submit current ICC research or evaluation reports evidencing maximum allowable shear and withdrawal load data.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: To ensure consistent quality of anchorage, obtain concrete expansion anchors from a single manufacturer.
- B. Manufacturer Qualifications: Provide concrete expansion anchors with current International Code Council Evaluation Service Reports acceptable to the Division of the State Architect, and in conformance with the 2022 California Building Code.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Hilti KB-TZ2 (ESR 4266).
 - 2. Simpson Strong-Bolt (ESR-1771).
 - 3. Hilti HUS-EZ (ESR-3027).
 - 4. SimpsonTiten HD (ESR-2713).
 - 5. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

- B. Finish: Type 316 stainless steel at exterior applications; zinc-plated at interior applications; mechanically galvanized or type 316 stainless steel when in contact with preservative treated lumber.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages and directions for installation from manufacturer for items to be embedded in concrete construction.

3.2 INSTALLATION

- A. Fastening to In-Place Construction (New or Existing Concrete): Provide anchorage devices where necessary for securing designated items indicated on the drawings, or as necessary for a complete and proper job to in-place construction.
- B. Install post-installed anchors in strict accordance with the manufacturer's written instructions.
- C. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for designated items of construction. Set work accurately in location, alignment and elevation, level true and free of rack, measured from established lines and levels.
- D. Concrete shall attain the specified design strength per the contract documents (2,500 psi minimum) prior to installation of post-installed anchors. Adhesive anchors shall be installed into concrete having a minimum age of 21 days at the time of installation. No anchors shall be installed into concrete that is less than 7 days old.

3.3 TESTING AND INSPECTION REQUIREMENTS

- A. General Testing Requirements:
 - 1. For verifying satisfactory installation workmanship, an independent testing laboratory shall proof load tests for concrete expansion anchors acting in tension in the presence of the project inspector.
 - 2. If any anchor fails testing, test all anchors of the same type, not previously tested until 20 consecutive anchors pass, then resume the initial test frequency.
 - a. If anchors are used for the support and bracing of non-structural components such as pipe, duct or conduit, the 20 consecutive anchors shall be only those anchors installed by the same trade.
 - 3. Continuous Inspection: Continuous inspection shall be provided during installation by project inspector.
- B. Testing Frequency:
 - 1. Sill Plate Bolting: Test 10% of anchors.
 - 2. Other Structural Applications: Test all anchors.
 - 3. Non-structural Applications and Equipment Anchorage: Test 50% or alternate bolts in a group, including at least 1/2 of the anchors in each group.
 - 4. Exceptions:
 - a. Undercut anchors that allow visual confirmation of full set shall not require testing.
 - b. Where the factored design tension on anchors is less than 100 pounds and the anchor is clearly noted on the approved construction documents, only 10% of those anchors shall be tested.
 - c. Where adhesive anchor systems are used to install reinforcing dowel bars in hardened concrete, only 25% of the dowels shall be tested if all of the following conditions are met:
 - 1) The dowels are used exclusively to transmit shear forces across joints between existing and new concrete.
 - 2) The number of dowels in any one member equal or exceeds 12.
 - 3) The dowels are uniformly distributed across a seismic force resisting members (such as shear walls, collectors, and diaphragms).

- 4) Anchors to be tested shall be selected at random by the special inspector.
 - d. Testing of shear dowels across cold joints in slabs on grade, where the slab is not part of the lateral force-resisting systems shall not be required.
 - e. Testing is not required for power actuated fasteners used to attach metal tracks of interior non-shear wall partitions for shear only, where there are at least three fasteners per segment of track.
- C. Test Loads: Test loads shall be listed in the contract drawings and shall be determined by one of the following methods:
- 1. Twice the maximum allowable tension load or 1-1/4 times the maximum design strength of anchors as provided in the anchor's ICC-ESR or in accordance with Chapter 17 of ACI 318.
 - a. Tension test load need not exceed 80% of nominal yield strength of anchor element ($0.8A_bF_y$).
 - 2. Tension or torque test values from the table within the contract drawings.
- D. Test Acceptance Criteria: Use the ICC-ESR for the anchor installed or the manufacturer's written instructions, acceptable to DSA. Field tests shall satisfy the following minimum requirements:
- 1. Hydraulic Ram Method: Anchors tested with a hydraulic jack or spring loaded devices shall maintain the test load for a minimum of 15 seconds and shall exhibit no discernible movement during the tension test, e.g. as evidence of loosening of the washer under the nut. For adhesive anchors, where other than bond is being tested, the testing devices shall not restrict the concrete shear cone type failure mechanism from occurring.
 - 2. Torque Wrenched Method: Anchors tested with a calibrated torque wrench must attain the specified torque within 1/2 turn of the nut.
 - a. Exceptions:
 - 1). Wedge or Sleeve type: 1/4 turn of the nut for a 3/8" sleeve anchor only.
 - 2). Screw Type: 1/4 turn of screw after initial seating of the screw head.
- E. Testing Procedure:
- 1. Testing procedure shall be as required by the manufacturer's ICC-ESR.
 - 2. Manufacturer's recommendation for testing may be approved by the enforcing agency, when ICC-ESR does not provide testing procedure.

END OF SECTION 03 1510

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide cast-in-place concrete, including form work and reinforcement, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
 - 1. The work of this Section includes special precautions to reduce cracking in concrete slabs.
 - 2. The work of this Section includes special procedures to reduce moisture vapor emissions through interior concrete slabs.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 03 1510: Post-installed Anchors.
 - 3. Section 07 9210: Joint Sealants.
 - 4. Section 09 6110: Moisture control treatment for flooring.
 - 5. Section 31 2000: Earthwork.
- C. Special Coordination Requirements: Coordinate with the work of the following sections to identify the finish flooring manufacturer's concrete slab requirements. Such requirements may be over and above the requirements of the Contract Documents and may require additional materials, means, or methods, which shall be included as part of the Work.
 - 1. Section 09 6500: Resilient flooring.
 - 2. Section 09 6800: Carpeting.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Mix Designs: Secure concrete mix designs from the concrete supplier or the testing laboratory in accordance with provisions of Section 01 4520, and submit to the Architect for review and approval. Distribute approved mix designs to testing laboratory, batch plant, job site, and governmental agencies having jurisdiction.
 - a. Include a statement clearly indicating the concrete supplier's proposed basis of concrete mix proportions based on ACI 301-16, Section 4.2.3.
 - b. When ACI 301-16, Section 4.2.3 is used, strength records used for establishing and documenting concrete mixture proportions shall not be more than 24 months old.
 - 2. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements for the following:
 - a. Vapor barrier.
 - b. Curing materials.
 - c. Admixtures.
 - d. Slip dowel system.
 - 3. Shop Drawings: Submit shop drawings for the reinforcing steel.
 - 4. Submit cementitious materials certification to DSA complying with CBC Section 1910A.1.
 - 5. Submit batch tickets of each load to the Inspector of Record.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with 2022 California Building Code except where more stringent requirements are shown or specified.

- B. In accordance with CBC Section 1705A.3.5, do not place concrete until forms and reinforcement have been inspected, all preparations for placement have been completed, and preparations have been checked by the Inspector of Record, all subject to observation of the Architect, Structural Engineer and DSA.
- C. Placing Record: In accordance with CBC Section 1705A.3.6, keep a concrete placing record on site recording the time and date of placing the concrete in each portion of the structure. Keep placing record until completion of the structure and make available to the inspection of the Owner, Architect, Structural Engineer, Inspector of Record, and DSA.
- D. Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic finish and texture of site concrete, parking lot concrete and fire lane concrete. Approval does not constitute approval of deviations from Contract Documents, unless Architect specifically approves deviations in writing.
 - 1. Form, reinforce, and cast concrete slab for 3 foot square field mock-up. One mock-up for each finish and texture specified.
 - 2. Concrete shall be same mix design as scheduled for Project.
 - 3. Perform placement and finishing work using same personnel as will place and finish concrete for Project.
 - 4. Mock-up shall be representative of work to be expected.
 - 5. Approval is for following aesthetic qualities:
 - a. Compliance with approved submittals.
 - b. Compliance with specified finish and texture.
 - d. Compliance with specified color.
 - 6. Obtain mock-up approval by the Owner, Architect and Project Inspector before starting work on Project.
 - 7. Unacceptable mock-ups shall be removed from the site and reinstalled until the mock-up is deemed to be in compliance with the project requirements and is acceptable by the Owner, Architect and Project Inspector.
 - 8. Protect and maintain approved field mock-ups during construction in an undisturbed condition as a standard for judging completed work. Remove mock-up and dispose of materials when no longer required and when directed by the Architect at the end of the project.

1.4 NOTICE CONCERNING SLAB CURLING AND SHRINKAGE CRACKING

- A. The Contractor is hereby notified that concrete construction practices and concrete materials can significantly increase the potential for cracking and slab curling, which include the following:
 - 1. Placement of slabs over high-moisture content subgrade.
 - 2. Increased mix temperature.
 - 3. Excessive haul in transit mixture, too long a waiting period at the project site, or too many revolutions at mixing speed.
 - 4. Use of smaller size aggregate under conditions where larger could have been used.
 - 5. Use of mixture having high shrinkage characteristics.
 - 6. Excessive coatings on aggregate due to insufficient washing or contamination during handling.
 - 7. Use of aggregates of poor inherent quality with respect to shrinkage.
 - 8. Exceeding the maximum water/cement ratio.
- B. The Contractor is responsible for choosing concrete materials and for implementing concrete construction practices which minimize slab curling and shrinkage cracking.

1.5 INTERNAL MOISTURE REDUCTION

- A. Moisture in Concrete Slabs:
 - 1. The Contractor is hereby notified that finish flooring adhesive is extremely sensitive to alkaline solutions (generally pH of 9.0 or greater). Highly alkaline solutions can be formed by moisture vapor within

concrete slabs condensing under impermeable flooring materials and combining with alkaline materials naturally occurring in concrete. Impermeable finish flooring materials include sheet vinyl, vinyl composition tile, vinyl-backed carpet, and elastomeric floor systems.

2. The Contractor is hereby notified that concrete construction practices are a major source of moisture within concrete slabs. These practices should be given proper attention to help reduce moisture within concrete slabs:
 - a. Water/cement ratio too high to provide for proper hydration and densification.
 - b. Lack of protection of prepared moisture barrier assembly from precipitation.
 - c. Floating practices which seal the surface of the concrete and prevent proper evaporation of bleed water.
 - d. Curing practices and admixtures that prevent proper hydration by rushing the process.

B. Contractor's Responsibility:

1. Interior concrete slabs shall meet the requirements of the Contract Documents. The Contractor shall use whatever means and methods are necessary to place and maintain slabs meeting such requirements.
2. Interior concrete slabs shall conform to additional requirements and recommendations of the finish flooring manufacturers.

1.6 SPECIAL WARRANTY

- A. Manufacturer's Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 copies of a warranty from the interior slab curing product manufacturer with an extended correction period of **15-years** covering labor and materials to replace or repair floor covering that fails due to moisture migration or moisture-born alkalinity contaminates originating from the concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 FORMS

- A. Design, erect, support, brace, and maintain formwork so it will safely support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure.
- B. Except for metal forms, use new materials. Materials may be re-used during progress of the Work, provided they are completely cleaned and reconditioned, recoated for each use, and capable of producing formwork of the required quality.
1. Form Facing for Exposed to View Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
 2. Chamfer or radius outside corners of beams, joists, columns, and walls.
- C. Slip Dowel System: Speed Dowel by Westec Barrier Technologies; #4 rebar dowels x 24" long at 18" on center, minimum of 12" sleeve.
- D. Snap Ties: Snap Ties by Dayton/Richmond Concrete Accessories (Constar Supply 559-564-5012), with A-8 Waterseal Washer.
- E. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not

requiring removal for satisfactory bonding of coatings to be applied.

2.3 MOISTURE BARRIER

- A. Capillary Break: 3" of 3/8" natural pea gravel or 3/4" maximum crushed rock.
- B. Vapor Barrier: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
 - 1. Acceptable Products:
 - a. Stego Wrap 15-mil Vapor Barrier by Stego Industries LLC.
 - b. Vaporguard by Reef Industries.
 - c. Perminator 15-mil by W.R. Meadows.
 - d. Viper Vaporcheck II 15-mil Class A Vapor Barrier by ISI Building Products.
 - 2. Material Properties:
 - a. Manufactured from prime virgin resins.
 - b. Permeance Rating: ASTM F1249, 0.01 perms or lower.
 - c. Permeance after Conditioning: ASTM E154, Sections 8, 11, 12, and 13: Less than 0.01 perms.
 - d. Puncture Resistance: ASTM E1709, minimum 2200 grams.
 - e. Tensile Strength: ASTM D882, minimum 50.0 lbf/in.
 - 3. Seal Tapes: Manufacturer's recommended tape for sealing seams in the vapor barrier and for sealing the vapor barrier to fresh concrete.
 - 4. Mastic: Manufacturer's recommended mastic.
 - 5. Accessories: Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.
- C. Compactable Slab Base: 3" of granular fill that is compactable, will remain stable, and support construction traffic.
 - 1. Granular fill is defined as a clean, fine grained uniformly-graded material with at least 10% to 30% of particles passing a No. 100 sieve, but not contaminated with clay, silt, or organic material.
 - 2. Expansion Index: < 15
 - 3. The use of clean concrete sand will not be permitted.

2.4 REINFORCEMENT

- A. Comply with the following as minimums:
 - 1. Bars: ASTM A615, Grade 40 for #3 bars and smaller, Grade 60 for #4 bars and larger, using deformed bars for #3 and larger.
 - 2. Bending: ACI 318-19, Section 26.6.3.
 - a. Bars shall be limited to one shop or field bend at any location on the bar.
 - b. Partially embedded bars shall not be field bent, except as indicated on the Drawings or permitted by the Architect.
 - c. A bar bent in the incorrect location shall not be straightened; such bars shall be discarded.
- B. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in ACI 318-19.
- C. Do not use reinforcement having any of the following defects:
 - 1. Bar lengths, depths, or bends exceeding the specified fabricating tolerances;
 - 2. Bends or kinks not indicated on the Drawings or required for this Work;
 - 3. Bars with cross-section reduced due to excessive rust or other causes.
- D. Shop fusion welded stirrup/tie cages shall be permitted provided they are in conformance with CBC 1903A.8.

2.5 CONCRETE

- A. Portland Cement: ASTM C150, Type II.
- B. Fly Ash: May be used as a partial substitute for Portland cement as follows:
 - 1. Fly ash: ASTM C618, Class N or F (Class C is not permitted).
 - 2. Fly ash used may be included in the water/cement ratio calculation.
 - 3. Not more than 20% by weight of fly ash shall be substituted for Portland cement.
- C. Normal Weight Aggregate: ACI 318 Section 26.4.1.2.1(a).(1) and ASTM C 33, except as modified in CBC Section 1903A.5. Provide aggregates from a single source for exposed concrete.
- D. Water: ACI 318-19, Section 26.4.1.4.
- E. Admixtures:
 - 1. Do not use calcium chloride admixtures.
 - 2. Admixtures are not permitted without approval from Architect and DSA.

2.6 NORMAL WEIGHT CONCRETE DESIGN MIX

- A. Proportions: Concrete mix shall be proportioned based on field experience or trial mixtures in accordance with ACI 318-19, Section 26.4.3, and ACI 301-16, Section 4.2.3.
 - 1. Mix design submittals shall include a statement clearly indicating the concrete supplier's proposed basis of concrete mix proportions through the use of one of the following:
 - a. Field experience under ACI 301-16 paragraph 4.2.3.4a, or
 - b. Trial mixtures under ACI 301-16 paragraph 4.2.3.4b.
 - 2. When ACI 301-16, Section 4.2.3 is used as the concrete supplier's proposed basis of concrete mix proportions, strength records used for establishing and documenting concrete mixture proportions shall not be more than 24 months old.
- B. Design Professional: A registered civil or structural engineer, licensed in California, with experience in concrete mix design shall select the relative amounts of ingredients to be used as basic proportions of the concrete mixes proposed for use (per DSA IR 17-13).
 - 1. Mix design submittals shall include the engineer's stamp and signature.
- C. Cement Content: Minimum of 5.5 sacks of cement per cubic yard, unless otherwise noted below.
 - 1. Minimum of 5.0 sacks of cement per cubic yard for rat slabs.
 - 2. Off-site concrete shall conform to governing agency standards.
- D. Type A Water Reducer (interior slab on grade only): 28.20 oz/cy, plus or minus 20%.
- E. Water/Cementitious Material Ratio:
 - 1. Footings: Maximum of 0.56.
 - 2. Site Concrete: Maximum of 0.67.
 - 3. Interior Slabs/Parking Lots/Fire Lanes: Maximum of 0.50.
- F. Minimum Compressive Strength:
 - 1. Footings, interior slabs, and retaining walls: 3,000 psi at 28 days.
 - 2. Site Concrete: 2,500 psi at 28 days.
 - 3. Parking Lots: 4,000 psi at 28 days.

G. Aggregate Gradation Optimization:

1. Workability Factor: 32-42%; **target 35%.**
2. Coarseness Factor: 52-72%; **target 60%.**
3. Fineness Modulus: 2.80 to 3.10.
4. Paste Fraction: 27% plus or minus.
5. Mortar Fraction: Passing the No. 8 sieve.
 - a. $\frac{3}{4}$ " to 1" aggregate: 55-57%.
 - b. 1-1/2" aggregate: 53-54%.

H. Aggregate Gradation Limits of Combined Mixture:

Sieve Size	% Passing	
	Interior Slabs Parking Lots Fire Lanes 1-1/2"	Footings Site Concrete Rat Slab Retaining Walls 1"
2"	100	--
1-1/2"	95-100	100
1"	80-96	94-100
3/4"	65-80	87-99
1/2"	55-65	65-78
3/8"	45-60	55-64
#4	35-50	40-55
#8	25-38	33-43
#16	20-30	19-32
#30	10-20	9-24
#50	2-12	4-12
#100	1-6	1-8
#200	0-4	0-4

I. Slump Limits: Proportion and design mixes for slump at point of placement of 4" plus or minus 1".

J. Concrete Temperature: 90 deg F maximum at time of placement.

K. Ready-Mix Concrete: Comply with ASTM C94, and as herein specified.

2.7 LIGHTWEIGHT CONCRETE DESIGN MIX

A. Proportions: Concrete mix shall be proportioned based on field experience or trial mixtures in accordance with ACI 318-19, Section 26.4.3, and ACI 301-16, Section 4.2.3.

1. Mix design submittals shall include a statement clearly indicating the concrete supplier's proposed basis of concrete mix proportions through the use of one of the following:

- a. Field experience under ACI 301-16 paragraph 4.2.3.4a, or
 - b. Trial mixtures under ACI 301-16 paragraph 4.2.3.4b.
 2. When ACI 301-16, Section 4.2.3 is used as the concrete supplier's proposed basis of concrete mix proportions, strength records used for establishing and documenting concrete mixture proportions shall not be more than 24 months old.
- B. Aggregate: Expanded shale, vacuum saturated or thermal quenched; ASTM C330.
1. Maximum Lightweight Aggregate Size: 3/4".
- C. Shrinkage Control: Aggregate shall be prepared within 72 hours of being used or be re-wetted for 1/2 hour, twice a day if longer storage is required at the plant.
- D. Compressive Strength: 3,000 psi at 28 days. Polished concrete: 3,500 to 4,000 psi at 28 days.
- E. Slump Limits: 3" plus or minus 1", measured at the end of the discharge line.
- F. Cement Content: Minimum 6.0 sacks of cement per cubic yard.
- G. Water/Cement Ratio: 0.50 maximum, measured on free water only.
- H. Maximum Lightweight Aggregate Size: 3/4".
- I. Entrained Air: 4% to 7%.
- J. Weight: 110 pounds per cubic foot, plus or minus 3 pounds.

2.8 CURING MATERIALS

- A. Interior Slabs with floor covering (resilient flooring and carpet): Concrete surface treatment applied the day of the concrete placement; volatile organic compound (VOC) content rating as required to suit regulatory requirements.
1. Acceptable Products:
 - a. PMC3300 by Curranseal, www.curranseal.com.
 - b. VC-5 by Sinak Corporation, www.sinak.com.
 - c. Synthetics 10S by Synthetic International, www.syntheticsintl.com.
- B. Interior Slabs with tile, polished concrete, sealed concrete or bare concrete: Curing blanket, 4 mil white opaque polyethylene laminated over 10 oz. burlap; ASTM C171.
- C. Exterior Flatwork on Grade: Clear, Curing compound, colorless, non-yellowing material containing 30% solids content minimum; ASTM C309.
1. Shall not discolor concrete or other materials, shall not leave an oily residue upon evaporation of solvent.
 2. Shall afford moisture loss not greater than 0.055 grams/cm² at minimum average of 300 square feet.
 3. Meet State of California Air Regulation Board Solvent Emission Standards.
 4. Curing compounds may not be used on areas to receive traffic coatings unless specifically accepted by the traffic coating manufacturer.
 5. Solvent borne acrylic cure and seal products are not acceptable; ASTM C1315.

2.9 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. Expansion Joint Filler: Comply with ASTM D1751 or provide resin-impregnated fiberboard conforming to ASTM

D1752.

- C. Non-shrink Grout:
 - 1. Factory premixed grout; ASTM C1107.
 - 2. Compressive strength: 7,000 psi at 28 days.
- D. Dry Pack Grout: One part Portland Cement to two parts fine sand.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Coordinate with Section 31 2000 – Earthwork prior to placing any concrete.

3.2 MOISTURE BARRIER

- A. Installation of Capillary Break:
 - 1. Prior to placing the rock capillary break, provide trench for all materials laid on the subgrade (i.e. piping and conduits), so that no material will project more than 3/4" above the subgrade.
 - 2. Evenly spread pea gravel over compacted subgrade.
- B. Install vapor barrier in accordance ASTM E1643:
 - 1. Level and tamp or roll aggregate, sand or tamped earth base.
 - 2. Install vapor barrier in strict accordance with the manufacturer's written instructions, taping all joints and installing the manufacturer's pipe boots at all penetrating pipes and conduits.
 - 3. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
 - 4. Overlap joints 6" minimum and seal with manufacturer's tape.
 - 5. Seal vapor barrier to footings or concrete stemwall per manufacturer's instructions.
 - 6. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 7. **No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.** Use slab forming and screeding methods and products which do not puncture the vapor barrier.
 - 8. Repair damaged areas by cutting patches of vapor barrier, overlap damaged area 6", and tape all four sides with tape.
 - 9. Where ganged conduits are required, bundle with manufacturer's tape and fill voids with mastic.
- C. Installation of Slab Base:
 - 1. Slab base material is a granular fill that is compactible, easy to trim, and will remain stable and support construction traffic.
 - 2. Cover vapor barrier with granular fill spread evenly to 3" thickness with a tolerance of +0" / -1" when measured from the bottom of the slab.
 - 3. Hold granular fill 12" away from exterior walls.
 - 4. Proof roll granular fill after installation to determine if it is uniformly stable to provide adequate bearing support during and after construction.
 - 5. **Moisture Content:** Granular fill moisture content shall be **below 6%** at time of concrete placement. If granular fill is saturated prior to placement of concrete, remove the material and replace.
 - 6. If rain is forecast prior to continuation of slab placement, remove granular fill adjacent to completed slab, cut and fold back vapor barrier over slab and seal to protect from water penetration into granular fill under existing concrete slab. Prior to continuing slab placement, fold back the vapor barrier, provide vapor barrier transition with minimum of 6" lap continuous both sides, replace granular fill and continue with concrete placement.

D. Protection of Installed Slab Base:

1. Protect all installed slab base construction from precipitation and water penetration by covering and providing positive drainage away from the slab base.
2. Cover slab openings and blockouts around columns to prevent penetration of water into the slab base and capillary break.

3.3 FORMWORK INSTALLATION

A. Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.

1. **Non-Exposed Surfaces:** Where concrete surfaces are not exposed to view, construct formwork conforming to a Class B Surface, Paragraph 4.8.3 of ACI PRC-117.1-14.
2. **Exposed Surfaces:** Where concrete surfaces are exposed to view, construct forms so that concrete surfaces will have a tolerance of 1/2 of the tolerance limits of a Class A Surface, Paragraph 4.8.3 of ACI PRC-117.1-14.

B. Forms shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together to maintain position and shape. Forms and their supports shall be designed so as not to damage previously placed structure.

1. **Slab Forming Techniques: Do not puncture the vapor barrier.**

3.4 SOIL TREATMENT OF SIDEWALK AND PAVEMENT AREAS WITH HERBICIDES

A. Just prior to placing concrete for pavements and sidewalks, apply herbicide soil treatment at recommended rates for application. Protect desirable vegetation from herbicide treatment.

B. Herbicide shall bear evidence of registration under Federal Insecticide, Fungicide, and Rodenticide Act for weed control application.

3.5 REINFORCING

A. Comply with the following, as well as the specified standards, for details and methods of reinforcing placement and supports.

1. Clean reinforcement and remove loose dust and mill scale, earth, oil, and other materials which reduce bond or destroy bond with concrete.
2. Position, support, and secure reinforcement against displacement by forms, construction, and the concrete placement operations. Provide metal chairs, dobies, or other aids manufactured for this purpose.
3. Place reinforcement to obtain the required coverages for concrete protection.
4. Reinforcement of site concrete and fire lane paving shall be placed at 2" below the concrete surface unless otherwise shown.
5. Unless otherwise shown or noted on the Drawings, lap bars as noted on Lap Schedule in structural drawings.
6. Partially embedded reinforcing shall not be bent without the approval of the DSA.

3.6 EMBEDDED ITEMS

A. Do not embed piping, other than electrical conduit, in structural concrete. See structural drawings for provisions for pipes, sleeves, conduits or other penetrations into or through the footings.

B. Set bolts, inserts, and other required items in the concrete, accurately secured so they will not be displaced, and in the precise locations needed. **IN NO CASE SHALL ANY BOLT OR ANCHOR BE STABBED IN PLACE WHILE OR AFTER THE CONCRETE IS POURED.** Evidence of stabbing will necessitate testing at the expense of the

contractor.

- C. **Slip Dowel System:** Install in accordance with manufacturer's written recommendations.

3.7 MIXING CONCRETE

- A. Transit mix the concrete in accordance with provisions of ASTM C94.
1. Water shall only be added at the beginning of discharge and shall be a one-time addition of water. At a minimum, the drum shall be turned an additional 30 revolutions after addition of water. After discharge has begun the addition of water is prohibited.
 2. Discharge of the concrete shall be completed within 90 minutes, or before the drum has revolved 300 times after the cement has been exposed to the mixing water or aggregates.
- B. Cold Weather Requirements:
1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. All concrete materials and all reinforcement, forms, fillers, and ground with which concrete is to come in contact shall be free from frost. Frozen materials or materials containing ice shall not be used.
 2. When mixing concrete during freezing or near-freezing weather, the mix shall have a temperature of at least 55 deg F., but not more than 90 deg F. When necessary, concrete materials shall be heated before mixing. Special precautions shall be taken for the protection of transit-mixed concrete.
 3. The concrete shall be maintained at a temperature of at least 55 deg F. for not less than 72 hours after placing. After the initial curing period allow the concrete surface to dry prior to exposure. Do not permit the concrete to cool faster than the rate of 5 deg F per hour or more for the first 24 hours.
- C. Hot Weather Requirements:
1. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection and curing to prevent excessive concrete temperatures or water evaporation that may impair required strength or serviceability of the member or structure.
 2. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

3.8 PLACING CONCRETE

- A. Concrete shall not be placed until the forms and reinforcement have been inspected, all preparations for the placement have been completed, and the preparations have been checked by the Inspector of Record, all subject to the observation of the structural engineer or Architect.
- B. Preparation:
1. Remove foreign matter accumulated in the forms.
 2. Rigidly close openings left in the formwork.
 3. Wet wood forms sufficiently to tighten up cracks; wet other material sufficiently to maintain workability of the concrete.
 4. Use only clean forms and tools.
- C. Conveying: ACI 318-19, Section 26.5.2.1.
1. Concrete shall be conveyed from mixer to place of final deposit by methods that will prevent separation or loss of materials.
 2. Conveying equipment shall be capable of providing a supply of concrete at site of placement without separation of ingredients and without interruptions sufficient to permit loss of plasticity between successive increments.
 3. Remove rejected concrete from the job site.

- D. Placing Concrete in Forms: ACI 318-19, Section 26.5.2.1.
 - 1. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concreting shall be carried on at such a rate that concrete is at all times plastic and flows readily into spaces between reinforcement.
 - 2. Where concrete is placed in lifts, each lift shall be thoroughly consolidated before the next layer is placed. The rate of placement shall be rapid enough so that previously placed concrete has not yet set when the next lift of concrete is placed upon it. Do not allow flow lines, seams, and planes of weakness (cold joints) to form as a result of placement means and methods.
- E. Placing Concrete Slabs:
 - 1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - 2. Bring slab surfaces to the correct level with a straightedge, and then strike off.
 - 3. Use wood bullfloats or darbies to smooth the surface, leaving the surface free from bumps and hollows.
 - 4. Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

3.9 CONSOLIDATION

- A. All concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.
 - 1. Where conditions make consolidation difficult, or where reinforcement is congested, batches of concrete adjusted to use smaller size aggregates shall be used as approved by the structural engineer and the enforcement agency.
 - 2. Do not vibrate forms or reinforcement.
 - 3. Do not use vibrators to transport concrete inside the forms.
 - 4. Perform consolidation by experienced personnel.

3.10 JOINTS

- A. Construction Joints (CJ):
 - 1. Do not use horizontal construction joints except as may be shown on the Drawings.
 - 2. If additional construction joints are found to be required, secure the Architect's approval of joint design and location prior to start of concrete placement.
 - 3. Joints shall be constructed in accordance with ACI 318-19, Section 26.5.6.
- B. Isolation Joints (IJ):
 - 1. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any isolation joint, unless specifically noted.
 - 2. Fill isolation joints full depth with joint material approved by the Architect.
 - 3. Provide isolation joints as shown on plans.
- C. Crack Control Joint (CCJ):
 - 1. Provide template or guide as required for straight sawcut.
 - 2. Joints shall be spaced as indicated on the Drawings, but not more than 10'-0" on center.
 - a. Joints shall be placed to produce panels that are as square as possible and never exceed a length to width ratio of 1 ½ to 1 – in which case additional joints shall be installed.
 - 3. Saw cut joints before concrete begins to cool, within 2 to 12 hours after placing.
 - 4. Use 1/8" thick blade and cut at least 1" deep but not less than one third (1/3) the depth of the slab.

3.11 CONCRETE SLAB FINISHING

- A. Finish work shall be performed in accordance with ACI 302.1R-15, Chapter 10.

- B. Finished Slab Surfaces: Except as may be shown otherwise on the Drawings, provide the following finishes at the indicated locations:
1. Scratch Finish: Apply to monolithic slab surfaces that are to receive concrete floor topping or mortar setting bed.
 2. Float Finish: Apply to monolithic slab surfaces that are to receive trowel finish and other finishes specified hereinafter, and to slab surfaces which are to be covered with tile on a setting bed.
 3. Trowel Finish: Apply to interior monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and to slab surfaces that are to be covered with resilient flooring, carpeting, thin-set tile, paint, or other thin-film finish coating system.
 4. Non-slip Broom Finish: Apply to exterior walks, stairs, drives, ramps, and similar pedestrian and vehicular areas. Coordinate required final finish with Architect before application.
 - a. Medium broom finish for slopes < 5%.
 - b. Heavy broom finish for slopes $\geq$ 5%.
- C. Finish Concrete Slab Tolerances:
1. Slabs shall be level unless slope is otherwise specified.
 2. Tolerances of finished slab surfaces shall comply with ACI 117.1R-14 "Class A Surface Finish Tolerance". Depressions in floor between high spots shall not be greater than 1/8" between a 10' long straight edge.
 3. Depressed surfaces shall be leveled with an approved filler and sanded smooth.
 4. High spots shall be ground down until level. Remove dislodged aggregate and patch floor.
 5. Grind or fill surface defects which would telegraph through applied floor covering systems.
 6. Owner reserves the right to test floors and concrete members for conformance to ACI 117.1R-14 Tolerance Specifications by Use of the "Dipstick Floor Profiler". Should tolerances not be within the limits specified, the Contractor shall be required to pay for all testing costs and repairs required to bring materials into compliance.
- D. Exterior Flatwork Edge and Joint Finishing:
1. Finish slab edges, including those at formed joints, with an edger having a radius of 1/8".
 2. Edge transverse joints prior to brooming. Brooming shall eliminate the flat surface left by the surface face of the edger.
 3. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with the properly proportioned mortar mixture and then finished.
- E. Required Grinding of Interior Slab:
1. The Contractor shall anticipate that grinding will be required as a result of curling or other slab defects. Grinding required to bring the slab surface into acceptable tolerances for finished flooring installation shall be included as part of the Work.
 2. Provide a slip resistant surface after grinding and filling with a 0.6 coefficient of friction at exposed slabs and exterior flatwork.

3.12 CURING

- A. ACI 318, Section 26.5.3: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Curing Methods with Curing Blankets:
1. Cure a minimum of 7 days.
 2. Provide wet covering of laminated burlap-polyethylene sheets. Lay burlap side down, lap joints 12" minimum and seal penetrations. Keep covering continuously moist, maintaining a film of water on concrete surface at all times. Install sheets in strict accordance with the manufacturer's written recommendations.
 3. Curing shall not be interrupted by removal of the wet covering sheets for any reason during the curing process. No work shall be performed over the curing slabs during the curing process.

4. The concrete shall be maintained above 50 deg F during the curing process.
 5. Do not use alternate methods unless specifically approved in writing by the Architect.
- C. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Avoid rapid drying at end of final curing period.
- D. Protection of Slabs After Curing: After curing is completed, do not allow water to stand on completed slabs. Remove standing water as soon as possible.

3.13 REMOVAL OF FORMS

- A. ACI 318, Section 26.11.2.
1. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby.
- B. No portion of the forming and shoring system may be removed less than 12 hours after placing concrete. When stripping time is less than the specified curing time, measures shall be taken to provide adequate curing and thermal protection of the stripped concrete.
1. Do not remove shoring until the member has acquired sufficient strength to support its own weight, the load upon it, and the added load of construction.
 2. Do not strip vertical concrete in less than 7 days.
- C. Finished Surfaces:
1. Exercise care in removing forms from finished concrete surfaces so that surfaces are not marred or gouged.
 2. Release sleeve nuts or clamps, and pull the form ties neatly.
 3. Do not permit steel spreaders, form ties, or other metal to project from, or be visible on, any concrete surface except where so shown on the Drawings.
- D. Repair of Surface Defects: Repair or replace deficient work at no additional cost to the Owner.
1. Repair tie holes and other surface defects immediately after formwork removal.
 2. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing.
 3. Repair tie holes and surface defects to match surrounding concrete color and surface texture.
 4. Repair tie holes and surface defects in conformance with ACI 301-16, Paragraph 5.3.7.

3.14 SURFACE FINISH OF VERTICAL CONCRETE SURFACES

- A. Unexposed Form Finish: Rub down or chip off fins or other raised areas.
- B. Exposed (to view) Form Finish: Rub down or chip off and smooth fins or other raised areas.
1. As-Cast Finish: Provide surface finish 3.0 in accordance with ACI 301-16, Paragraph 5.3.3.3.
 2. Rubbed Finish:
 - a. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
 - b. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
 - c. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.

3.15 FINISH OF CURBS AND GUTTERS

- A. Finish of Curbs and Gutters:

1. Tool edges of gutter and top of curb with an edging tool to a radius of 1/2"
2. Float and finish surfaces with a smooth wood float until true to grade, section and uniform in texture.
3. Brush floated surfaces with a fine-hair brush using longitudinal strokes.
4. Immediately after removing the front curb form, rub face of curb with wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. While still wet, brush surface in the same manner as the gutter and curb top.
5. Finish the top surface of gutter and entrance drives to grade with a wood float.

3.16 MISCELLANEOUS CONCRETE ITEMS

- A. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- B. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.
- C. Dry Pack Grout:
 1. Pack solid under sill plates where indicated to provide continuous bearing.
 2. Provide dry pack prior to installation of roof framing.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Testing of concrete materials shall comply with Section 01 4520, CBC Chapter 17A, and CBC Section 1910A.
- B. The Owner will employ a testing laboratory to perform tests and to submit test reports. Sampling and testing for quality control during placement of concrete may include the following, as directed by the Architect.
- C. Compaction and Moisture Testing sub-grade.
 1. Test sub-grade immediately prior to placing any concrete or placing a vapor barrier as described in Section 31 2000 – Earthwork.
- D. Sampling Fresh Concrete: Comply with requirements of ASTM C172.
 1. Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 2. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens are made.
 3. Compression Test Specimen: ASTM C31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 4. Compressive Strength Tests: ASTM C39; one set for each day's pour, but not less than one set for each 50 cubic yards or each 2,000 square feet of surface area of slabs or walls for each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days; and one specimen retained in reserve for later testing if required.
 5. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
- E. Batch Plant Inspection:
 1. Continuous batch plant inspection during mixing will be required on this project for structural concrete, including but not limited to footings, foundation walls, retaining walls, columns, and floor slabs in compliance with CBC Section 1705A.3.3.
 2. Batch plant inspection may be waived in accordance with CBC Section 1705A.3.3.1.
- F. Reinforcing Steel Testing **will be required on this project**, except for non-structural concrete work. Comply with CBC Section 1910A.2; testing will be waived if mill certificates are provided.

- G. Slab Finish Tolerance Testing: Where requested by the Architect, test slabs for finish tolerance in accordance with ACI 117 Tolerance Specifications by Use of the "Dipstick Floor Profiler".
- H. Test Results will be reported in writing to Architect and Contractor within 24 hours that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- I. Non-Destructive Testing: Rebound hammer, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- J. Additional Tests:
 - 1. The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect.
 - 2. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
 - 3. The Owner shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.
 - 4. The Owner shall be compensated for such additional testing by deducting the additional costs from the General Contractor's final payment.

END OF SECTION 03 3000

SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide structural steel as shown on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 01 4520: Testing and inspection requirements.
 - 3. Section 05 5000: Metal fabrications.
 - 4. Section 09 9100: Field painting of steel members.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Provide producers' or manufacturers' specifications and installation recommendations for the following products, including laboratory test reports and other data required to prove compliance with the specified requirements.
 - a. Structural steel, including certified copies of mill test reports covering chemical and physical properties;
 - b. High strength bolts, including nuts and washers;
 - c. Unfinished bolts and nuts;
 - d. Structural steel primer paint.
 - 2. Shop Drawings: Provide shop drawings including complete details and schedules for fabrication and shop assembly of members.
 - a. Include details of cuts, connections, camber, holes, and other pertinent data;
 - b. Indicate welds by AWS symbols, and show size, type, and length of weld;
 - c. Provide setting drawings, templates, and directions for installing anchor bolts and other required anchors;
 - d. Identify details by reference to sheet and detail number of the Drawings.
 - e. Indicate locations of Architecturally Exposed Structural Steel.

1.3 QUALITY ASSURANCE

- A. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedures" and CBC Section 2204A.1.
- B. Codes and Standards: Comply with provisions of the following:
 - 1. California Building Code, 2022 Edition.
 - 2. AISC 360-16.
 - 3. AISC 341-16.
 - 4. For exposed steel designated as "Architecturally Exposed Structural Steel", comply with AISC Code of Standard Practice, Section 10 Architecturally Exposed Structural Steel.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.

- B. Delivery and Storage:
 - 1. Deliver materials to the job site properly marked to identify the location for which they are intended.
 - 2. Use markings corresponding to markings shown on the approved Shop Drawings.
 - 3. Store in a manner to maintain identification and to prevent damage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Wide Flanges: ASTM A992, Grade 50.
- C. Rolled Steel Shapes, Plates, and Bars: ASTM A36, or ASTM A572 Grade 50 where indicated on structural drawings.
- D. Steel Pipe: ASTM A53, Type E or S, Grade B, and where applicable, API-5L, Grade B.
- E. Steel Tube: ASTM A500, Grade C.
- F. Anchor Bolts: ASTM F1554, Grade 36, headed type with heavy hexagonal nuts unless otherwise indicated.
- G. Unfinished Threaded Fasteners:
 - 1. ASTM A307, grade A, regular low carbon steel bolts and nuts.
 - 2. Provide either hexagonal or square heads and nuts; except use only hexagonal units for exposed connections.
- H. Electrodes for Welding: E-70XX; AWS standards.
- I. High Strength Threaded Fasteners: Provide heavy hexagonal structural bolts, heavy hexagonal nuts, and hardened washers, all from quenched and tempered medium carbon steel; ASTM A325.
- J. Automatic End Welded Studs: Nelson Granular Fluxfilled Shear Connector or anchor studs or approved equivalent manufactured of C-1015 cold rolled steel; ASTM A108.
- K. Steel Rod: Mild carbon steel, weldable quality.

2.2 PAINT

- A. Primer: 10-99 by Tnemec or No. 5269 by Rustoleum.

2.3 GROUT

- A. Grout: Non-shrink, non-metallic aggregate type, ASTM C1107; capable of developing a minimum compressive strength of 7,000 psi at 28 days.

2.4 FABRICATION

- A. Shop Fabrication and Assembly:
 - 1. Fabricate items of structural steel in accordance with AISC specifications.

2. Properly mark and match-mark materials for field assembly and for identification as to location for which intended.
 3. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 4. Where finishing is required, complete the assembly, including welding of units, before start of finishing operations.
 5. Provide finish surfaces of members exposed in the final structure free from markings, burrs, and other defects.
- B. Connections:
1. Provide bolts and washers of types and sizes required for completion of field erection.
 2. High Strength Bolted Construction:
 - a. Install high strength threaded fasteners in accordance with AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
 - b. Use A325N bolts unless noted otherwise.
 - c. Use A325 SC bolts at moment connections and where indicated on the Structural Drawings.
 3. Welded Construction: Comply with AWS Code for procedures, appearance, and quality of welds, and methods used in correcting welded work.
 4. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
- C. Holes for Other Work:
1. Provide holes required as detailed on drawings for securing other work to structural steel framing, and for passage of other work through steel framing members, and show on the Shop Drawings.
 2. Provide threaded nuts welded to framing, and other specialty items as shown, to receive other work.
 3. Cut, drill, or punch holes perpendicular to metal surfaces.
 4. Do not flame cut holes or enlarge holes by burning.
 5. Drill holes in bearing plates.
- D. Architecturally Exposed Structural Steel: Fabricate with special care using material selected for best appearance. Apply necessary fabricating techniques to produce and maintain the quality of work within tolerances of the AISC Specifications for Architecturally Exposed Structural Steel.
1. Fabricate and exposed edges and ends of plates or bars to be square and smooth, free of cutting marks, shear distortion, burrs, and nicks.
 2. Provide uniform consistent joints with all exposed copes, miters and butt cuts.
 3. Mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials. Do not apply erection marks, symbols or painted notes to exposed surfaces.
 4. Provide erection and anchoring devices, where practicable, which allow for 3-dimensional adjustment of the steel members relative to base structure.
 5. Perform manual oxygen cutting only with a mechanically guided torch.
 6. Fill dents, marks, gouges, and imperfections in painted steel with metallic filler and grind smooth and flush with adjacent surfaces.

2.5 SHOP PAINTING

- A. General:
1. Shop paint structural steel work, except for the following:
 - a. Those members or portions of members to be embedded in concrete or mortar.
 2. Paint embedded steel which is partially exposed on the exposed portions, and the initial 2" of embedded areas only.
 3. Do not paint surfaces which are to be welded or high-strength bolted with friction type connections.
 4. Apply two coats of paint to surfaces which are inaccessible after assembly or erection. Change color of the second coat to distinguish it from the first.

- B. Surface Preparation:
 - 1. After inspection and before shipping, clean steel work to be painted.
 - 2. Remove loose rust, loose mill scale, and spatter, slag, and flux deposits.
 - 3. For interior steel, clean in accordance with SSPC-SP3, Power Tool Cleaning.
 - 4. For exterior steel, clean in accordance with SSPC-SP6, Commercial Blast Cleaning.
- C. Painting:
 - 1. Immediately after surface preparation, apply structural steel primer paint in accordance with the manufacturer's recommendations and at a rate to provide a uniform dry film thickness.
 - 2. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 ERECTION

- A. Comply with AISC specifications and "Code of Standard Practice," except as may be modified herein.
- B. Anchor Bolts:
 - 1. Provide anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
 - 2. Provide templates and other devices necessary for presetting bolts and anchors to accurate locations.
- C. Bases and Bearing Plates: Shop weld to columns and members attached to concrete, unless otherwise shown on drawings.
- D. Splicing:
 - 1. Splice members only where indicated unless, with the Architect's approval, splices not indicated would result in lower costs due to reduced shipping expense.
 - 2. For splices not indicated, submit structural calculations prepared and signed by a structural engineer licensed to practice in the state of California.
 - 3. Splices of members not indicated on the drawings will required DSA approval.
- E. Gas Cutting:
 - 1. Do not use gas cutting torches for correcting fabricating errors in the structural framing.
 - 2. Cutting will be permitted only in secondary members as acceptable to the Architect.
 - 3. When gas cutting is permitted, finish the gas cut section to a sheared appearance acceptable to the Architect.
- F. Surveys:
 - 1. Establish permanent benchmarks necessary for accurate erection of structural steel.
 - 2. Check elevations of concrete surfaces, and locations of anchor bolts and similar items, before erection proceeds.
- G. Temporary Shoring and Bracing:
 - 1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed

- loads.
- 2. Provide temporary guy lines to achieve proper alignments of the structure as erection proceeds.
- 3. Remove temporary connections and members when permanent members are in place and the final connections have been made.
- H. Setting Bases and Bearing Plates:
 - 1. Clean concrete bearing surfaces free from bond-reducing materials, and then roughen to improve bond to the surface.
 - 2. Clean the bottom surface of base and bearing plates.
 - 3. Set loose and attached base plates and bearing plates for structural members in wedges or other adjusting devices.
 - 4. Tighten anchor bolts after the supported members have been positioned and plumbed.
 - 5. Do not remove wedges or shims but, if protruding, cut off flush with the edge of the base or bearing plate prior to packing with grout.
 - 6. Pack grout solidly between bearing surfaces and bases or plates to assure that no voids remain.
 - 7. Finish exposed surfaces, protect installed materials, and allow to cure in strict compliance with the manufacturers' recommendations as approved by the Architect.
- I. Field Assembly:
 - 1. Set structural frames accurately to the lines and elevations indicated.
 - 2. Align and adjust members forming part of a complete frame or structure before fastening permanently.
 - 3. Clean the bearing surface, and other surfaces which will be in permanent contact, before assembly.
 - 4. Adjust as required to compensate for discrepancies in elevation and alignment.
 - 5. Level and plumb individual members of the structure within specified AISC tolerances.
 - 6. Establish required leveling and plumbing measurements on the mean operating temperature of the structure, making allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
 - 7. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and the removal of paint on surfaces adjacent to welds.
- J. Automatic End Welded Studs:
 - 1. The studs shall be automatic end welded in accordance with the manufacturer's recommendations in such a manner as to provide complete fusion between the end of the stud and the plate.
 - 2. There should be no porosity or evidence of lack of fusion between the welded end of the stud and the plate.
 - 3. The stud shall decrease in length during welding approximately 1/8" for 5/8" and under, and 3/16" for over 5/8" diameter.
 - 4. Welding shall be done only by qualified welders approved by the welding inspector.
- K. Architecturally Exposed Structural Steel: Comply with erection requirements of AISC Code of Standard Practice, Section 10.

3.3 TESTING AND INSPECTING

- A. Testing: Refer to Section 01 4520 for testing and inspection requirements.
 - 1. The Owner's selected testing laboratory will pick up specimens and make required tests.
 - 2. Cost of procuring test specimens at locations more than 50 miles from the job site will be paid by the Owner and back charged to the Contractor.
 - 3. Costs of tests of identified stock will be paid by the Owner; except that if a test fails to comply with the specified requirements, the cost of testing will be paid by the Owner and back charged to the Contractor.
 - 4. Costs of tests of unidentified stock will be paid by the Owner and back charged to the Contractor.
- B. Test Specimens:

1. Test specimens shall be furnished by the steel fabricator, and shall be taken under the direction of the Owner's testing laboratory.
 2. Each specimen shall be machined by the Owner's selected testing laboratory to dimensions required by ASTM A370.
 3. Cost of procuring, making, and machining test specimens shall be considered test costs as defined above.
- C. Material Identification and Testing:
1. Identification of structural steel members shall comply with AISC 360.
 2. Steel not readily identifiable as to grade from marking and test records shall be tested to determine conformity to the specified standards.
 3. Additional tests may be required when deemed necessary by the Architect.
- D. Shop and Field Inspection: A complete four sided inspection of steel will be made when required by the Architect. The Contractor shall provide labor, equipment, and facilities needed to move and handle the materials to be inspected.
1. Cost of inspecting will be paid by the Owner subject to the same provisions made above for tests.
 2. If, after fabrication and inspection, the work of this Section is found to be defective and to require reinspection, cost of such reinspection will be paid by the Owner and back charged to the Contractor.
 3. Access: The Contractor shall provide access for the testing agencies and inspectors to places where structural steel work is being fabricated or produced, so that required testing and inspecting may be accomplished.
- E. Welding Inspection:
1. Unless otherwise specified, perform all shop and field welding under observation of a qualified inspector from a testing laboratory approved by the Architect and the DSA; CBC Section 1705A.2.5 and Table 1705A.2.1.
 2. Inspect every layer of weld for quality, penetration, and conformity with design requirements.
 3. Require the welding inspector to submit a signed report to the Architect, Structural Engineer, and DSA verifying that:
 - a. The welding is adequate and was performed in conformity with specified requirements; and
 - b. Adequate methods have been used to determine the quality of the welding.
 4. The welding inspector may use gamma ray, magnaflux, trepanning, or any other aid to visual inspection considered necessary to assure adequacy of welding, or may use ultrasonic testing performed in accordance with pertinent requirements of governmental agencies having jurisdiction.
 5. Cost of welding inspection will be paid by the Owner in accordance with Section 01 4520.
- F. Erection Inspecting:
1. The Owner's testing and inspecting agency will inspect the installation of all high strength bolted connections, will visually inspect field welded connections, will perform such additional tests and inspections of field work as are required by the Architect, and will prepare test reports for the Architect, Structural Engineer, and DSA; CBC Section 1705A.
 2. The testing agency will conduct and interpret the tests, and will state in each report whether the inspected work complies with the requirements, specifically stating all deviations therefrom.
- G. Corrections:
1. Correct deficiencies in structural steel work which inspections and test reports indicate to be not in compliance with the specified requirements.
 2. Perform additional tests required to reconfirm noncompliance of the original work and to show compliance of corrected work, all at no additional cost to the Owner.
- H. Automatic End Welded Studs: Inspection, in accordance with CBC Section 1705A.2.1, of all shop and field welding operations for automatic end welded studs shall be made by a qualified welding inspector approved by the DSA. The type and capacity of the welding equipment shall be in accordance with the manufacturers

recommendations and shall be checked and approved by the welding inspector.

3.4 FIELD PAINTING

A. General:

1. Prepare surfaces in a manner appropriate to the condition in strict accordance with the manufacturer's written recommendations.
2. Clean spots and surfaces where primer coats have been removed, damaged, or burned off, and clean field bolts and other field connections not concealed in the finished Work.
3. Remove dirt, oil, and grease.
4. Apply a spot coat of the approved primer.
5. Do not apply paint to wet, damp, oily, or improperly prepared surfaces.

- B.** Using spray or brush, as recommended by the manufacturer of the approved paint material, fill all joints and corners and cover the surfaces with a smooth unbroken film of at least 1.5 dry mils thickness.

END OF SECTION 05 1200

SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide miscellaneous metal work shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 09 9100: Field painting of steel members.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data:
 - a. Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - b. Submit manufacturers recommended installation procedures.
 - 2. Shop Drawings: Submit shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.

1.3 QUALITY ASSURANCE

- A. Perform shop and/or field welding required in connection with the work of this Section in strict accordance with pertinent recommendations of the American Welding Society.
- B. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedures" and CBC Section 2204A.1.
- C. Codes and Standards: Comply with provisions of the following: California Building Code, 2022 Edition.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Comply with following standards, as pertinent, unless otherwise noted in the documents.
 - 1. Steel Sections: ASTM A36.
 - 2. Steel Tubing: ASTM A500, Grade C cold-formed structural tubing.
 - 3. Steel Pipe: ASTM A53, Type S, Grade B, standard weight or extra-strong as noted in the plans.
 - 4. Bolts, Nuts, and Washers: ASTM A325, Type 1, galvanized to ASTM A153 where connecting galvanized components.
 - 5. Welding Materials: AWS D1.1; type required for materials being welded.

2.2 FASTENERS

- A. General:
 - 1. For exterior use and where built into exterior walls, provide zinc-coated fasteners.
 - 2. Provide fasteners of type, grade, and class required for the particular use.
- B. Bolts, Nuts, and Washers: ASTM A325, Type 1, galvanized to ASTM A153 where connecting galvanized components.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.4 FINISHES

- A. Primer: 10-99 by Tnemec or No. 5269 by Rustoleum.
- B. Provide zinc coating for those items indicated or specified to galvanized, as follows:
 - 1. ASTM A153 for galvanizing iron and steel hardware.
 - 2. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strips 1/8" thick and heavier.
 - 3. ASTM A386 for galvanizing assembled steel products.
 - 4. ASTM A535 for galvanizing sheet steel.
- C. For repair of galvanizing, use a high zinc-dust content paint complying with MIL-P-21035.

2.5 FABRICATION

- A. Except as otherwise shown on the Drawings or the approved Shop Drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.
- B. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.
- C. Fabricate with accurate angles and surfaces which are true to the required lines and levels, forming exposed connections with hairline joints, and using concealed fasteners wherever possible.
- D. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use. Cut, reinforce, drill, and tap miscellaneous metal work as required to receive finish hardware and similar items.
- E. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- F. Curved work shall be evenly sprung.

2.6 FABRICATED ITEMS

- A. Rough Hardware: Provide bent or otherwise custom fabricated bolts, plates, anchors, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting work, and for anchoring or securing work to concrete or other structures.
 - 1. Provide galvanized rough hardware at exterior conditions.

- B. Miscellaneous Framing and Supports: Provide miscellaneous framing and supports not a part of the structural steel framework, as required to complete the work.
 - 1. Fabricate miscellaneous units to shapes, sizes, and profiles indicated, or if not indicated, of required dimensions to receive adjacent work. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware and similar items.
 - 2. Provide galvanized framing and supports at exterior conditions.
- C. Steel Handrails, Guards, and Railings: Provide round pipe or square tubing as indicated on the Drawings.
 - 1. Round Pipe: 1-1/2" nominal diameter standard weight galvanized steel pipe, 0.145" wall thickness.
 - 2. Square Tubing: 1-1/2" galvanized steel square structural tubing, 0.1875" wall thickness.
 - 3. Wall Brackets: No. 377/378 by Julius Blum, or No. 1703-2 by R&B Wagner, with bracket filler for either gypsum board or plaster.
 - 4. Fabrication:
 - a. Provide flush fittings with joints welded and ground smooth and flush. Weld vertical supports to horizontal members in same manner as fittings.
 - b. Remove burrs from all exposed cut edges.
 - c. Miter or radius all joints as required. Form elbow bends and wall returns to uniform radius, free from buckles and twists, with smooth finish surfaces, or use prefabricated bends.
 - d. Provide wall returns at ends of wall mounted handrails to with 1/8" of wall.
 - e. Close exposed ends by welding 3/16" minimum thickness steel plate in place or with prefabricated fittings.
 - f. Provide galvanized steel sleeves for concrete embedment where indicated.
 - g. Secure ends of members butted to vertical surfaces with galvanized steel flanges.
 - h. Secure handrails to walls with brackets spaced at 5'-0" on center maximum.
 - i. Provide vertical posts at the spacing indicated, but not more than 5'-0" on center.
 - j. Welding: Accurately miter and cope intersections of posts and rails and weld all around. Thoroughly fuse without undercutting or overlap. Remove spatter, grind exposed welds and contour surfaces to match those adjacent.
 - k. Provide pressure relief holes at closed ends.
- D. Steel Ladders:
 - 1. Fabricate stringers and brackets from steel flat bar.
 - 2. Provide 3/4" x 3/4" solid steel ladder rungs with aluminum oxide grit bonded to steel base; MEBAC by McNichols or approved equal.
 - 3. Provide welded assembly with all welds ground smooth.
- E. Removable Bollards:
 - 1. Removable locking bollard, ground sleeve, and sleeve top and lid, powder-coated factory finish, RPL4 by TrafficGuard Direct, Inc., www.trafficguard.net or approved equal.
 - 2. Bollard completely removes from the ground sleeve and provides flush surface.
 - 3. Install bollard and ground sleeve in conformance with the manufacturer's written installation instructions. Provide gravel base for drainage of bollard.

2.7 SHOP PAINTING

- A. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP6, Commercial Blast Cleaning.
 - 2. Interiors (SSPC Zone 1A): SSPC-SP3, Power Tool Cleaning.

- B. Cleaning: Clean ferrous and galvanized metal surfaces with proper solvents to remove all grease and other foreign matter which will hinder and/or prevent proper finishing and installation.
- C. Application: Apply 1 coat of shop primer to the dry film thickness recommended by the manufacturer to surfaces of metal fabrications except those which are indicated to be embedded in concrete or masonry and in compliance with requirements of SSPC-PA1, Paint Application Specification No. 1, for shop painting.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.3 INSTALLATION

- A. General:
 - 1. Set work accurately into position, plumb, level, true, and free from rack.
 - 2. Anchor firmly into position.
 - 3. Where field welding is required, comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.
 - 4. Grind exposed welds smooth, and touch up shop prime coats.
 - 5. Do not cut, weld, or abrade surfaces which have been hot-dip galvanized after fabrication and which are intended for bolted or screwed field connections.
- B. Primer Repair: Immediately after erection, clean the field welds, bolted connections, and abraded areas of shop priming. Paint the exposed areas with same material used for shop priming.
- C. Galvanizing Repair: Repair all damage to galvanizing as a result of fabrication, handling, and installation, with 2 coats of cold galvanizing paint in accordance with the manufacturer's written instructions.
- D. Pipe Railings and Handrails: Unless otherwise indicated or approved by the Architect:
 - 1. Secure to wall with approved fasteners into solid blocking.

END OF SECTION 05 5000

SECTION 06 1100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide lumber, construction panels, structural composite wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform rough carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1730: Wood I-joists.
 - 3. Section 06 1800: Structural glued-laminated timber.
 - 4. Section 06 4000: Architectural woodwork.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements for the following:
 - a. Framing anchors.
 - b. Preservative treatment.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
- B. Machine Nail Samples: Contractor shall allow the Inspector to take random samples from actual machine nail containers proposed for use on the project. Samples shall be reviewed and accepted prior to any machine nailing. Nails sampled shall meet the requirements for machine nailing indicated on the Drawings.

1.3 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. All material and workmanship shall comply with CBC Chapter 23 and ANSI/AWC NDS 2018.
 - 2. **Lumber standards:** DOC PS-20-05 American Softwood Lumber Standard, with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review. Factory mark all lumber indicating the specie and grade of each piece.
 - 3. **Inspection Agencies:** All lumber shall be graded in accordance with Standard Grading Rules for West Coast Lumber, No. 17 by West Coast Lumber Inspection Bureau (WCLIB), or Western Lumber Grade Rules, latest edition by Western Wood Products Association (WWPA).
 - 4. **Plywood Panel Standards:** DOC PS-1-09 Construction and Industrial. For products not manufactured under PS-1 provisions, with American Plywood Association (APA) Performance Standard and Policies for Structural-Use Panels, Form No. E445. Plywood used for structural purposes shall be marked "APA W/EXT GLUE" and shall be span-rated sheathing. Factory-mark each plywood panel with APA trademark evidencing compliance with grade requirements.
 - 5. **Preservative Treatment:** Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Rejection:
 - 1. Below-grade material shall not be used as load-carrying members which have been designed for specified allowable stresses and acceptable safety factors.
 - 2. Any material which falls below grade shall be rejected for load-carrying use.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. Protection:
 - 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
 - 2. Identify framing lumber as to grades, and store each grade separately from other grades.
 - 3. Protect metals with adequate waterproof outer wrapping.
 - 4. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.

PART 2 - PRODUCTS

2.1 LUMBER

- A. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by DOC PS-20-05, for moisture content specified for each use.
 - 1. Provide dressed lumber, S4S, unless otherwise indicated.
 - 2. Provide seasoned lumber with 19% maximum moisture content at time of dressing and shipment, and at time of use, unless otherwise indicated.
- B. Slope of grain of lumber used in tension members shall not exceed 1:8 slope.
- C. Framing lumber shall be No. 1 Douglas Fir, unless otherwise indicated on the drawings.
- D. Where wood member are in contact with masonry or concrete, use No. 1 Douglas Fir pressure treated with an approved factory preservative treatment as specified in this Section.
- E. **ALL 3X AND LARGER MATERIAL SHALL BE "FREE OF HEART CENTER".**
- F. Fascia: Provide Hem-Fir material at all finished fascia boards and at fascia boards covered with metal fascia and trim.

2.2 CONSTRUCTION PANELS

- A. Plywood: Exterior Grade with exterior glue, graded to conform to DOC PS-1-09.
- B. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels with grade designation, APA A-C PLUGGED and SANDED INT with exterior glue, 3/4" thick.
- C. Roof Sheathing: APA Rated Sheathing, C-D, Exposure 1; thickness and span index as indicated.
- D. Wall Sheathing: APA Rated Sheathing, C-D, Struct I, Exposure 1; thickness and span index as indicated.

2.3 ACCESSORIES AND OTHER MATERIALS

- A. Building Paper: Kraft paper; ASTM D227.
- B. Sheet Metal Framing Anchors: Shall be as noted on the drawings.
- C. Machine Bolts: ASTM A307.

D. Lag Bolts: ASME B18.2.1.

E. Nails:

1. Use **common nails** except as otherwise noted.
2. Comply with ASTM F1667. Minimum dimensions shall be as follows:

<u>Pennywt.</u>	<u>Shank Dia.</u>	<u>Head Dia.</u>	<u>Length</u>
8d	0.131" ± .004"	0.281" ± 10%	2.5" ± 1/16"
10d	0.148" ± .004"	0.312" ± 10%	3.0" ± 3/32"
16d	0.162" ± .004"	0.344" ± 10%	3.5" ± 3/32"

3. All nails for pressure treated or fire-retardant lumber shall be hot-dipped zinc-coated galvanized. Nails with other types of galvanizing may be used if pre-approved by the enforcement agency.

F. Fasteners and Anchors: Size, type, material as indicated and as recommended by applicable standards; unfinished, except as specified below.

1. In Preservative Treated Wood:
 - a. Use Categories UC2 and UC3B: Hot-dip zinc coating, types and weights in accordance with the treated wood or anchor manufacturer; ASTM A153 or F2329.
 - b. Use Category UC4A: Type 316L stainless steel.
2. In Exposed Exterior Conditions: Type 316L stainless steel.
3. In Concrete or Masonry: Mechanically deposited zinc coating; ASTM B695, Class 55 minimum.

G. Connectors and Hangers: Fabricate from steel with minimum ASTM A653 G90 zinc coating, thickness to suit framing conditions.

1. At Preservative Treated Wood:
 - a. Use Categories UC2 and UC3B: Hot-dip zinc coating; ASTM A653, G185 minimum.
 - b. Use Category UC4A: Type 316L stainless steel.
2. At Exposed Exterior Conditions: Type 316L stainless steel.

H. Construction Adhesives: Comply with VOC requirements of California Green Building Standards Code, Section 5.504.4.1.

2.4 STRUCTURAL COMPOSITE LUMBER

A. Laminated Veneer Lumber (LVL): Structural composite lumber manufactured from veneers of a single wood species, or specie combinations, bonded through a continuous-feed press, with grain oriented parallel to the length of the member with approved adhesives, free of finger joints, scarfs, or mechanical connections in full length members.

1. Moisture Content: Between 2 and 8 percent.
2. Adhesive: Waterproof type; ASTM D-2559.

B. Provide sizes indicated on the Drawings, with the following minimum properties:

1. $F_b = 2900$ psi.
2. $F_v = 285$ psi.
3. $E = 2.0 \times 10^6$ psi.

C. Fabrication: Manufacture laminated veneer lumber in a plant accepted by the authority having jurisdiction and under the supervision of a third party inspection agency. Identify each member with identification stamp; Section 7.10 of ICC ESR-2993.

2.5 FACTORY PRESERVATIVE TREATMENT

- A. Lumber Above Grade: AWP A U1-14, Use Category UC2, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 2. Treat lumber in contact with masonry or concrete.
 - 3. Treat lumber in other locations as indicated.
- B. Lumber Exposed to Weather: AWP A U1-14, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 2. Treat lumber exposed to weather.
- C. Lumber in Contact with Soil: AWP A U1-14, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.
 - 1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
 - 2. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.
- D. Plywood Above Grade: AWP A U1-14, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry plywood after treatment to maximum moisture content of 15 percent.
 - 2. Treat plywood in contact with masonry or concrete.
 - 3. Treat plywood in other locations as indicated.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COMPLIANCE

- A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.
- B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

3.3 WORKMANSHIP

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Lumber Selection:
 - 1. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.

2. Cut out and discard defects which render a piece unable to serve its intended function.
3. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

D. **Do not shim any framing component unless specifically indicated on the drawings.**

3.4 GENERAL FRAMING

A. General:

1. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.
2. Set horizontal and sloped members with crown up.
3. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved by the Architect.

B. Bearings:

1. Make bearings full unless otherwise indicated on the Drawings.
2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.
3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

C. Fire Blocks and Draft Stops: CBC Section 718.

1. **General:** In combustible construction, firestopping and draft stopping shall be installed to cut off all concealed draft openings (both vertical and horizontal) and shall form an effective barrier between floors, between a top story and a roof or attic space, and shall subdivide attic spaces, concealed roof spaces and floor-ceiling assemblies. The integrity of all fire and draft stops shall be maintained.
2. **Fire Stops:** Provide firestopping in the following locations:
 - a. In concealed spaces of stud walls and partitions, including furred spaces, at the ceiling and floor levels and at 10'-0" intervals along the length of the wall.
 - b. In fire sprinklered buildings having furred spaces without sprinklers, provide minimum 1/2" thick plywood fire stop so spaced (horizontally or vertically) to contain no more than 51 cubic feet of area. Coordinate with fire sprinkler installer.
 - c. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings;
 - d. In concealed spaces between stair stringers at the top and bottom of the run and between studs along and in line with the run of stairs if the walls under the stairs are unfinished;
 - e. In openings around vents, pipes, ducts, chimneys, fireplaces and similar openings which afford a passage for fire at ceiling and floor levels, with noncombustible materials.
3. **Draft Stops:** Provide draft stopping at locations indicated on the drawings.

D. Furring, Stripping, Grounds, and Backing:

1. All wood furring, stripping, blocking, bucks and grounds shall be furnished and installed by the Contractor where required for support or backing for other materials whether shown or not on the drawings and/or these specifications. All pipes and ducts shall be furred in wherever shown.
2. Provide horizontal and vertical backing and blocking for nailing all joints at walls, parapets, ceilings, soffits, etc. finish materials shall be provided whenever needed throughout the building. Horizontal and vertical backing shall also occur at counter heights, wainscot heights and for securing all fixtures, cabinet work, shelving and all other items that require support from the wall.
3. Furnish and set all wood grounds for plastering, sheet metal and other trades. Grounds shall be of proper size and spacing for the installation of work as noted under the various headings.
4. All blocks, grounds, etc., which are embedded in concrete shall be dipped in creosote after being cut to size and after nails are driven which are to hold them in the concrete.

E. Plywood Installation:

1. Placement:
 - a. Place plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise shown on the Drawings.
 - b. Center joints accurately over supports, unless otherwise shown on the Drawings.
 - c. Stagger panel end joints.
 2. Protect plywood from moisture by use of waterproof coverings until the plywood in turn has been covered with the next succeeding component or finish.
 3. Installation of plywood shall comply with the requirements of CBC and the APA. If in conflict conform to CBC.
- F. Nailing:
1. Use only common wire nails or spikes of the dimension shown on CBC Table 2304.10.1 - Fastening Schedule, except where otherwise specifically noted on the Drawings.
 2. For conditions not covered in the Nailing Schedule provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
 3. Nail without splitting wood.
 4. Pre-bore as required.
 5. Remove split members and replace with members complying with the specified requirements.
- G. Bolting:
1. Drill holes 1/32" larger in diameter than the bolts being used.
 2. Drill straight and true from one side only.
 3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.
- H. Lag Screws: Prebore holes to 40% to 70% of shank diameter at threaded portion, enlarging holes to shank diameter for length of shank.
- I. Wood Screws:
1. Preboring is not required but shall not exceed 7/8 x shank diameter and 7/8 x diameter of the screw at the root of the thread.
 2. Do not hammer screws into holes, soap may be used to facilitate insertion.
- J. Sills and Plates:
1. Install pressure preservative-treated lumber for plates and sills in conformance with CBC Section 2304.10.5.
 2. Bolt to foundations and slabs. Level sills with dry-pack, washers placed, and nuts tightened to level bearing.
 3. Pack space between sill and concrete with dry-pack cement grout.

END OF SECTION 06 1100

SECTION 06 1730 - WOOD I-JOISTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide prefabricated wood I-joists where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1100: Rough Carpentry

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Shop Drawings: Submit shop drawings showing fabrication, installation, anchorage, and interface with other components of the structure.

1.3 QUALITY ASSURANCE

- A. I-joists shall have a valid evaluation report issued by a qualified independent evaluation agency as prescribed in DSA IR A-5, complying with 2022 CBC, ASTM D5055-05, and ICC-ES AC-14.
- B. Identify each of the joist by a stamp indicating the joist series, ICC-ES report number, manufacturer's name, plant number, date of fabrication, and the independent inspection agency's logo.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. Deliver materials of this Section to the job site in bundles banded together for handling and shipping.

PART 2 - PRODUCTS

2.1 MATERIAL SUBSTITUTIONS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Substitutions:
 - 1. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500 and are ICC approved.
 - 2. The manufacturer shall be responsible for preparing an Addendum or Construction Change Document for the Architect to submit to DSA for approval of the proposed products in lieu of those indicated on the drawings and in the specifications, including complete shop drawings, details, and calculations (using the original design loads), stamped and signed by a California registered structural engineer.

3. The manufacturer's structural engineer shall travel to DSA offices at no cost to the Owner if required to obtain approval.
4. Costs incurred by the Architect for preparation and processing of a Construction Change Document for substitutions shall be paid by the Contractor.

2.2 WOOD I JOISTS

- A. Available 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. RedBuilt: Red-I Joist, ESR 2994; basis of design.
- B. Top and Bottom Flanges: LVL material, Grade 2.2E covered by a valid ICC-ES evaluation report.
- C. Web: Oriented strand board (OSB), Exposure 1, (24/0) APA performance rated sheathing (PRS) or Structural 1 grade complying with PRP-108 and PS2-04.
- D. Blocking: All wood I-joist blocking shall be same as related wood I-joists.

2.3 FABRICATION

- A. Fabricate wood I-joists in accordance with the DSA approved manufacturing standards and as indicated on the Drawings.
- B. General:
 1. Size and detail the work of this Section to fit dimensions and loads indicated on the Drawings.
 2. Design in accordance with allowable values and section properties assigned and approved by the governmental agencies having jurisdiction.

2.4 SOURCE QUALITY CONTROL

- A. Provide I-joists from mills that qualify under an approved QA/QC program conforming with:
 1. ASTM D5055, Sections 8, 9, and 10.
 2. ICC-ES AC14, Appendix A, or ICC-ES approved equivalent such as APA QA Policy for Performance Rated I-Joists.
 3. ICC-ES AC14, Appendix B.
 4. Unannounced audits by a third party auditor of a qualified inspection agency shall be performed, per ICC-ES AC14. All quality control reports resulting from such audits must be maintained by the manufacturers and made available to DSA upon request.

PART 3 - EXECUTION

3.1 INSTALLATION AND ERECTION

- A. Install wood I-joists in accordance with approved shop drawings and manufacturer's written instructions.
- B. Do not impose temporary construction loads that cause stresses beyond design limits.
- C. Provide safety bracing to keep wood I-joists straight and plumb, and to ensure adequate lateral support for the individual joist members and the entire system until the sheathing material is applied.

END OF SECTION 06 1730

SECTION 06 1800 - STRUCTURAL GLUED-LAMINATED TIMBER

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide structural glued-laminated timber and beams and related items for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Specification Section 06100: Rough Carpentry.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Comply with CBC Chapter 23, ANSI/AITC A190.1-12, and ASTM D3737.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. Protection:
 - 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
 - 2. Protect member with adequate waterproof outer wrapping.
 - 3. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.

PART 2 - PRODUCTS

2.1 GLUED-LAMINATED TIMBER MATERIALS

- A. Lamination Lumber: West Coast Douglas Fir species, graded in conformance with WCLIB Rules No. 16, Sect. 154, and other requirements of the above standards.
- B. Adhesives: Exterior type, ASTM D2559, qualifying for both wet or dry use service conditions.
- C. Exposed Structural Glued-Laminated Timber: Those portions of glued-laminated timbers which form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave overhangs or similar covering shall be pressure treated with an approved preservative or be manufactured from wood of natural resistance to decay.

2.2 MANUFACTURE

- A. Comply with AITC Standard A190.1-12, and CBC Section 2303.1.3.
 - 1. Moisture content of wood at time of gluing shall not exceed 12 percent and shall not be less than 7 percent. The range of moisture content of laminations assembled into a single member shall not exceed 5 percent at time of gluing.
- B. Combination Grade: According to designated type(s) of member(s) and stress grade(s) required, glulam members are assembled of composite grades of laminations; AITC 117, Table 1A. Combinations per 2018 NDS

supplement, Table 5A.

- C. Bending Members: See structural framing plans for glu-lam beam species and combinations specific to each member. Unless otherwise specified and/or detailed, tension zone laminations are provided as follows:
 - 1. Simple Beams: Full length at bottom only. (unbalanced section)
 - 2. Cantilever Beams: Full length at top and bottom.
 - 3. Continuous Beams: Full length top and bottom, (balanced section).
- D. Compression or Tension Members: Provide combination symbol 24F-E4 unless otherwise noted.
- E. End Joints: Qualified pre-glued finger joints bond ends of lumber into continuous laminations. Provide end joint spacing as indicated on the Drawings.
- F. Appearance Grades: As specified on drawings, Architectural per AITC 110-01.
- G. Protection:
 - 1. Coatings: End Seal (liquid wax); Surface sealer: Chapman Pen-A-Seal, or equal.
 - 2. Wrapping: Load Wrap (protect in transit); Individual Wrap each beam.
- H. Camber: The required camber for fabrication of each member is indicated on the Drawings, and may be either circular or parabolic, at the manufacturer's option.
 - 1. Unless otherwise indicated, all single-span members shall be cambered to a +1600 foot radius. Where manufacturer's standard camber is other than +1600 foot radius, beams shall be manufactured to provide the equivalent of a +1600 foot radius camber.
 - 2. Cantilever and multiple-span members shall not be cambered unless specifically indicated. Cambers, where indicated, shall be a smooth curve on the back-span from support to support and on the cantilever from support to end of cantilever.
 - 3. The Contractor shall be responsible for verification that the fabricated cambers are correct prior to installing beams.

2.3 SOURCE QUALITY CONTROL

- A. Inspection:
 - 1. Materials and fabrication shall be approved as required by the Division of the State Architect. The manufacture and fabrication of structural glued-laminated timber shall be in accordance with ANSI/AITC Standard A190.1 and ASTM D3737.
 - 2. All work shall be under the supervision of qualified personnel.
 - 3. All glue-laminated members shall be continuously inspected by an inspector specially approved by the Division of the State Architect; CBC Section 1705A.5.4. An AITC certificate will not meet this requirement.
- B. AITC Quality Control: Inspection and Certification per AITC 200-73. Stamp each conforming member with the appropriate AITC Quality Mark and provide an AITC Certificate for each lot or order.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COMPLIANCE

- A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.
- B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

END OF SECTION 06 1800

SECTION 06 4000 - ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide architectural woodwork where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Types of woodwork included are:
 - 1. Plastic covered casework.
 - 2. Laminated plastic countertops and splashes.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 3. Hardware Schedule: Submit schedule with product data sheets for each type of hardware used.
 - 4. Shop Drawings: Submit shop drawings in conformance with NAAWS Section 1 - Submittals. For further information refer to www.woodworkinstitute.com.
 - a. First page shall bear the *Woodwork Institute Certified Compliance Label*.
 - b. Shop drawings shall be provided in sufficient details to show fabrication, installation, anchorage, colors, and interface of the work of this Section with the work of adjacent trades.
 - 5. Samples: Submit four color chip samples of each proposed material in the correct color and finish.
 - 6. Before delivery to the job-site, the woodwork supplier licensees of the Woodwork Institute shall issue a *Certified Compliance Certificate* with the original submittals indicating the woodwork products furnished for this project and certifying that these products and their installation will fully meet all the requirements of the NAAWS grade or grades specified and the Contract Documents.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures.

1.3 REFERENCES

- A. Minimum standards for work within this section shall be in conformance with the Woodwork Institute.
- B. North American Architectural Woodwork Standards (NAAWS).

1.4 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, manufacture and install architectural woodwork in strict accordance with the *North American Architectural Woodwork Standards* for the grades specified. All woodwork shall be provided by a single source WI affiliate manufacturer that is able to provide a WI *Certified Compliance Certificate*. If provisions for the grade specified are in conflict with, or modified by the drawings and/or specifications, the modifications shall govern.

- B. Woodwork Institute Cabinet Design Series (CDS): Refer to Appendix A of the *North American Architectural Woodwork Standards*.
 - 1. CDS numbers have been used to identify the intended design of individual cabinet units.
 - 2. Dimensions indicated are for nominal outside dimensions and fabricators are permitted a 1/2" tolerance in length; no tolerance is permitted for depth and height.
 - 3. Modifications to the Woodwork Institute Casework Design Series are denoted by the letter "M" following the design number.
 - 4. Apply finished end panels or integral members on exposed ends of cabinets. Close gaps at wall-to-wall installations by filler panels not to exceed 1-1/2" in width.
- C. Coordinate the locations required for solid blocking or backing.

1.5 WOODWORK INSTITUTE CERTIFICATIONS

- A. Woodwork Institute Certified Compliance Program (CCP):
 - 1. Before delivery to the job-site, the woodwork supplier licensees of the Woodwork Institute shall issue a *Certified Compliance Certificate* with the original submittals indicating the woodwork products furnished for this project and certifying that these products and their installation will fully meet all the requirements of the NAAWS grade or grades specified and the Contract Documents.
 - 2. Non-licensees of the Woodwork Institute shall provide WI *Certified Tracking Acknowledgment* with the original submittals, that they have arranged for inspection by a WI Inspector after completion of fabrication and installation. If all conditions are found to be compliant, the inspector will issue a *Certified Compliance Certificate*, indicating the millwork products furnished for this project, and certifying that these products and their installation fully meet all the requirements of the grade or grades specified and the Contract Documents.
 - 3. Each elevation of woodwork and countertop shall bear a certified compliance label.
 - 4. In addition to the CCP requirements, the millwork fabricator and/or installer shall allow field inspection by a WI Representative.
- B. CCP Costs: The millwork fabricator and/or installer shall pay all costs for certified compliance. Issuance of a Certified Compliance Certificate is a prerequisite for final acceptance.
- C. Owner reserves the right to request and pay for additional inspections by a representative of the Woodwork Institute to determine that the work of this Section has been performed in accordance with the specified standards. In the event such inspection determines that the work of this Section does not comply with the specified requirements, immediately remove all non-complying items and replace them with items complying with the specified requirements, all at no additional cost to the Owner, and reimburse the Owner for the cost of the additional inspections.
- D. Woodwork and/or installation determined to be non-compliant (and not corrected) will be rejected.

1.6 QUALIFICATIONS:

- A. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified.
- B. Fabricator shall be a member/licensee in good standing of the Woodwork Institute.
- C. Installer shall be a member/licensee in good standing of the Woodwork Institute.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600 and Woodwork Institute *Architectural Woodwork Standards*, latest edition.
- B. Deliver all materials only when the area of operation is enclosed and plaster and concrete work is dry, and area is broom clean.
- C. Work area shall be well ventilated and protected from direct sunlight, excessive heat, rain or moisture. Temperature shall be maintained between 60 and 90 F and relative humidity between 45% and 65%. The HVAC system shall be on and functioning.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate all fabrication, delivery and installation work with the general contractor and other applicable trades.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 PLASTIC COVERED CASEWORK

- A. Construction: Comply with *Architectural Woodwork Standards Section 10 - Casework*.
 - 1. Grade: Custom.
 - 2. Construction Style: Style A Frameless.
 - 3. Construction Type: Type I - Multiple self-supporting units rigidly joined together or Type II - Single length sections to fit access openings at the Contractor's option.
 - 4. Door and Drawer Front Style: Flush Overlay.
 - a. Let in 1/8" reveals for all institution hinges specified, unless otherwise noted.
 - 5. Door and Drawer Edge Type:
 - a. Type A for flush doors and drawers.
 - b. Type E for glass doors.
 - 6. Accessible Sink Cabinet (WI #154): Provide 1" minimum support at bottom edge of sink skirt. Provide 3" base width at freestanding leg of cabinet (refer to detail on the Drawings).
 - 7. Provide fillers at the tops of uppers, wall hung cabinets and full height cabinets to fill the void between the casework and the wall.
- B. Cladding Materials:
 - 1. General:
 - a. Laminate cladding: High-pressure plastic laminate; NEMA LD 3.
 - b. Melamine overlay: Thermofused low-pressure melamine overlay.
 - 2. Exposed Surfaces:
 - a. Horizontal surfaces: 0.050" laminate cladding.
 - b. Vertical surfaces: 0.028" laminate cladding.
 - c. Shelf, drawer, door and cabinet box edging: 3 mm solid-color PVC edging.
 - 3. Semi-Exposed Surfaces:
 - a. Inside cabinet door surface: 0.028" laminate cladding.
 - b. Inside cabinet backs and sides: Melamine overlay.
 - c. Shelf tops and bottoms: Melamine overlay.

- d. Drawer interior surfaces: Melamine overlay.
- e. Shelf, drawer, door and cabinet box edging: 3 mm solid-color PVC edging.
- f. All other locations: 0.028" laminate cladding.
- g. Special Conditions: Clad backs and sides of cabinets in open knee spaces (i.e., handicap alcoves) with 0.028 laminate cladding to match exposed surface colors, unless noted otherwise.
- 4. Balance Sheets: Provide plastic laminate balance sheets of thickness required by manufacturer.
- 5. Colors:
 - a. Laminate: As indicated on the drawings.
- 6. CBC Section 803.11: Laminated products factory-produced with a wood substrate shall comply with one of the following:
 - a. The laminated product shall meet the criteria of CBC Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.8 of NFPA 286.
 - b. The laminated product shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of CBC Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.
 - c. Melamine: White.
 - d. Shelf edging: Match shelf color for semi-exposed, match cabinet color for exposed.
 - e. Door and drawer edging: Match plastic laminate color unless otherwise noted.
 - f. Open bookcases: Match laminate on both exposed and semi-exposed surfaces.

2.3 LAMINATED PLASTIC COUNTERTOPS, SPLASHES

- A. Grades: Comply with *North American Architectural Woodwork Standards Section 11 - Countertops*.
 - 1. Grade: Custom.
- B. Cladding Materials: 0.050" horizontal high-pressure laminate; NEMA LD 3. If post formed laminate is used provide post form grade 0.42 laminate.
 - 1. CBC Section 803.11: Laminated products factory-produced with a wood substrate shall comply with one of the following:
 - a. The laminated product shall meet the criteria of CBC Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.8 of NFPA 286.
 - b. The laminated product shall have a Class A, B or C flame spread index and smoke-developed index, based on the requirements of CBC Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.
- C. Tops and Splashes:
 - 1. Construction: Fully formed
 - 2. Front edge:
 - a. 180 degree wrap Full Round (3/4" radius).
 - b. Exposed ends: Self-edge.
 - 3. Backsplash:
 - a. Type: Integral cove.
 - b. Top edge: Waterfall. Self-edge ends.
 - c. Height: Minimum 4" unless indicated otherwise on the drawings.
 - 4. End Splash (where indicated):
 - a. Type: Square butt joint.
 - b. Top edge: Self-edge coped to backsplash with self-edge ends held short of front edge.
 - c. No end splash is required when countertop abuts a plastic laminate cabinet side, provide matching color seam sealant at joint.

- d. End splash shall be installed on top of the countertop; butting the countertop to the end splash is not acceptable.
- 5. Splicing: Countertop splices shall be no closer than 48" from a sink.
- 6. Exposed Edges: All exposed edges including sink and utility cut-outs shall be sealed with an opaque waterproof sealant.

D. Colors: As indicated on the Drawings.

2.4 CABINET HARDWARE

A. Finish: US-26D finish where exposed unless otherwise specified.

B. Hardware Schedule:

- 1. Hinges: ANSI/BHMA A156.9 Grade 1, WI Grade 1; H08-9XG60 Institutional Hinge by Terry, or 370/450 Series Overlay Hinge by Rockford Process.
- 2. Doors & drawer pulls: Stanley #4483, Hafele #116.07.622; US 26D.
- 3. Door and drawer locks: National C8173/C8178, Olympus 100DR/200DW.
- 4. Regular Drawer slides: Full extension 100# rated, Accuride #7432.
- 5. File Drawer Slides: Full extension 100# rated, Accuride #3832.
- 6. Adjustable shelf clips: Hettich 016721 with locating pin, or Hafele 282.11.752 (with screw in each clip).
- 7. Wire Management Grommets: As manufactured by Doug Mockett & Co.
 - a. Round grommets: EDP Series 2-1/2" diameter plastic with flip-top cap.
 - b. Elongated grommets: King Kong Series with flip-top cap.
 - c. Corner grommets: EDP Series 2-1/2" diameter plastic with flip-top corner cap.
 - d. Color: Black.
- 8. Card Holder (CD-1): Brainerd Name Tag Holder, 2-1/2" x 1/2". Provide at each teacher mail slot.
- 9. Card Holder (CD-2): KV 701 Card Holder. Provide at each flat file drawer.
- 10. Flipper Door Slide: Accuride #1432 anti-rack cable system
- 11. Wardrobe hanger rod: Knappe and Vogt KV660, length to fit. Wall supports; KV734 and KV735.
- 12. Magnetic Door Catch: All metal construction.

C. Key door and drawer locks alike by room. Provide a minimum of 6 keys per room. Key each room differently and provide 4 master keys.

2.5 COUNTERTOP SUPPORT BRACKETS

- A. Unless otherwise specified, heavy duty workstation brackets: 1/8" steel construction, 1000 pound load rating per pair, texture powder coat finish, 18" x 18". Secure to wall with 3/16" lag screws with 1.5" embedment into blocking.
- B. Product: Item Number 72531 82 128 by US Futaba or approved equivalent.

2.6 LOUVERS

- A. No. 672 Grille by Hart & Cooley or approved equal. Size as indicated on the drawings.

2.7 FABRICATION

- A. Fabricate the work of this Section in strict accordance with the approved Shop Drawings and the WI construction requirements for the grade specified.
- B. All toe space base boards shall be solid wood.

- C. Construct bases with toe kicks as indicated on the Drawings at cabinet sides or ends.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Pre-installation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be maintained.
- C. Verify adequacy and proper location of any required backing or support framing.

3.2 FIELD MEASUREMENTS

- A. Take necessary measurements in the field to assure proper dimensions for the work of this Section.

3.3 INSTALLATION

- A. Installation shall only occur after materials have been acclimatized for a minimum of 72 hours. NAAWS section 2.4.4.4.1 shall not apply.
- B. Install the work of this Section in strict accordance with the approved Shop Drawings and the referenced standards, anchoring all items firmly into position, as noted on Plans.
- C. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.
- D. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
 - 1. Edges of cut-outs subject to moisture shall be sealed with an opaque waterproof sealant, before trim, sink, etc. are installed.
- E. Cabinets:
 - 1. Install without distortion so that doors and drawers fit openings properly and are accurately aligned.
 - 2. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
 - 3. Maintain veneer sequence matching (if any) of cabinets.
 - 4. Provide felt silencers on backs of cabinet doors, minimum of 1 per door.
 - 5. Fill openings at tops of cabinets created by scribes and trim.
- F. Tops:
 - 1. Anchor securely to base units and other support systems as indicated.
 - 2. **Laminate plastic countertop butt splices are critical. Use same production lots and prematch joints to minimize color variation.**

3.4 INSPECTION

- A. Schedule WI CCP Inspection with at least 7 days prior notice to planned installation start. Notify the Architect and Inspector of the day and time at least 48 hours prior to the inspection.

END OF SECTION 06 4000

SECTION 07 2100 - BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide building insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.

PART 2 - PRODUCTS

2.1 BUILDING INSULATION MATERIALS

- A. Fiberglass Insulation: Inorganic (non-asbestos) fibers formed with binders into resilient flexible blankets or semi-rigid batts; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated.
- B. Available 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. Certain-teed Products Corp.
 - 2. Johns Manville
 - 3. Owens-corning Fiberglass Corp.
 - 4. United States Gypsum Co.
 - 5. FiberTek Insulation.
 - 6. Substitutions: Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- C. Batt Width: Provide widths as required for flanged staple supported, nominal 16" or 24" for wood studs, or friction fit full 16" or 24" for metal studs, or cut to fit as required in other widths.
- D. Support: Provide manufacturers recommended supporting systems as required for each installation. All insulation shall be continuously supported in a manner to permanently hold the insulation in place.
 - 1. Wood framing shall be friction fit supported.
 - 2. Metal framing shall be friction fit supported.
 - 2. Support with RSA polypropylene biaxially oriented netting, 2-1/4" x 1-1/8" mesh.

2.2 INSULATION TYPES

- A. Thermal Fiberglass Batts: ASTM C665, Type I.
 - 1. Exterior walls concealed; R-19.
 - 2. Exterior roof/ceiling concealed; R-30.
 - 3. Flame spread - 25, smoke developed - 450; ASTM E84.
 - 4. Combustion Characteristics: Pass; ASTM E136.
 - 5. Recycled Content: Certified to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.
- B. Sound Attenuation Fiberglass Batts: ASTM C665, Type I, full wall thickness.
 - 1. Interior wall stud cavities, friction fit.
 - 2. Flame spread - 25, smoke developed - 450; ASTM E84.
 - 3. Combustion Characteristics: Pass; ASTM E136.
 - 4. Recycled Content: Certified to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

2.3 ACCESSORIES

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position.
- B. Between Studs:
 - 1. Install insulation tight in spaces and tight to exterior side of mechanical and electrical services with the plane of the insulation.
 - 2. Leave no gaps or voids.
 - 3. Trim insulation neatly to fit spaces.
 - 4. Use wire or metal straps to hold insulation in place.
- C. Between Wood Roof Rafters:
 - 1. Install insulation tight in spaces and tight to exterior side of mechanical and electrical services with the plane of the insulation.
 - 2. Leave no gaps or voids.
 - 3. Trim insulation neatly to fit spaces.

4. Use wire or metal straps to hold insulation in place.
- D. Between Wood I Joists: Wire up insulation under roof decks by running 16 or 18 gauge wire diagonally or perpendicular to the insulation every 18" to 24".

END OF SECTION 07 2100

SECTION 07 2700 - AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide an air barrier system constructed to perform as a continuous air barrier and consisting of roof and wall assemblies sealed to the foundation, as indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1000: Plywood sheathing.
 - 3. Section 07 6200: Flashing and sheet metal.
 - 4. Section 07 5115: Cold-Pressed Built-up roofing.
 - 5. Section 07 6110: Standing seam metal roofing.
 - 6. Section 07 9210: Elastomeric joint sealants.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.3 DEFINITIONS

- A. Air Barrier: Air tight barrier made of materials that are relatively air impermeable but water vapor permeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.

1.3 AIR BARRIER SYSTEM DESCRIPTION

- A. Provide a continuous air barrier that is designed and constructed to control air leakage into, and out of, the building's conditioned space. The air barrier shall be sealed at all joints for its entire length.
- B. Air barrier shall be composed of one or more of the following:
 - 1. Materials that have an air permeance not exceeding 0.004 cfm/ft² under a pressure differential of 1.6 psf; (0.02 L/s/m² at 75 Pa) ASTM E2178.
 - a. Materials deemed to comply with CEC Section 140.3(a)9A, with all joints sealed and all materials installed in accordance with the manufacturer's instructions, as listed in CEC Table 140.3-A.
 - 2. Assemblies of materials that have an average air leakage not exceeding 0.04 cfm/ft² under a pressure differential of 1.57 psf; ASTM E2357, ASTM E1677, ASTM E1680 or ASTM E283.
 - a. Materials deemed to comply with Section 140.3(a)9B if all joints are sealed and all of the materials are installed as air barriers in accordance with the manufacturer's instructions, as follows:
 - 1) Concrete masonry walls that have at least two coatings of paint or at least two coatings of sealer coating.
 - 2) Concrete masonry walls with integral rigid board insulation.
 - 3) Structural insulated panels.
 - 4) Portland cement or Portland sand parge, or stucco, or a gypsum plaster, each with a minimum

1/2 inch thickness.

3. The entire building has an air leakage rate not exceeding 0.004 cfm/ft² at a pressure differential of 1.57 psf, when the entire building is tested, after completion of construction, in accordance with ASTM E779 or another test method approved by the Commission.

1.4 AIR BARRIER ASSEMBLIES DESCRIPTION

- A. Air barrier materials and assemblies of materials indicated on the Drawings and specified herein are as follows:
- B. Wood Stud Framed Walls with Plaster:
 1. Cement plaster specified in Section 09 2400.
 2. Plywood sheathing specified in Section 06 1100. All joints shall be over continuous solid blocking or shall be sealed with an approved air barrier tape.
- C. Low Slope Wood Framed Roofs:
 1. Cold-Pressed Built-up roofing specified in Section 07 5115.
 2. Plywood sheathing specified in Section 06 1100.
- D. Continuity of air barrier system through attics and interstitial spaces is maintained using foam-in-place insulation as specified in this section.
- E. Bridge and seal air leakage pathways and gaps, including but not limited to:
 1. Connections of the walls to the roof air barrier.
 2. Connections of the walls to the foundations.
 3. Seismic and expansion joints.
 4. Openings and penetrations of window and door frames, store front, curtain wall.
 5. Piping, conduit, duct and similar penetrations.
 6. Masonry ties, screws, bolts and similar penetrations.
 7. Flashing and sheet metal assemblies.
 8. All other air leakage pathways in the building envelope.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this Section with the work of other Sections for proper time and sequence to avoid construction delays.
- B. Pre-installation Meeting: Convene pre-installation meeting a minimum of one week prior to starting framing to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions, if any.
 1. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
 - a. Owner.
 - b. Architect.
 - c. Inspector.
 - d. Air barrier material installers.
 - e. Installers of framing, exterior sheathing, continuous insulation, roofing, metal wall panels, cement plaster, and electrical, plumbing and mechanical subcontractors as applicable.
 2. Ensure meeting agenda includes review of methods and procedures related to insulation installation including coordination with related work.
 3. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas; ASTM C 1029, Type II; minimum density of 2.2 lb/ft³ and minimum aged R-value at 1-inch thickness of 4.9 per inch.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ProSeal Eco by Icynene Inc.
 - 2. Substitutions: Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Performance Requirements:
 - 1. Air Permeance: Maximum of 0.004 cfm/sf maximum (0.02 L/s/m² at 75 Pa): ASTM E2178.
 - 2. Water Vapor Permeance: Maximum 2 perm; ASTM E96, desiccant method.
 - 2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Development Index: 450 or less
 - 3. Compressive strength: Minimum 26 psi (ASTM D1621).
 - 4. Sustainability Requirements:
 - a. Low Emitting: Insulation tested according to CA/DPH/EHLB/v.1.1-2010.
 - b. Resistant to fungal growth as per ASTM C1338.
 - c. Containing no PBDE.

2.2 JOINT AND SEAM TAPE

- A. Tape:
 - 1. 3M All Weather Flashing Tape #8067 or approved equal.

2.3 ACCESSORIES

- A. Sealants and Accessories:
 - 1. As specified or as recommended by foam manufacturer.
 - 2. As specified in Section 07 9210.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
- C. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barriers, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants, tapes and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

3.4 FOAMED-IN-PLACE AIR BARRIER INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thickness recommended by manufacturer. Do not spray into rising foam. Minimum thickness of 2".
- D. Do not apply insulation within 3" of heat emitting devices or where the temperature is in excess of 200 degrees F, per ASTM C411 or in accordance with applicable codes.
- E. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.
- F. Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

- A. Allow access to air barrier work areas and staging.
- B. Do not cover installed weather barriers until required inspections have been completed.

3.6 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION 07 2700

SECTION 07 4100 - METAL ROOFING PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide the work of this Section as indicated and specified. Extent of metal roofing is indicated. Types of metal panels required include, but are not limited to:
 - 1. Formed metal roof panel system.
 - 2. Fascia, trim, and associated metal flashing at perimeters and penetrations.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 6200: Sheet metal flashing and trim.
 - 3. Section 07 9210: Sealants and caulking.

1.2 SUBMITTALS FOR REVIEW

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature, product specifications, and test reports for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Shop Drawings:
 - a. Provide shop drawings sealed by a registered structural engineer licensed in the state of California.
 - b. Indicate typical layout including dimensions. Indicate all profiles, joints, connections, edge conditions, valleys supports, anchorages, trim, flashings, closures, and special accessory components not included in manufacturer's product data and provisions for expansion and contraction.
 - 4. Samples: Submit 3 samples, each approximately 12" square, in colors specified.
 - 5. Calculations: Submit calculations of wind loads and minimum clip spacings meeting the requirements of this section sealed by a registered structural engineer licensed in the state of California.
 - 6. Warranty: Submit specimen copy of manufacturer's water-tightness warranty, including evidence of application for warranty and manufacturer's acceptance of installer and warranty conditions.
 - 7. Installer Certification: Obtain written certification from manufacturer of specified roofing system certifying that Installer is a licensed applicator of the specified roofing system for this project. Provide original signed copy of certification with submittal package.
 - 8. Design and Test Reports: Submit certified test reports from an independent testing laboratory indicating compliance with the specified performance requirements.
 - 9. Evidence of Experience: Provide evidence that installer has completed the manufacturer's approved roofing contractor course and is currently certified for the installation of this roof system.

1.3 CONTRACT CLOSEOUT SUBMITTALS

- A. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- B. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.

1.4 DESIGN AND PERFORMANCE CRITERIA

- A. Thermal Expansion and Contraction:
 - 1. Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by changes in temperature without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.
 - 2. The design temperature differential shall be not less than 200° F.
 - 3. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.
 - 4. Location of metal roofing rigid connector shall be at roof ridge unless otherwise approved by the Project Architect. Metal ridge connector may require design as per job conditions by specified manufacturer.
- B. Uniform Wind Load Capacity:
 - 1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria. Anchor clips shall be installed exactly as spacing given in Paragraph 3.3.B.
 - a. Design Code: ASCE 7-10, Method 2 for Components and Cladding.
 - b. Safety Factor: 1.650 after any load reduction or material stress increase.
 - c. Category III Building with an Importance Factor of 1.15.
 - d. Wind Speed: 115 mph.
 - e. Ultimate Pullout Value: 590 pounds per each of the two fasteners holding the panel anchor to the roof decking or framing system.
 - f. Exposure Category: C.
 - 2. Capacity shall be determined using pleated airbag method in accordance with ASTM E1592, testing of sheet metal roof panels. Allowable safe working loads shall be determined by dividing the ultimate test load by the safety factor specified above.
- C. Uniform Positive Load Capacity:
 - 1. The installed roof system shall be capable of resisting the following positive uniform roof loads:
 - a. Roof Live Load of 20 psf;
 - b. Capacity to resist positive loads shall be determined by empirical calculations in accordance with AISI. Calculation shall be sealed by a registered professional engineer.
 - 2. Installed roof system shall carry positive uniform design loads with a maximum system deflection of L/180 as measured at the rib (web) of the panel.
 - 3. Dead Load: Loading of the roof structure, due to tear off of existing, and/or installation of new roofing materials shall not exceed the present loading due to weight of the existing roofing system.
- D. UL Fire Resistance P Ratings for Roof Assemblies: If applicable, panel system shall be approved for use in an appropriate Construction Assembly; UL 263.
- E. UL Wind Uplift Resistance Classification: Class 1-90; UL 580.
- F. UL Class A fire rating per UL 790.
- G. ASTM E283: Static pressure air infiltration (doors, windows, curtain walls):
 - 1. Pressure Leakage Rate:
 - a. 1.57 psf: 0.0007 cfm/sf.
 - b. 6.24 psf: 0.0002 cfm/sf.
 - c. 20.0 psf: 0.0036 cfm/sf.
- H. ASTM E331: Static pressure water infiltration (doors, windows, curtain walls):
 - 1. Pressure Result: 5 gal./hr. per sf and static no leakage
 - 2. Pressure of 20.0 Psf for 15 minutes.

- I. ASTM E1680: Static pressure air infiltration (roof panels):
 - 1. Pressure Leakage Rate:
 - a. 1.57 psf: 0.0012 cfm/sf.
 - b. 6.24 psf: 0.0001 cfm/sf
 - c. 20.0 psf: 0.0011 cfm/sf.
- J. ASTM E1646: Static pressure water infiltration (roof panels):
 - 1. Pressure Result: 5 gal./hr. per s.f. and static no leakage.
 - 2. Pressure of 20.0 Psf for 15 minutes.
- K. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolations for conditions outside test range are not acceptable.
- L. Water penetration (dynamic pressure): No water penetration, other than condensation, when exposed to dynamic rain and 70 mph wind velocities for not less than five minutes duration, when tested in accord with principles of AAMA 501.1.
- M. Water Penetration in Low Slope Applications: No water penetration or panel movement when subject to 6" head of water for 6 hrs when tested in accordance with the ASTM E2140 and when subject to 6" head of water for 7 days when tested in accordance with the TAS 114 appendix G.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who has completed the manufacturer's approved roofing contractor course and is currently certified for the installation of this roof system.
- B. Source Limitations: Obtain all components of roof system from a single manufacturer, including roll goods materials if required. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer.
- C. Source Quality Control: Manufacturer shall have in place a documented, standardized quality control program such as ISO-9001 approval.
- D. Engage the Manufacturer's Field Representative to conduct required periodic inspections of work in progress as described herein and shall furnish written documentation of all such inspections.
- E. Manufacturer shall provide the Owner project with a written statement that they will provide a site inspection 3 days a week that confirms that the project is being constructed as specified, by an experienced, full time employee of the company.
- F. Site Formed Panels: Panels in excess of shippable length shall be formed on-site. Site formed panels shall meet each of the following requirements:
 - 1. Panels shall be formed on heavy duty factory type roll formers. Roll formers shall gradually form the panel profile utilizing no fewer than 12 forming stations to improve quality and minimize oil canning.
 - 2. All tooling shall be polished and tempered to a minimum hardness of Rockwell C - 52. Tooling shall be maintained clean and in good working condition. Tooling repairs or modifications made by means of welding, sawing, grinding, or the like are unacceptable, as they may contribute to poor quality, aesthetics, and performance of the end product.
 - 3. Panels shall be of identical profile and characteristics as factory formed panels and specimens used as the basis of performance tests.
 - 4. Sealant shall be factory applied in a separate factory formed snap on cap. Site/field applied seam sealant is unacceptable. Seam caps may be shipped in 45'-0" or less length and lap spliced over full length panels in accordance with manufacturer's system details.

5. Site roll forming equipment shall be operated by a trained full time experienced technician. The installer must provide additional personnel to handle raw materials and finished product as necessary.
- G. Mechanically Curved Panels: Panels shall be mechanically curved to the exact radius of each curved roof area. Panels may be mechanically curved in the factory or on site. Mechanical curving equipment shall be operated by a full time experienced technician.
 1. Flat panels conformed to the roof shape are not acceptable and will be rejected.
- H. Tapered Panels: Tapered panels shall be formed from a single piece of metal. Tapered panels formed from multiple pieces of joined metal are unacceptable. All performance tests must be applicable for the greatest panel width of the tapered panels. Tapered panels must be designed to accommodate thermal expansion and contraction while fixed at the narrowest end of the panel.
- I. Colors: Provide finish selections indicated in the Finish Schedule.
 1. Acceptable Manufacturers: Products and manufacturers specified in the Finish Schedule are for purposes of color matching only. Refer to this Specification Section for additional manufacturers.
 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as manufacturer's standard from the listing of acceptable manufacturers. The Contractor shall be responsible for providing matching colors.
 3. Custom Colors: Where the Finish Schedule specifies custom colors, provide matching colors from the listing of acceptable manufacturers.

1.6 PRE-ROOFING MEETING

- A. Not less than three nor more than 10 calendar days prior to scheduled start of roofing installation, conduct a roofing substrata inspection and pre-roofing meeting at the job site. Review methods and procedures related to roofing system including, but not limited to, the following:
 1. Meet with Owner, Architect, Inspector, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 2. Discuss proposed schedule for installation of the roofing, and reach agreement as to dates of start and finish of installation of the roofing.
 3. Discuss product submittals and warranties.
 4. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 5. Discuss interface with the work of other trades.
 6. Discuss proposed methods for installation of the roofing, and equipment and personnel to be used.
 7. Discuss inspection methods to be used.
 8. Visually inspect all substrata upon which roofing is scheduled to be applied for compliance with requirements, including flatness and fastening.
 - a. Determine general acceptability, and determine areas requiring further preparation.
 - b. Determine acceptable remedies for unacceptable areas.
 9. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

1.7 SPECIAL WARRANTY

- A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's **20-year** extended warranty. Warrant coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.

- B. Roof Manufacturer's Warranty: In addition to the warranty requirements of the Contract Documents, roof system manufacturer shall execute two copies of a single warranty covering of the following criteria. Multiple-source warranties are not acceptable.
1. Manufacturer's **30-year** "No Dollar Limit" watertightness warranty, including coverage for all trim, flashings, and penetrations associated with the roof area.
 2. The metal roof panel system shall not allow intrusion of water from the exterior of the roof system into the building envelope, when exposed to ordinary weather conditions and ordinary wear and usage.
 3. Warranty shall commence on date of Notice of Completion.
- C. Installer's Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of the roofing installer's **3-year** extended warranty covering roof system installation and water-tightness.
1. Warranty shall include repair or replacement of damaged finishes, furnishings and equipment due to defective roof materials or workmanship and return building to its original condition.
 2. Installer shall make repairs without reference to or consideration of the cause or nature of such leaks or defects within 24 hours after receipt of notice from the Owner by telephone, telegram, or letter.
 3. Repairs required within the warranty period shall be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
 4. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.
 5. This warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

1.8 MANUFACTURER'S INSPECTIONS

- A. When the project is in progress, the roofing system manufacturer will inspect the work not less than 3 days per week. In addition, the manufacturer will:
1. Keep the Architect or Owner informed as to the progress and quality of the work as observed.
 2. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
 3. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

PART 2 - PRODUCTS

2.1 METAL ROOFING PANEL SYSTEM

- A. Acceptable Products:
1. Basis of design is R-MER Span by The Garland Company, Inc., 800/762-8225.
 2. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.
- B. Materials:
1. Panel Material: 22 gage, Galvalume steel, type AZ-55, smooth; ASTM A792.
 2. Flashing Material: 24 gage minimum, Galvalume steel, type AZ-55, smooth; ASTM A792.

- C. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
 - 1. Exterior 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.30 mil primer coat plus 0.70 mil color coat, 1.0 mil total minimum thickness.
 - 2. Interior: Inhibitive thermo-cured primer, 0.15 mil minimum dry film thickness with off-white wash coat, 0.30 mil minimum dry film thickness.
 - 3. Color: As indicated on the Finish Schedule.

2.2 PANEL CONFIGURATION

- A. Provide the same panel profile from a single manufacturer for all standing seam roof areas.
- B. Provide standing seam panels incorporating mechanically interlocked, concealed anchor clips allowing unlimited thermal movement, and of configuration which will prevent entrance or passage of water.
 - 1. Panel/Cap configuration must have a total of 4 layers of steel surrounding anchor clip for prevention of water infiltration and increased system strength designed to limit potential for panel blow-off.
 - 2. Profile of panel shall have mesa's every 2" on center continuous throughout panel which are a minimum of 1-1/2" wide.
 - 3. Exposed fasteners, screws and/or roof mastic are unacceptable and will be rejected. System configuration only allows for exposed fasteners at panel overlap (if required) and trim details (as per manufacturer's guidelines).
 - 4. Provide panels in continuous lengths from ridge to eave with no overlaps unless approved by manufacturer, in writing.
 - 5. Panels lengths which exceed maximum shipping lengths shall be field rolled on equipment owned by the panel manufacturer. Seam sealant must be factory applied.
 - 6. Seam caps shall be manufactured in the factory and may be installed with end laps. Seam sealant must be factory applied.
 - 7. Curved panels shall be mechanically curved to the exact radius of each curved roof area. Panels may be mechanically curved in the factory or on site. Flat panels field-conformed to the roof shape are unacceptable and will be rejected.
 - 8. Tapered Panels: Tapered panels shall be formed from a single piece of metal. Tapered panels formed from multiple pieces of joined metal are unacceptable. All performance tests must be applicable for the greatest panel width of the tapered panels. Tapered panels must be designed to accommodate thermal expansion and contraction while fixed at the narrowest end of the panel.
- C. Seam Configuration: 2-3/8" minimum height for added upward pressures and aesthetic appeal.
 - 1. Continuous anchor reveals to allow anchor clips to resist positive and negative loading and allow unlimited expansion and contraction of panels due to thermal changes.
 - 2. Integral (not mechanically sealed) seams are unacceptable. Select the type of Anchor Clip required for this project. Most systems will require Galvalume steel clips. Aluminum panels should use stainless steel clips to prevent galvanic corrosion. Batten style clips should be specified only for R-MER Span batten style seam panels.
- D. Concealed Standard Anchor Clips: 16 gage Galvalume steel, 1-piece clip with projecting legs for additional panel alignment and provision for unlimited thermal movement in each direction along the longitudinal dimension.
 - 1. 2-piece clips are unacceptable.
 - 2. Sealant applied in panel cap must be isolated from clip to ensure that no sealant damage occurs from the movement of the panel during expansion and contraction.
 - 3. Clip must maintain a clearance of a minimum of 3/8" between panel and substrate for proper ventilation to help prevent condensation on underside of panel and eliminate the contact of panel fastener head to panel.

- E. Seam Cap: Snap-on cap shall be a minimum of 1" wide "T" shaped of continuous length up to 45'-0" according to job conditions and field seamed by means of manufacturer's standard seaming machine.
 - 1. Cap shall be designed to receive 2 beads of continuous hot applied gasketing sealant which will be applied independent of anchor clip to allow unlimited thermal movement of panel without damage to cap sealant.
 - 2. Sealant shall be a SIS (Styrene-Isoprene-Styrene) block copolymer type thermoplastic rubber adhesive, non-fatigue water barrier.
- F. Standing Seam Panel Width: 18".
- G. Stiffening Ribs: Located in flat of panel to minimize oil canning and telegraphing of structural members.
- H. Replaceability: Panels shall be of a symmetrical design with snap on, mechanically seamed cap configuration such that individual panels may be removable for replacement without removing adjacent panels.
- I. Panel ends shall be panned at ridge, headwall, and hip conditions, or where applicable.
- J. Panel Length: Full length without joints, including bends.

2.3 ROOF SYSTEM ACCESSORIES

- A. Gable Anchor Clips: Galvalume steel, type AZ55, minimum thickness 16 gage.
- B. Fasteners:
 - 1. Concealed Fasteners: Corrosion resistant steel fasteners (zinc plated, stainless steel or equal) designed to meet structural loading requirements. Provide #14 as the minimum fastener size.
 - 2. Exposed fasteners: Series 410 stainless steel fasteners or 1/8" diameter stainless steel waterproof rivets. All exposed fasteners shall be factory painted to match the color of the standing seam panels.
- C. Closures: Factory precut closed cell foam meeting ASTM D1056 or ASTM D3575, enclosed in metal channel matching panels when used at hip, ridge, rake, and jamb.
- E. Sealant:
 - 1. Concealed Application: Non-curing butyl sealant or approved equal.
 - 2. Exposed Application: Garland SS sealant or approved equal.
 - 3. Panel Joint (End Lap) Sealant: Non-curing modified isobutylene tri-polymer tape of thickness to fully adhere to both surfaces being joined with indicated service life of 20 years.
 - 4. Colors: As selected by architect from sealant manufacturer's standard selection.
- F. Membrane Underlayment: SlopeShield Plus SA by VaproShield, 20 mils thickness, or approved equal.
 - 1. Air Permeance: 0.00086 cfm/sf at 1.57 lbs/sf; ASTM E2178.
 - 2. Water Vapor Permeance: 30 perms; ASTM E96.
 - 3. Surface Burning Characteristics: Class A, ASTM E84; flame spread rating of 5 and smoke development classification of 45.
 - 4. Tensile Strength: 16 lbF/in MD and 8 lbF/in XMD; ASTM D2523.
- G. Provide all miscellaneous accessories for complete installation.

2.4 FLASHING

- A. Provide flashing, counterflashing, valleys, edge metal, anchor clips, cleats, gaskets, sealants and other materials required.

1. Prefinish exposed materials to color indicated on the Finish Schedule.
 2. Material, thickness, and finish to match roof panels.
- B. Piping Penetrations: Flexible EPDM pipe flashing with aluminum base. Decktite by ITW Buildex, Masterflash by Construction Fasteners Inc., or approved equal.
- C. Roof Curb Flashings: Fabricate to lap under roof panels on the high side and over roof panels on the low side.

2.5 FABRICATION

- A. Shop fabricate metal roofing and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight, and uniform bends and rises. Hem exposed edges of flashings.
- B. Form flashing components from full single width sheet in minimum 10'-0" lengths. Provide shop fabricated, mitered corners, joined using closed end pop rivets and joint sealant.
- C. Fabricate roofing and related sheet metal work in accordance with approved shop drawings and applicable standards.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that substrate is sound, dry, properly sloped for drainage, and completely secured in position.
- C. Verify that provision has been made for roof drains, scuppers, flashings, and all other interface items attaching to or penetrating through the work of this Section.
- D. Beginning installation constitutes acceptance of the substrate and responsibility for proper performance.
- E. Do not allow the installed work of this Section to be used as a storage space for other materials.
- F. Do not permit unnecessary walking on the finished roof. Require all personnel to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material which could cause damage and/or discoloration when installing or walking on the finished roof.
- G. Capture all drilling debris on a cloth placed roofing panels.
- H. Remove and replace all damaged material.

3.2 UNDERLAYMENT INSTALLATION

- A. Membrane underlayment shall be applied in accordance with CBC Table 1507.1.1(2). Install shingle fashion in strict accordance with the manufacturer's written instructions in valleys, continuous at roof ridge and eaves, at all roof penetrations (HVAC, plumbing, electrical), and other locations indicated. Install per manufacturers recommendations.

3.3 METAL ROOFING INSTALLATION

- A. Comply with all details and install roofing materials and flashings in accordance with approved shop drawings and manufacturer's product data, within specified erection tolerances.
- B. Prepare roof for the installation of standing seam panels, including:
 - 1. Directly over the completed roof substrate, install 1-piece panel anchor clips.
 - 2. Set anchor clips on 16 gage galvanized pre-punched bearing plates to distribute the loads on the board insulation.
 - 3. Anchor Clip Spacing:
 - a. 48" for Zone 1 (field)
 - b. 24" for Zone 2 (eave, ridge, hip, and rake).
 - c. 24" for Zone 3 (corners).
 - d. Zones 2 & 3 must extend 48" onto the roof area.
- C. Installation of Roof Panels: Roof panels can be installed by starting from either end and working towards the opposite end. Due to the symmetrical design of the specified panels system, it is also acceptable to start from the middle of the roof and work toward each end.
 - 1. A stainless steel pop rivet shall be secured through the anchor reveal of the panel leg and extend into the arm of the panel clip located at the ridge of the system. Provide at each arm of the clip along the ridge. The panel is then anchored at both sides of the clip.
 - a. Capture all drilling debris during this operation with a rag or cloth placed on the panels at the drilling operation.
 - b. Panels are not securely attached to the roof until fixed to the anchor clip. To avoid damage and injury, all panels shall be fixed to the anchor clip immediately as they are installed.
 - 2. Uninstalled panels which are temporarily stored on the ground or roof shall be secured in place at the end of each day's work to prevent possible damage or injury.
- D. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners where required to prevent corrosive action between fastener, substrate, and panels.
- E. Limit exposed fasteners to extent indicated on shop drawings.
- F. Anchorage shall allow for temperature expansion/contraction movement without stress or elongation of panels, clips, or anchors. Attach clips to structural substrate using fasteners of size and spacing as determined by manufacturer's design analysis to resist specified uplift and thermal movement forces.
- G. Seal laps and joints in accordance with roofing system manufacturer's product data.
- H. Coordinate flashing and sheet metal work to provide weather tight conditions at roof terminations. Fabricate and install in accordance with standards of SMACNA Manual.
- I. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof mounted equipment in accordance with system manufacturer's product data and design calculations.
- J. Installed system shall be true to line and plane and free of dents, and physical defects. In light gauge panels with wide flat surfaces, some oil canning may be present. Oil canning does not affect the finish or structural integrity of the panel and is therefore not cause for rejection.
- K. Maximum variation from true planes or lines shall be 1/4:20 and 3/8:40 or more.
- L. Form joints in linear sheet metal to allow for 1/4" minimum expansion at 20'-0" on center maximum and 8'-0" from corners.

- M. At joints in linear sheet metal items, set sheet metal items in two 1/4" beads of butyl sealant. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- N. Remove damaged work and replace with new, undamaged components.
- O. Touch up exposed fasteners using paint furnished by roofing panel manufacturer and matching exposed panel surface finish.
- P. Clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at date of substantial completion. Touch up minor abrasions and scratches in finish.

3.4 ROOF CURB FLASHING INSTALLATION

- A. Install roof curb flashings in strict accordance with the manufacturer's written installation instructions. Make provisions for thermal and structural movement.

3.5 CLEAN UP

- A. Touch up damaged paint surfaces with air dry touch up paint provided by manufacturer. Follow directions carefully to minimize color irregularities. Small brush application only - **do not spray touch up paint.**
- B. At completion of each day's work and at Work Completion, sweep panels, flashing and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate. Remove debris from project site upon completion of each phase/building of work.

END OF SECTION 07 4100

SECTION 07 5115 - COLD-PROCESS BUILT-UP ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide cold-process built-up asphalt roofing system on wood deck where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Roofing system includes, but is not limited to:
 - 1. Roofing membrane and related flashings, including cool roof cap sheet with acrylic top coat.
 - 2. Substrate board.
 - 3. Fasteners, walk pads, flashings and other accessories.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 6200: Sheet metal flashing and trim.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - a. Provide total system breakdown, by layer, in weight and composition.
 - b. Provide letter of certification, signed by roofing manufacturer, that all products used in completed roof assembly are asbestos free.
 - c. Submit manufacturer's installation instructions.
 - d. Submit manufacturer's certificate that products are physically and chemically compatible with each other and meet listed ASTM or Federal Specifications.
 - e. Submit manufacturer's certificate that products comply with current safety and environmental regulations, including hazardous materials labeling and air quality/VOC regulations
 - f. Provide Energy Star Compliance information for each type of product within the roofing system
 - g. Base, perimeter, and detail flashings, cants, and membrane terminations
 - h. Insulation fastening patterns.
 - 2. Installers Certification: Submit written and signed "wet signature" certification from manufacturer that installer is approved by manufacturer to install specified roofing system for this project. .
 - 3. Manufacturers Certification: Submit written and signed certification from manufacturer that roof deck and details and roofing systems comply with manufacturers recommendations and are suitable for application, climate zone, slope.
 - 4. Submit evidence of meeting performance requirements, including FMG listing.
- B. Contract Closeout Submittals:
 - 1. Operation and Maintenance manuals in accordance with requirements of Section 01 7820.
 - 2. Warranties: Special warranties specified in this Section.
 - 3. Inspection Reports: Roofing system manufacturer's daily and final technical inspection reports of completed roofing installation.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

- B. **Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience. All materials shall be from single source manufacturer for base sheets, inter-plys, cap sheets, adhesives, mastics, and coatings.
- C. **FMG Listing:** Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
 - 1. **Fire/Windstorm Classification:** Class 1A- 90.
- D. **Flashings:** Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:
 - 1. **FMG 1-49:** Loss Prevention Data Sheet for Perimeter Flashings.
 - 2. **FMG 1-29:** Loss Prevention Data Sheet for Above Deck Roof Components.
 - 3. **NRCA Roofing and Waterproofing Manual (Fifth Edition)** for construction details and recommendations.
 - 4. **SMACNA Architectural Sheet Metal Manual (Fifth Edition)** for construction details.
- A. **Wind Uplift:** Meet or exceed the product and securement requirements of Factory Mutual Approval Guide and Loss Prevention Data 1-28, 1-29 and 1-48. Meet wind uplift securement requirements for **1-60** windstorm rating.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
 - 1. Company specializing in applying specified roofing system with minimum 5 years documented experience.
 - 2. Company approved by materials manufacturer for specified guarantee work.
 - 3. **Installing Foreman:** Individual specializing in applying specified roofing system with minimum 10 years documented experience.
- B. **Manufacturer Qualifications:** A qualified manufacturer that has UL listing and FMG approval for roofing system and with minimum 10 years experience in materials of like design and application.
- C. **Manufacturer's Technical Representative Qualifications:** An individual experienced in the installation and maintenance of the specified roofing system and qualified to determine Installer's compliance with the requirements of this section.
 - 1. **Manufacturer's Technical Representative Qualifications:** An authorized full-time employee representative of manufacturer experienced in the installation and maintenance of the specified roofing system and qualified to determine Installer's compliance with the requirements of this Project.
- D. **Source Limitations:** Obtain all components for roofing system from single roofing system manufacturer.
- E. **UL Listing:** Provide built-up roofing system and component materials which have been tested for application and slopes indicated and are listed by Underwriters' Laboratories, Inc. (UL) for Class A external fire exposure.
 - 1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package or container indicating that materials have been produced under UL's Classification and Follow-Up Service.

1.5 PRE-ROOFING MEETING

- A. Not less than three nor more than ten calendar days prior to scheduled start of roofing installation, conduct a roofing substrata inspection and pre-roofing meeting at the job site. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner, Architect, Inspector, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Discuss proposed schedule for installation of the roofing, and reach agreement as to dates of start and finish of installation of the roofing.
3. Discuss product submittals and warranties.
4. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
5. Discuss interface with the work of other trades.
6. Discuss proposed methods for installation of the roofing, and equipment and personnel to be used.
7. Discuss inspection methods to be used.
8. Visually inspect all substrata upon which roofing is scheduled to be applied for compliance with requirements, including flatness and fastening.
 - a. Determine general acceptability, and determine areas requiring further preparation.
 - b. Determine acceptable remedies for unacceptable areas.
9. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

1.6 SPECIAL WARRANTY

- A. Special Warranty: Submit 2 executed copies of roofing manufacturer's special warranty in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 1. Special warranty includes roofing membrane, flashings, roofing membrane accessories, roof insulation and fasteners and other components of roofing system.
 2. Warranty Period: 30 years from date of Recording of Notice of Completion.
 3. Warranty renewal requirements at 20 year period.
- B. Special Project Warranty: Submit 2 executed copies of the following installer's special warranty, signed by the Contractor and the roofing subcontractor:
 1. The undersigned agree for a period of 2 years after Substantial Completion of the Work to make immediate repairs as required to stop leaks or correct defects in the work of this Section, within 24 hours after receipt of notice from Owner by telephone, telegram, or letter; and further agree to make such repairs without reference to or consideration of the cause or nature of such leaks or defects.
 2. As a further condition of this 2-year Special Warranty the undersigned hereby agree to repair or replace any other damaged products and finishes, to return the building to its original condition, and to notify the roof system manufacturer in writing within 30 days that such repairs were made.
 3. Open seams, buckles, curled edges, fishmouths, splits, wrinkles, etc., will be considered as evidence of poor and/or defective workmanship and products.
 4. Repairs required within the stated period will be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
 5. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.
 6. This Special Project Warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him, and shall run concurrent with other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 COLD-PROCESS BUILT-UP ROOFING SYSTEM

- A. Basis of Design: Characteristics of specific products manufactured by The Garland Company, www.garlandco.com, are indicated to establish required level of quality, appearance, and performance. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. As part of the work of this Section, provide all materials required by the roofing manufacturer for the specified special warranties, and the UL and Factory Mutual requirements specified.
- C. All roofing, except sheet metal work, required for the roof system to be provided shall be manufactured by or approved in writing by the manufacturer of the roof system and such approved roofing shall be included in the roofing manufacturer's warranty.

2.2 SHEET MATERIALS

- A. Base Sheet Materials - One Ply: Flexbase Plus 80 by The Garland Company; ASTM D6162 Type III, ASTM D5147.
- B. Flashing Materials: Roof drain ply reinforcing and smooth or gravel coated system cap sheet.
 - 1. Base Sheet at Flashing: HPR Premium Modified Base Sheet by The Garland Company, Inc.; ASTM D4601; includes curbs and walls.
 - 2. Cap Sheet: SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.
 - a. Granule Color: White
 - b. StressPly Plus FR Mineral by The Garland Company, ASTM D6162, Type III, Test Method ASTM D5147.
- C. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one-part asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing membranes and flashings, with low-VOC formulation acceptable to authorities having jurisdiction.
 - 1. Weather King Plus WC Adhesive by The Garland Company,

2.3 AUXILIARY ROOFING MEMBRANE MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.
- B. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required by roofing system manufacturer for application; Silver Flash by The Garland Company, Inc.
- C. Cold-Applied Flashing Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing base flashings.
- D. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM 4470; designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
- F. Metal Flashing Sheet: Metal flashing sheet is specified in Section 07 6200.

- G. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.4 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, fibrous-felted wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration; 1/2" thickness; mechanically attached over rosin sheet.
1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, provide tapered to drains.

2.5 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Wood Nailer Strips and Cants: No. 2 or better lumber, pressure treated for fire and rot resistance. Creosote and asphaltic preservatives are not acceptable.
- D. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Roof walk pads, if required, to maintain warranty of roofing system. Refer to drawings for service paths required to maintain rooftop equipment.

2.6 COATING MATERIALS

- A. Roof Coating/Top Coat: Acrylic Latex coating, highly reflective, elastomeric, and compatible with modified bitumen surfaces, meeting CCRC "Cool Roof" requirements and Title 24.
1. Pyramid Roof Coating by The Garland Company Inc.

2.7 OTHER MATERIALS

- A. Zinc Flashings: Pipe penetrations/drain pans.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
- a. Verify that deck is supported and secured.
- b. Verify that deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains, valleys or eaves.
- c. Verify that surface substrate is properly prepared and dry.
- d. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, blocking and cant strips are in place and that roof drains are securely clamped in place.

- e. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- f. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
- 3. In the event of discrepancy, immediately notify the Architect.
- 4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Provide approved UL approved fire extinguishers readily accessible at areas of roofing work. Strictly comply with all state, local, and federal fire and safety regulations.
- D. Cover roof drains to prevent debris entry. Remove cover at end of each days work.

3.3 DRAINAGE SUBSTRATE REVIEW

- A. Verify crickets and transitions are constructed in compliance with roof deck criteria. Fill all voids, splits and holes.
- B. Verify roof drainage provides minimum 1/2 inch per foot fall at all areas, including cricket valleys.

3.4 PROTECTION

- A. Where traffic must continue over finished roof installation, protect surfaces to the satisfaction of Architect and materials manufacturer.
- B. Do not drop roofing materials on roofing deck.

3.5 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.
- B. Install roofing membrane, base flashings, and component materials in compliance with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system as listed in FMG's "Approval Guide" for fire/windstorm classification indicated. Comply with recommendations in FMG Loss Prevention Data Sheet 1-49.
- C. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations; modify as required to comply with requirements of FMG references above:
 - 1. Base Flashing at Parapet Wall: Plates BUR-1 and BUR-1S.
 - 2. Base Flashing and Counterflashing at Parapet Wall: Plates BUR-4 and BUR-4S.
 - 3. Base Flashing and Counterflashing at Parapet Wall, Movement Joint: Plates BUR-6 and BUR-6S.
 - 4. Perimeter Edge, Raised: Plates BUR- and BUR-2S.
 - 5. Perimeter Edge, Gravel-stop: Plates BUR-3 and BUR-3S.
 - 6. Scupper, Raised: Plates BUR-21 and BUR-21S.
 - 7. Gutter at Draining Edge: Plates BUR-22 and BUR-22S.
 - 8. Expansion Joint, with Metal Cover: Plates BUR-7 and BUR-7S and Section 07 6200.

9. Expansion Joint, with Premanufactured Cover: Plates BUR-7A and BUR-7AS and Section 07 9510.
10. Curb Detail at Rooftop HVAC Units, Premanufactured: Plates BUR-12 and BUR-12S.
11. Curb Detail at Rooftop HVAC Units, Job-Built, Wood: Plates BUR-13 and BUR-13S.
12. Curb Detail at Skylight, Roof Hatch, and Smoke Vents: Plates 14 and 14S .
13. Penetration, Structural Member: Plates BUR-14 and BUR-14S.
14. Penetration, Sheet Metal Enclosure: Plates 15 and 15S.
15. Penetration, Stack Flashing: Plates BUR-17 and BUR-17S.
16. Penetration, Pocket: Plates BUR-19 and BUR-19S.
17. Roof Drain: Plates BUR-20 and BUR-22S.

3.6 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roof insulation.
- C. Wood Cant Strips: Install and secure preformed 45-degree insulation wood cant strips at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- G. Mechanically Fastened: Install insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type. Install 16 metal screws and plates per 4' x 8' board.
 1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.7 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing built-up roofing system.
- D. Coordinate installing roofing system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.

3. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Cold Process Asphalt Heating:
 1. An in-line heat exchange unit may be used to facilitate application.
 - a. Do not exceed maximum adhesive temperature of 100° F.
 - b. Heat exchange unit: Use heat transfer oil approved by heating equipment manufacturer.
 - c. Follow operation procedures recommended by heating equipment manufacturer.
- F. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.8 ROOFING MEMBRANE INSTALLATION

- A. Install one ply sheet starting at low point of roofing system. Align ply sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
 1. Embed ply sheet in a solid mopping application of cold fluid-applied adhesive applied at rate required by roofing system manufacturer; minimum rate of application to be not less than 2 ½ - 3 gallons per 100 s.f.
 2. Cap Sheet: Install lapped granulated cap sheet starting at low point of roofing system. Offset laps from laps of preceding ply sheets and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.
 - a. Embed cap sheet in a solid mopping application of cold fluid-applied adhesive applied at rate required by roofing system manufacturer. Minimum Rate: to be not less than 3 gallons per 100 sq. ft.

3.9 FLASHINGS AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
 1. Prime substrates with asphalt primer if required by roofing system manufacturer.
 2. Backer Sheet Application: Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants in Type IV hot asphalt a solid mopping of hot roofing asphalt.
 3. Flashing Sheet Application: Adhere flashing sheet to substrate in Type IV hot asphalt applied at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4- 6 inches on to field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
- D. Install stripping, according to roofing system manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
 1. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of asphalt roofing cement or in a solid mopping of hot roofing asphalt applied at not less than 425 deg F, and extend onto roofing membrane.
 2. Roof penetrations and Flashings: Provide zinc flashing or other roof penetration assembly as approved by manufacturer for each individual component. Provide cut sheet of each assembly with roofing submittals. Coordinate flashing assembly with installer at pre-construction meeting.
 - a. ZincJaks flashings by Commerical Innovations (888) 744-3439, or equal. Zinc, lead-free pipe flashing and drain pans for low slope roof applications.

- E. Roof Drains: Set 30-by-30-inch zinc flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with stripping and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 - 1. Install flashing-sheet stripping by same method as installing base flashing.
 - 2. ZincJaks by Commercial Innovations (888) 744-3439, or equal. Zinc, lead-free pipe flashing and drain pans for low slope roof applications.

3.10 ROOF COATING

- A. Apply coatings to roofing membrane and base flashings not less than 40 days following completion of roofing membrane according to manufacturer's written instructions, by spray, roller, or other suitable application method, prime surface as required. Materials shall be installed in a two coat application, 2nd coat applied perpendicular to 1st coat. Spray and backroll first coat applying 1.5 gallons per 100 s.f. Spray second coat applying 1.0 gallons per 100 s.f.

3.11 FIELD QUALITY CONTROL

- A. Manufacturer's Representative: Local manufacturers field representative shall provide inspections, reports, and job site visits during the installation of roof system; 3 days per week minimum.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect and the Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 PROTECTING AND CLEANING

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

END OF SECTION 07 5115

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.
- B. Types of flashing and sheet metal work include, but are not limited to:
 - 1. Metal copings.
 - 2. Metal wall and counter-flashings.
 - 3. Gutters, downspouts, and scuppers.
 - 4. Metal trim/fascia units.
 - 5. Miscellaneous sheet metal accessories.
- C. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 3110: Asphalt shingles.
 - 3. Section 07 5115: Built-up roofing.
 - 4. Section 07 6100: Standing seam metal roofing.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Shop Drawings: Submit detailed drawings of layout, joining, profiles, terminations, and anchorages of fabricated work. Submit detailed drawings of special accessory components.
 - 2. Samples: Submit 3 samples, each approximately 12" square, in colors specified.

1.3 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air-Conditioning Contractors National Association (SMACNA).
- B. Standard commercial items may be used for flashing, trim, reglets and similar purposes provided such items meet or exceed the quality standards specified.

1.4 SPECIAL WARRANTY

- A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's 20-Year warranty. Warrant coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.2.
- B. Special Project Warranty: Upon completion of the Work and as a condition of its acceptance, deliver to the Architect two original copies of the following Special Warranty, signed by the Contractor and the roofing subcontractor:
 - 1. The undersigned hereby propose, and upon execution of this document by the Owner, agree for a period of 2 years after Substantial Completion of the Work to make immediate repairs as required to stop leaks

- or correct defects in the work of this Section, within 24 hours after receipt of notice from the Owner by telephone, telegram, or letter; and further agree to make such repairs without reference to or consideration of the cause or nature of such leaks or defects.
2. As a further condition of this 2-year Special Warranty, the undersigned hereby agree to repair or replace any other damaged products and finishes, to return the building to its original condition, and to notify the roof system manufacturer in writing within 30 days that such repairs were made.
 3. Repairs required within the stated period will be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
 4. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.
 5. This Special Warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

PART 2 - PRODUCTS

2.1 FLASHING MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Materials and Gauges: Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide highest quality and gauge commensurate with the referenced standards. In no case shall sheet metal be less than 24 gauge.
- C. Galvanized Steel Sheet Materials: ASTM A653, with G90 zinc coating; minimum 24 gauge except as otherwise indicated.
- D. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.

2.2 PREMANUFACTURED PARAPET COPING ASSEMBLIES

- A. Coping Manufacturer: Subject to compliance with requirements, provide products by:
 1. R-Mer Edge Coping by Garland, 1-800-321-9336.
 2. Perma-Tite Coping by Metal-Era, 1-800-558-2162.
 3. Permasnap Coping by Hickman Engineered Systems, 1-828-676-1700.
 4. Presto Lock Coping by Johns Manville, 1-800-445-1500.
 5. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.
- B. Performance Characteristics:
 1. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-3 to positive and negative design wind pressure as defined by CBC Section 1504.5.
 2. Coping sections shall expand and contract freely while mechanically locked in place on anchor cleats.
 3. Coping sections shall lock to anchor cleats by mechanical pressure from support chairs.
 4. All coping cover joints shall be underlaid with gutter/support chairs capable of draining water.

C. Materials:

1. Coping: Formed steel sheet, galvanized, 24 gauge thick, minimum; factory finish PVDF coating
2. Anchor Cleat: 20 gauge galvanized steel, 12" wide, with coping support; cleat spaced at 5'-0" on center minimum, mechanically fastened as indicated.
3. Concealed Splice Plates: Material and finish to match coping, 8 inch" wide, with factory applied dual non-curing sealant strips or formed water channels.
4. Fasteners: Stainless steel screw type with a minimum pull-out resistance of 240 #; no exposed fasteners permitted.

D. Fabrication:

1. Factory fabricated to sizes required.
2. Factory fabricated mitered and welded corners, end caps, and wall terminations.
3. Factory formed to radius and arch where indicated.

2.3 PREMANUFACTURED REGLET ASSEMBLIES

A. Reglet Manufacturer: Subject to compliance with requirements, provide products by:

1. Springlock Flashing and Reglets by Fry Reglet Corp.
2. Snap-Tite System by Mm Systems Corp.
3. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Materials:

1. Reglet: 24 gauge galvanized steel; ASTM A653 with G90 zinc coating.
2. Counter Flashing: 24 gauge galvanized steel; ASTM A653 with G90 zinc coating; factory prefinished.
3. Provide prefabricated prefinished inside and outside corners, sealed watertight.

2.4 FABRICATED FLASHINGS

A. Fascia: Fabricate profile as indicated, 24 gauge minimum thickness.

1. 6" wide concealed back-up plate, formed to exact profile of fascia and secure plate in place prior to installation.
2. Install continuous bead of sealant each side of joint and set fascia in place leaving 1/4" space between sections.

B. Exposed Gutters: Fabricate profile as indicated, 24 gauge minimum thickness.

1. Provide expansion joints with watertight joints.
2. Seal all joints with sealant.

C. Exposed Downspouts: Fabricate profile as indicated, 24 gauge minimum thickness.

1. Provide strainers with outlet tubes.

D. Crickets: 22 gauge minimum thickness.

1. Fabricate as indicated similar to SMACNA Figure 4-18, Detail 2.

E. Drip Edges: Fabricate as indicated, 24gauge minimum thickness.

F. Continuous Cleats: Form from same material as the unit which the cleat anchors, 20 gauge minimum thickness.

2.5 FINISHES

- A. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
 - 1. 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness.
 - 2. Color: As indicated on the Finish Schedule.
 - 3. Provide factory applied strippable plastic film for protection during fabrication and installation.

2.6 MISCELLANEOUS MATERIALS

- A. Nails, Rivets, and Fasteners: Same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- B. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- C. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet
- D. Roofing Cement: ASTM D 2822, asphaltic.
- E. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- F. Solder: For use with steel provide 50-50 tin/lead solder (ASTM B32), with rosin flux.
- G. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.7 FABRICATION

- A. General: Fabricate in accordance with the SMACNA Architectural Sheet Metal Manual.
 - 1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
 - 2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".
 - 3. Shop fabricate work to the greatest extent possible.
- B. Fabricate and form work to fit substrates. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- C. Fabricate to shapes indicated in 10'-0" lengths except where shorter lengths are required by construction or sheet size.
- D. Corners: Shop prefabricate interior and exterior turns, and other changes in direction using epoxy seam sealer and rivets to rigidly secure the assembly and render watertight.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

- A. General: Comply with manufacturer's written instructions and with SMACNA Architectural Sheet Metal Manual, 2003 Edition. Anchor units securely in place by methods indicated, providing for expansion of metal units; conceal fasteners where possible; and set units true to line and level. Install work with laps, joints, and seams which will be permanently watertight and weatherproof.
 - 1. Where lap seams are indicated, lap according to pitch, but not less than 3".
 - 2. Make flat and lap seams in the direction of flow.
- B. Joints:
 - 1. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.
 - 2. Provide suitable watertight expansion joints for runs of more than 40'-0", except where closer spacing is indicated on the Drawings or required for proper installation.
- C. Separations:
 - 1. Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
 - 2. Where sheet metal work will be in contact with masonry, concrete, or stone, evenly coat contact surfaces with non-sagging mastic. Where sheet metal work will be embedded in mortar joints, evenly coat both sides with non-sagging mastic.
- D. Embedment: Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07 9210 of these Specifications or other materials and methods approved by the Architect.

3.4 COPING INSTALLATION

- A. Snap-On Coping Cap Detail:
 - 1. Install miters first.
 - 2. Position base flashing of the roofing membrane over the wall edge covering nailers completely, fastening 8" on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 - 3. Install minimum 16 gauge, 16" long anchor chair at a maximum of 60" on center.
 - 4. Install 6" wide splice plate by centering over 16" long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center, approximately 2" from the coping cap joint. Install coping cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.
- B. Installing contractor shall check as-built conditions and verify the manufacturer's coping details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the coping manufacturer's installation guide when setting copings.
- C. Installer shall use mechanical fasteners with minimum 240 # (109 kg) pull-out resistance suitable for parapet substrates.

3.5 CLEANUP

- A. After completion, clean all exposed work of scraps, stains, and dirt. After cleaning, wash with clean water and wipe dry.

END OF SECTION 07 6200

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide roof accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Roof accessories include, but are not limited to the following:
 - 1. Roof hatches.
 - 2. Roof curbs.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 5115: Built-up roofing.
 - 3. Section 07 6100: Standing seam metal roofing.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Operation and Maintenance manuals in accordance with requirements of Section 01 7820.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 ROOF ACCESS HATCH

- A. Roof Hatch:
 - 1. Construction: 14 gage galvanized sheet metal.
 - 2. Finish: Factory prime coated for finish painting at the job site.
 - 3. Insulation: 1-1/2" rigid glass fiber, located on outside face of curb.
 - 4. Mounting: Provide frames and curbs suitable for mounting conditions indicated on the Drawings.
 - 5. Curb Height: 8" from finished surface of roof, minimum.
 - 6. Ladder Safety Post: At ladder access hatches; galvanized steel telescoping tubular section secured to ladder rungs that locks automatically when fully extended. Upward and downward movement controlled by a stainless steel spring balancing mechanism; Bilco Model LU-2 or approved equal.
- B. Acceptable Ladder Access Products:
 - 1. J.L. Industries, Model RGH-1.
 - 2. Dur-Red, Model No. LH, 30" x 36".
 - 3. Nystrom, Model RHG, 30" x 36".
 - 4. Lane-Aire, Standard Rood Hatch, 30" x 36".

5. Bilco, Type S, 30" x 36".
- C. Hatch Rail System: Fiberglass reinforced polymer fixed safety railing system mounted to roof hatch flashing without penetrating roof membrane; OSHA 29 CFR 1910.23 compliant.
 1. Acceptable Products: Bilco Bil-Guard Hatch Rail System.

2.3 ROOF CURBS

- A. Manufactured Curbs, Equipment Rails, Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counter-flashing, internal reinforcing, and top side and edges formed to shed water; as manufactured by The Pate Company, ThyBar Corporation, or Vent Products Inc.
 1. Construction: 14 gage galvanized sheet metal.
 2. Finish: Factory prime coated for finish painting at the job site.
 3. Insulation: 1-1/2" rigid glass fiber, located on outside face of curb.
 4. Wood Nailer: Preservative treated wood nailer along top of curb.
 5. Mounting: Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
 6. Curb Height: 8" from finished surface of roof, minimum.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, anchoring all items firmly into position for long life under hard use.
- C. Put operating components through at least five complete operating cycles, adjusting as required, and achieving optimum ease of operation.

END OF SECTION 07 7200

SECTION 07 7220 - ROOF CURBS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide roof curbs where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 ROOF CURBS

- A. Manufactured Curbs, Equipment Rails, Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counter-flashing, internal reinforcing, and top side and edges formed to shed water; as manufactured by The Pate Company, ThyBar Corporation, or Vent Products Inc.
 - 1. Construction: 14 gage galvanized sheet metal.
 - 2. Finish: Factory prime coated for finish painting at the job site.
 - 3. Insulation: 1-1/2" rigid glass fiber, located on outside face of curb.
 - 4. Wood Nailer: Preservative treated wood nailer along top of curb.
 - 5. Mounting: Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
 - 6. Curb Height: 8" from finished surface of roof, minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, anchoring all items firmly into position for long life under hard use.

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END OF SECTION 07 7220

SECTION 07 8400 - FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide firestopping where shown on the Drawings, in all penetrations through fire rated walls, floors, and ceiling, and as specified herein, and as needed for a complete and proper installation. The Work of this Section includes, but is not limited to:
 - 1. Through penetration firestops and smoke stops for all fire-rated bearing and non-bearing wall and floor assemblies, both blank (empty) and those accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
 - 2. Membrane penetration for fire-rated walls.
 - 3. Architectural/construction joint firestops within walls, floors, or the intersections of floors to exterior walls, or the intersection of top of walls to ceilings.
 - 4. Top of wall firestopping in all fire-rated partitions.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 9210: Sealants and caulking.
 - 3. Section 22 0000: Plumbing.
 - 4. Section 23 0000: General Mechanical Provisions.
 - 5. Section 26 6000: General Conditions for Electrical Work.
 - 6. Section 27 0000: Communication Systems General.
- C. Completely coordinate with work of all other trades.
- D. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. UL Tested Systems: Submit drawings showing typical installation details for the methods of installation. Indicate which firestop materials will be used and thickness for different hourly ratings. Indicate construction of wall or floor assemblies, size, F-rating, T-rating, and remarks.
 - 4. Engineering Judgements: Submit manufacturer's drawings for all non-standard applications where no UL tested system exists. Indicate the "tested" UL system upon which the judgement is based so as to assess the relevance of the judgement to some known performance.

1.3 PERFORMANCE REQUIREMENTS

- A. Firestopping Systems (Materials and Design):
 - 1. Conform to both Flame (F) and Temperature (T) ratings as determined by tests conducted in accordance with ASTM E814 in a configuration that is representative of field conditions.
 - 2. F ratings shall be a minimum of 1-hour but not less than the fire resistive rating of the assembly being penetrated.
 - 3. T ratings shall be based on measurement of the temperature rise on penetrating item(s).

- B. Firestopping materials and systems shall be capable of closing or filling through-openings created by:
 - 1. The burning or melting of combustible pipes; cable jacketing, or pipe insulation materials, or;
 - 2. Deflection of sheet metal due to thermal expansion (electrical and mechanical ductwork).
- C. Firestopping shall be flexible, allowing for normal pipe movement and shall not shrink upon drying as evidenced by cracking or pulling away from contact surfaces.
- D. Firestopping shall be moisture resistant and shall not dissolve in water after curing.
- E. Penetrations containing loose electrical, data, or communications cabling shall be protected using firestopping systems that allow unrestricted cable changes without damage to seal.
- F. Materials shall not require ampacity derating in power cable installations.

PART 2 - PRODUCTS

2.1 FIRESTOPPING MATERIALS

- A. Available 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. 3M Ceramic Materials
 - 2. Tremco
 - 3. Morgan Thermal Ceramics
 - 4. USG
 - 5. RectorSeal Corp.
 - 6. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Wall, Floor, and Ceiling Penetrations: ASTM E814.
 - 1. Provide systems designed specifically for the penetration condition, materials, and required fire rating.
 - 2. Through-penetration fire stops may be used for membrane penetrations.
 - 3. The F rating shall apply to all through-penetrations and shall not be less than the required fire-resistance rating of the assembly penetrated.
 - 4. The T rating shall apply to those through-penetration location required to have T ratings as specified in CBC Sections 714 and shall not be less than the required fire-resistance rating of the assembly penetrated.

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

- B. Verify that all pipe, conduit, cable, and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturers recommended installation procedures to comply with the designated and required firestop rating.
- B. Conditions Requiring Firestopping:
 - 1. General: Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.
 - 2. Through-Penetrations: Install firestopping in all penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.
 - 3. Membrane-Penetrations: Where required by CBC Section 714, protect all membrane-penetrations in rated walls with firestopping.
 - 4. Construction Joints/Gaps: Provide firestopping:
 - a. Between the edges of floor slabs and exterior walls.
 - b. Between the tops of walls and the underside of floors.
 - c. In the control joints in masonry walls and floors.
 - d. In expansion joints.
- C. Dam Construction: When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material shall be removed after appropriate curing. Noncombustible damming materials may be left as a permanent component of the firestop system.

END OF SECTION 07 8400

SECTION 07 9210 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as needed to provide a positive barrier against passage of moisture and air.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 03 3000: Cast-In-Place Concrete.
 - 3. Section 09 9100: Painting.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Samples: Submit samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used. Provide minimum of 4 samples of each manufacturers standard color for each application. Provide sample of each installation type for Architect approval prior to beginning installation. Repeat samples until acceptable installation is approved by the Architect.

1.3 QUALITY ASSURANCE

- A. Rejection of Installed Caulking and Sealants: Indication of lack of skill on the part of installers shall be sufficient grounds for rejection of installed caulking and to require its immediate removal and complete re-caulking at no additional cost to the Owner.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Comply with VOC requirements of California Green Building Standards Code, Sections 5.504.4.1 and 5.504.4.2.

2.2 SEALANTS AND CAULKING

- A. Silicone Sealant:
 - 1. White Mildew Resistant: 786 White by Dow Corning, Sanitary 1700 White by General Electric, 863 White by Pecora.
 - 2. General Exterior: 791 by Dow Corning, Silpruf by General Electric, 864 by Pecora, Spectrum 2 by Tremco.
- B. Polyurethane Sealant:
 - 1. General Use: DynaTrol II by Pecora, Dymeric by Tremco, Sikaflex-2c,NS/SL by Sika.
 - 2. Self-leveling Type: NR-201 by Pecora, Sonalastic SL1 by Sonneborn, Sikaflex 1cSL by Sika.
- C. Acrylic Latex Sealant: AC-20+ Silicone by Pecora, Sonolac by Sonneborn.
- D. Colors: Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturer.
 - 1. In concealed installations use standard gray or black sealant.
 - 2. Provide black sealant at glazing pockets.

2.3 ACCESSORY MATERIALS

- A. Primers: Non-staining type, recommended by manufacturer to suit application.
- B. Back-up Materials: Non-absorbent, non-staining, and specifically recommended for application by sealant manufacturer.
- C. Bond Preventative Materials: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- D. Masking Materials: Appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, removable without damage to substrate or staining.
- E. Joint Cleaner: Non-corrosive, non-staining type recommended by sealant manufacturer; compatible with joint forming materials.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work will be performed. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Prepare all surfaces to receive sealants and caulking in strict accordance with the manufacturer's written requirements. Use solvents and primers where recommended by the manufacturer.
- B. Clean all concrete joints, full depth free of debris and dust.

3.3 INSTALLATION

- A. Install joint backing to achieve a neck dimension of no greater than 1/3 the joint width. Install in strict accordance with the manufacturer's written instructions.

- B. Install bond breaker where joint backing is not used.
- C. Mask adjacent surfaces to prevent contact of sealant with adjoining surfaces which would be stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape after tooling without disturbing joint seal.
- D. Install sealant to manufacturer's instructions.
- E. Measure joint dimensions and size materials to achieve required width/depth ratios.

3.4 PRODUCT USAGE BY LOCATION

- A. Where more than 1 type of sealant is listed, the Contractor may use either listed product that is best suited in accordance with the sealant manufacturer's written recommendations for the joint location and type and the surfaces to be sealed with particular attention given to prevent staining. Provide sealants and caulking as follows:
 - 1. Exterior, general use: Polyurethane or Silicone.
 - 2. Interior, wet areas: Mildew Resistant Silicone.
 - 3. Interior, general use and painting: Acrylic latex.
 - 4. Expansion and control joints, vertical and overhead surfaces: Polyurethane or Silicone.
 - 5. Expansion and control joints, horizontal surfaces: Self-leveling Polyurethane.
 - 6. Interior concrete slab (where slab is finished floor, fill all crack control joints): Polyurethane.
 - 7. Exterior concrete walks and courts (where indicated on the plans): Polyurethane.
 - 8. Horizontal surfaces, traffic: Self-leveling Polyurethane.
 - 9. Glazed tile and/or masonry: Polyurethane or Silicone.
 - 10. Plumbing fixtures: Mildew Resistant Silicone.
 - 11. Glazing to metal frame: Black Silicone.

3.5 CLEANING AND REPAIRING

- A. Clean adjacent soiled surfaces.
- B. Repair or replace defaced or disfigured finishes caused by sealant work.

END OF SECTION 07 9210

SECTION 08 1110 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide hollow metal doors, and hollow metal door and window frames, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 08 7100: Hardware requirements and templates.
 - 3. Section 08 8100: Glass for vision panels, sidelights, and windows.
 - 4. Section 09 9100: Field Painting

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Shop Drawings: Submit details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.

1.3 QUALITY ASSURANCE

- A. Provide all products of this Section from a single manufacturer.
- B. Comply with ANSI/SDI A250.8-2003 and HMMA 861-14.

1.4 FIRE AND SMOKE RATINGS

- A. Fire and Smoke Rated Door Assemblies: Where fire-rated or smoke-rated assemblies are indicated or required, provide door and frame assemblies that have been tested, listed, and labeled by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Side-hinged or Pivoted Swinging Doors: UL 10C.
 - 2. Doors in Fire-rated Corridors and Smoke Barriers: 20 minute fire protection rating; UL 10C without hose stream test.
 - 3. Door in Exit Enclosures and Exit Passageways: UL 10C; maximum transmitted temperature end point of not more than 450F above ambient at end of 30 minutes of standard fire test exposure.
 - 4. Smoke and Draft Control Doors: UL 10C and UL 1784.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Steelcraft, (805) 837-4111.
 - 2. Stiles Custom Metal, Inc., (209) 538-3667.
 - 3. Ceco Door Products, (510) 489-1700.

4. Curries, (559) 432-5537.
5. Security Metal Products, (310) 641-6690.
6. Metal Manufacturing Co., (916) 922-3484.
7. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 METAL DOORS

- A. Exterior Flush Doors:
 1. ANSI/SDI A250.8, Level 3, Model 2 (seamless), minimum 16 gauge (0.067") faces.
 2. Top Closure: 16 gauge flush end channel closure with seal against moisture entry.
 3. Bottom Closure: 16 gauge recessed end channel with drainage openings.
 4. Galvanizing: Hot-dipped zinc coating; ASTM A653 with A60 or G60 coating.
 5. Reinforce doors internally with 18 gauge steel hat section ribs.
 - a. Weld reinforcing to each door face with spot welds to faces spaced 4" on center.
 - b. Ends of ribs welded together full width of the supporting web span.
 - c. Insulate space between ribs with 2 lb. density polyurethane bonded to both faces; ASTM C591.
 6. Reinforce for finish hardware provided under Section 08 7000; ANSI/SDI A250.8.
- B. Exterior Stile-and-Rail Doors: Unitized, true tube type construction with joints continuously welded and ground smooth.
 1. ANSI/SDI A250.8, Level 3, Model 3, minimum 16 gauge (0.067") faces.
 2. Core: 2 lb. density polyurethane bonded to both faces; ASTM C591, U-factor of 0.10.
 3. Top Closure: Flush end channel closure with seal against moisture entry.
 4. Bottom Closure: Recessed end channel with drainage openings.
 5. Galvanizing: Hot-dipped zinc coating; ASTM A653 with A60 or G60 coating.
 6. Reinforce for finish hardware provided under Section 08 7000; ANSI/SDI A250.8.
- C. Interior Doors: Full flush or stile-and-rail design as indicated.
 1. ANSI/SDI A250.8, Level 3, Model 2 (seamless), minimum 16 gauge (0.053") faces.
 2. Core: 2 lb. density polyurethane bonded to both faces; ASTM C591, U-factor of 0.10.
 3. Galvanizing: Hot-dipped zinc coating; ASTM A653 with A60 or G60 coating.
 4. Reinforce for finish hardware provided under Section 08 7000; ANSI/SDI A250.8.
- D. Finish:
 1. After fabrication, fill all tool marks and surface imperfections, sand and dress smooth.
 2. Grind, fill, and dress all weld joints.
 3. Coat surface with factory primer for field finishing; ANSI/SDI A250.10.

2.3 METAL FRAMES

- A. Type and Design:
 1. Provide frames in the dimensions and types shown on the Drawings, non-labeled or labeled as indicated, in 16 gauge (0.053") for interior frames and 14 gauge (0.067") for exterior frames.
 2. Galvanizing: Hot-dipped zinc coating; ASTM A653 with A60 or G60 coating.
 3. **Face welded construction.**
 4. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.
 5. Reinforce for finish hardware provided under Section 08 7000; ANSI/SDI A250.8.
 6. Frames Wider than 48": Reinforce with steel channel fitted tightly into frame head, flush with top.
 7. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.

- B. Finish:
 - 1. After fabrication, fill all tool marks and surface imperfections, sand and dress smooth.
 - 2. Grind, fill, and dress all weld joints.
 - 3. Coat surface with factory primer for field finishing; ANSI/SDI A250.10.
 - 4. Remove all areas of rust to bare metal; reprime prior to finish paint.
- C. Frame Anchors:
 - 1. Wood Stud Anchor: 18 gauge galvanized steel, "lock-in" type.
 - 2. Closed Metal Stud Wall Anchor: 18 gauge galvanized steel, "lock-in" or factory welded type.
 - 3. Wire Masonry Anchors: 3/16" diameter wire, "lock-in" type.
 - 4. Masonry T-Anchors: 18 gauge galvanized steel, "lock-in" type.
 - 5. Existing Wall Anchor: 18 gauge galvanized steel, "lock-in" or factory welded type.
 - 6. Base Anchor: 16 gauge galvanized steel, welded-in or adjustable; provide a minimum of 2 fasteners in each anchor.
 - 7. Mullion Base Anchor: 16 gauge galvanized steel, mullion slides over; provide a minimum of 2 fasteners in each anchor.
 - 8. Corner Post Base Anchors: 12 gauge galvanized steel, corner post slides over; provide a minimum of 2 fasteners in each anchor.

2.4 FINISH HARDWARE

- A. Coordinate anchorage hardware and secure templates from the finish hardware supplier.

2.5 ACCESSORIES

- A. Removable Glazing Stops (at window frames only):
 - 1. Formed 20 gauge (0.032") sheet steel, butted corners; secured to frame with countersunk #6 zinc-coated tamper-proof screws.
 - 2. Chemically treat and paint with a rust inhibitive primer all metal surfaces to which glazing stops are secured and the inside of the glazing stops to installation.
- B. Glazed Light Frames:
 - 1. 20 gauge (0.042") cold rolled steel frame, tightly mitered corners. At exterior locations, provide galvanized frames. Locate screws on room side.
 - 2. Provide labeled frames at fire rated assemblies.
 - 3. Finish: Factory baked enamel; custom color as selected by the Architect.
 - 4. Model LoPro (LoPro-IS where required due to glazing thickness) by Anemostat or approved equal.
- C. Interior Door Louvers:
 - 1. 18 gauge (0.042") cold rolled steel frame, tightly mitered corners, inverted Y non-vision louver, 50% free area. Locate screws on inside side.
 - 2. Prime finish for field painting under Section 09 9100.
 - 3. Model AFDL by Anemostat or approved equal.
- D. Exterior Door Louvers:
 - 1. 18 gauge (0.042") cold rolled galvanized steel frame, tightly mitered corners, 22 gauge galvanized internal louver, 50% free area. Locate screws on inside side.
 - 2. Prime finish for field painting under Section 09 9100.
 - 3. Model AFDL by Anemostat or approved equal
- E. Transom Louvers:
 - 1. 18 gauge (0.042") cold rolled steel frame, tightly mitered corners, inverted Y non-vision louver, 50% free area. At exterior locations, provide galvanized frames and attached mesh insect screens. Locate screws

on inside side.

2. Prime finish for field painting under Section 09 9100.
3. Model AFDL-T by Anemostat or approved equal.

2.6 PREPARATION FOR HARDWARE

- A. Coordinate anchorage hardware and secure templates from the finish hardware supplier.
- B. Reinforcement: Reinforce components for hardware installation in accordance with ANSI/SDI A250.8 except where more stringent requirements are called for within this specification.
 1. Provide box or channel type lock and closer reinforcements, continuous from top to bottom of door and welded to face sheets.
- C. Punch single leaf frames to receive 3 silencers; provide one silencer per leaf at the head of double leaf frames unless gasketing is specified for that specific opening.
- D. Factory prepare hardware locations in accordance with Section 08 7100.
- E. Plaster Guards: 26 gauge galvanized steel plaster/dust guards, welded to frame at finish hardware cutouts where mortar, plaster, dust or other materials might obstruct hardware operation and to close off interior of openings.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIRE RATED ASSEMBLIES

- A. Install fire-rated doors and frames in accordance with their listings and NFPA 80.
 1. Install smoke and draft control doors in accordance with NFPA 105.

3.3 FRAME INSTALLATION

- A. Install frames and doors in accordance with the manufacturer's written recommendations and ANSI/SDI A250.8.
- B. Set welded frames in position prior to beginning metal stud partition work; brace frames until permanent anchors are set.
- C. Set anchors for frames as work progresses. Install anchors at hinge and strike levels. Place frames prior to construction of enclosing walls and ceilings; provide minimum 3 anchors per jamb at hinge and strike locations.
 1. Where indicated in the plans, secure frames in place with screw fasteners at frame anchors to wall framing or post-installed expansion anchors at masonry and concrete. Countersink fasteners, fill with body putty, sand smooth and flush with no voids or ridges. Conceal installed fasteners so as to be invisible at exposed faces.
- D. Set frames accurately into position, plumbed (within 1/8" in 10'), aligned, and braced securely until permanent anchors are set.

1. Use temporary setting spreaders at all locations. Use intermediate spreaders to assure proper door clearances and header braces for grouted frames.

3.4 DOOR INSTALLATION

- A. Install doors per manufacturer's recommendation.
- B. Install hollow metal doors in frames using hardware specified in Section 08710 Finish Hardware.
- C. Clearances at edge of doors.
 1. Between door and frame at head and jambs: 1/8".
 2. At meeting edges pairs of doors and at mullions: 1/8".
 3. At sills without thresholds: 5/8" maximum above finish floor.
 4. At sills with thresholds: 1/8" above threshold.

3.5 ADJUST AND CLEAN

- A. Remove dirt and excess sealants, mortar or glazing compounds from exposed surfaces.
- B. Final Adjustments: Adjust moving parts for smooth operation.
 1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
 2. Leave work in complete and proper operating condition.
 3. Remove defective work and replace with work complying with the specified requirements.
- C. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touchup of compatible air-drying primer submitted by the manufacturer.
- D. Fill all dents, holes, etc. with metal filler, sand smooth and flush with adjacent surfaces - reprise and paint to match specified finish.

END OF SECTION 08 1110

SECTION 08 1400 - WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide wood doors where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications
 - 2. Section 08 1110: Hollow metal doors and frames.
 - 3. Section 08 7100: Hardware requirements.
 - 4. Section 08 8000: Glazing for vision panels.
 - 5. Section 09 9100: Field finishing of wood doors and metal vision panel frames and door louvers.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Submit door manufacturer's technical data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
 - 4. Samples: Submit 12 samples, (6 to be submitted to painter for finish samples), approximately 8" x 8" in size, of each of the proposed door face materials representing typical range of color and grain for each species of veneer required.

1.3 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:
 - 1. "Manual of Millwork" of the Woodwork Institute, for the grade or grades specified.
- B. Manufacturer: Obtain doors from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. Delivery:
 - 1. Deliver doors to the job site after plaster and cement are dry, and after the building has reached average prevailing humidity of its locality.
 - 2. Deliver prefinished doors in manufacturer's original containers, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol on the covering.
 - 3. Seal all four edges of unfinished doors when delivered to the job site.
- C. Storage:
 - 1. Stack flat on 2" x 4" lumber, laid 12" from ends and across center.
 - 2. Under bottom door and over top and sides of stack, provide plywood or corrugated cardboard to protect door surfaces.

3. Store doors in area where there will be no great variations in heat, dryness, and humidity.

D. Do not drag doors across one another; lift doors and carry them into position.

1.5 SPECIAL WARRANTY

A. In addition to the warranty requirements of the Contract Documents, provide 2 original copies the manufacturer's written **Lifetime Warranty**.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Provide flush wood doors of the types, designs, and thicknesses shown on the Door Schedule in the Drawings, labeled or non-labeled as indicated and required, and in solid core or hollow core as shown on the Door Schedule.
- C. Grade: Except as may be shown otherwise on the Drawings, fabricate the work of this Section to "PREMIUM GRADE" standards of the referenced WI, Door Face Characteristics.
- D. Plastic Laminate Veneer:
 - 1. Grade: Premium
 - 2. Laminate Face: High-pressure decorative laminate complying with NEMA LD 3, Grade HGS.
 - 3. Stiles: Plastic-laminate matching faces, applied before faces.
 - 4. Refer to Door and Finish Schedules for colors, patterns, and finishes.

2.2 INTERIOR WOOD DOORS

- A. Non-Rated Solid Core Doors: Flush, 5-ply, 1-3/4" thick, 1-1/4" laminated hardwood stiles, 1-1/4" softwood rails and lock blocks, crossbanded 1/16" thick minimum, with particleboard core complying with ANSI A208.1, Grade LD-2.
 - 1. Architectural Solid Core (APC-3) by Haley.
 - 2. Particleboard Door by Eggers Industries.
 - 3. Particleboard Core Door (DPC-1) by Weyerhaeuser.
 - 4. Particleboard Door by Pacific Architectural Wood Products.
 - 5. Flush Wood Veneer Doors (PC-5 or SCLC) by VT Industries.
 - 6. GPD-PC Architectural Door by Graham Wood Doors.

2.3 FABRICATION

- A. Openings: Cut and trim openings through doors to comply with applicable requirements.
- B. Provide proper blocking for every surface applied piece of hardware. No sex bolt or through bolt application of hardware will be allowed.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Fitting and Machining:
 - 1. Unless doors are completely fitted and machined at the mill, fit them for width by planing and fit them for height by sawing:
 - a. Bottom: 1/2" clearance maximum.
 - b. Top: 1/8" clearance maximum.
 - c. Lock edge and hinge edge: Bevel 1/8" in 2" maximum.
 - 2. Machine doors for hardware in accordance with recommendations of the hardware manufacturers, as those recommendations have been approved by the Architect.
 - 3. Seal cut surfaces after fitting and machining.
- B. Install doors to comply with manufacturer's written instructions and referenced WIC standards.
- C. Replace or rehang doors which are hinge bound and do not swing or operate freely.

3.3 COMPLIANCE

- A. The Owner reserves the right to request and pay for an inspection by a representative of the referenced organization to determine that the work of this Section has been performed in accordance with the specified standards.
- B. In the event such inspection determines the work of this Section does not comply with the specified requirements, immediately remove the non-complying items and replace them with items complying with the specified requirements, all at no additional cost to the Owner, and reimburse the Owner for the cost of the inspection.

END OF SECTION 08 1400

SECTION 08 3100 - ACCESS DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide ceiling and soffit access door where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.

1.3 EXTRA MATERIALS

- A. Keys: Provide for the Owner's use, 1 complete set of all tools and keys for each door that come packaged with the doors. Provide identification tag with each door key indicating key location.
- B. Deliver keys to the Inspector of Record. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 CEILING/SOFFIT ACCESS DOORS

- A. Non-Rated Flush Ceiling / Soffit Access: Access units with flanged frame flush with gypsum board and plaster ceilings and soffits:
 - 1. Construction: 14 gage steel door and flanged frame.
 - 2. Finish: Factory primed for painting on the job site.
 - 3. Locking: Provide each unit with cylinder locks and two keys per unit.
 - 4. Size: 22" by 36".
 - 5. Acceptable products:
 - a. Model TM by J.L. Industries.
 - b. Model DSC-214M by Karp Associates.
 - c. Model L-DW by Larsen's Manufacturing.
 - d. Style M by Milcor.
 - e. Model NT by Nystrom.
 - f. UF-5000 by Acudor Access Doors.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, anchoring all items firmly into position for long life under hard use.
- C. Put operating components through at least five complete operating cycles, adjusting as required and achieving optimum ease of operation.

END OF SECTION 08 3100

SECTION 08 7100 - FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Door Hardware.
- B. Related Sections:
 - Section 06 2000 - Rough Carpentry: Finish Hardware Installation
 - Section 07 9200 - Joint Sealers – exterior thresholds
 - Section 08 1100 - Metal Doors and Frames
 - Section 08 2100 - Wood Doors
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
 - 1. Windows.
 - 2. Cabinets, including open wall shelving and locks.
 - 3. Signs, except where scheduled.
 - 4. Toilet accessories, including grab bars.
 - 5. Installation.
 - 6. Rough hardware.
 - 7. Access doors and panels, except cylinders where detailed.
 - 8. Corner Guards.

1.2 REFERENCES:

- Use date of standard in effect as of Bid date.
- A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- B. ADA – Americans with Disabilities Act of 1990
- C. BHMA – Builders Hardware Manufacturers Association
- D. DHI – Door and Hardware Institute
- E. NFPA – National Fire Protection Association
 - NFPA 80 – Fire Doors and Windows
 - NFPA 105 – Smoke and Draft Control Door Assemblies
 - NFPA 252 – Fire Tests of Door Assemblies
- F. UL – Underwriters Laboratories
 - UL10C – Positive Pressure Fire Tests of Door Assemblies.
 - UL 305 – Panic Hardware
- G. WHI – Warnock Hersey Incorporated State of California Building Code
- H. Local applicable codes

- I. SDI – Steel Door Institute
- J. WIC – Woodwork Institute of California
- K. AWI – Architectural Woodwork Institute
- L. NAAMM – National Association of Architectural Metal Manufacturers

1.3 SUBMITTALS & SUBSTITUTIONS

- A. SUBMITTALS: Submit six copies of schedule per Section 01 3300. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Type, style, function, size, quantity and finish of hardware items.
 - 2. Use BHMA Finish codes per ANSI A156.18.
 - 3. Name, part number and manufacturer of each item.
 - 4. Fastenings and other pertinent information.
 - 5. Location of hardware set coordinated with floor plans and door schedule.
 - 6. Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7. Mounting locations for hardware.
 - 8. Door and frame sizes, materials and degrees of swing.
 - 9. List of manufacturers used and their nearest representative with address and phone number.
 - 10. Catalog cuts.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. Make substitution requests in accordance with specification section 01 2580. Include product data and indicate benefit to the Project. Furnish operating samples on request.
 - 1. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- D. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Operation and maintenance manuals in accordance with requirements of Section 01 7820, for each type of hardware.
- E. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

1.4 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.
 - a) Responsible for detailing, scheduling and ordering of finish hardware.
- B. Hardware: New, free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- D. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.
 - 1. Where scheduled item is now obsolete, bid and furnish manufacturer's updated item at no additional cost to the project.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
 - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical as the same operation and quality as type specified, subject to Architect's approval.

1.7 SEQUENCING AND COORDINATION:

- A. Coordinate with concrete.
- B. Reinforce walls for wall-mounted hardware, including wall stops and stainless-steel guard rails.
- C. Coordinate finish floor materials and floor-mounted hardware.
- D. Furnish manufacturer templates to door and frame fabricators.
 - 1. Ensure proper blocking in wood doors to support wood screws for panic hardware and door closers.
 - 2. Ensure proper reinforcement in metal doors and frames to support machine screws for panic hardware and door closers.
- E. Use hardware consultant to check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

1.8 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:
 - 1. Locksets: Three years.
 - 2. Exit Devices: Three years.
 - 3. Closers: Thirty.
 - 4. Other Hardware: Two years.

1.9 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
 - 1. Test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
 - 2.

1.10 REGULATORY REQUIREMENTS:

- A. Locate latching hardware between 34" to 44" above the finished floor, per California Building Code, Section 1010.1.9.2 and 11B-404.2.7.
 - 1. Locate panic hardware between 36" to 44" above the finished floor.

- B. Handles, pull, latches, locks, other operating devices: readily openable from egress side without tight grasping, tight pinching, or twisting of the wrist to operate. California Building Code 1010.1.9.1 and 11B-309.4.
- C. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.
- D. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per California Building Code Section 11B-404.2.8.1.
- E. Smooth surfaces at bottom 10" of push sides of doors, facilitating push-open with wheelchair footrests, per California Building Code Section 11B-404.2.10.
- F. Door opening clear width no less than 32", measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 34" and the hardware projects no more than 4". California Building Code Section 11B-404.2.3, 11B-404.2.4, and 1010.1.1.
- G. Door opening clear height no less than 80" measured from top of sill to bottom of frame header stop. Projections into clear opening height not to exceed 4". California Building Code Section 11B-404.2.3 and 1010.1.1.1.
- H. Thresholds: floor or landing no more than 1/2" below the top of the threshold of the doorway. Change in level between 1/4" and 1/2": beveled to slope no greater than 1:2 (50 percent slope). California Building Code Section 11B-404.2.5.
- I. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls, per DSA Policy #99-08 (Access).
- J. Pairs of doors: limit swing of one leaf to 90 degrees to protect persons reading wall-mounted tactile signage.
- K. New Buildings on a K-12 Public School campus shall be provided with locks which allow the doors to classrooms and any other room with an occupant load of five or more persons to be locked from the inside. Locks shall conform to the specification and requirements of Section 1010.1.11. Exceptions include doors that are normally locked from the outside, relocatable moved within the same campus, and reconstruction projects.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:

Hinges	(IVE) Ives	Bommer
Continuous Hinges	(IVE) Ives	Select
Key System	(SCH) Schlage	Owner's Standard
Locks	(SCH) Schlage	Owner's Standard
Exit Devices	(VON) Von Duprin	Owner's Standard
Closers	(LCN) LCN	Owner's Standard
Auto Flush Bolts	(IVE) Ives	Trimco
Coordinators	(IVE) Ives	Trimco
Silencers	(IVE) Ives	Trimco
Kickplates	(IVE) Ives	Trimco
Stops & Holders –	(IVE) Ives	Trimco
Overhead Stops	(GLY) Glynn-Johnson	None available
Thresholds	(NGP) National Guard	Reese
Seals & Bottoms	(NGP) National Guard	Reese

2.2 HINGING METHODS:

- A. Note: drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

- C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
 - 1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins.
 - 2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.
- D. Continuous Hinges:
 - 1. Pinned steel/stainless steel type: continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
 - a) Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise architect if required width exceeds 8 inches.

2.3 LOCKSETS and LATCHSETS:

- A. Mortise Locksets and Latchsets: as scheduled.
 - 1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - 2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
 - 3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
 - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
 - 4. motions to operate.
 - 5. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
 - 6. Scheduled Lock Series and Design: Schlage L series, 06A design.
 - 7. Certifications:
 - a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
 - b) ANSI/ASTM F476-84 Grade 31 UL Listed.
 - 8. Comply with CBC Section 11B-309.4.
- B. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled.
 - 1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
 - 2. Locking Spindle: stainless steel, integrated spring and spindle design.

3. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
4. Latchbolt: solid steel.
5. Backset: 2-3/4" typically, more or less as needed to accommodate frame, door or other hardware.
6. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
7. Electric operation: Manufacturer-installed continuous duty solenoid.
8. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
9. Lock Series and Design: Schlage D series, "Rhodes" design.
10. Certifications:
 - a) ANSI A156.2, 1994, Series 4000, Grade 1.
 - b) UL listed for A label and lesser class single doors up to 4ft x 8ft.
11. Comply with CBC Section 11B-309.4.

2.4 EXIT DEVICES / PANIC HARDWARE

- A. General features:
1. Independent lab-tested 1,000,000 cycles.
 2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
 3. 0.75-inch throw deadlocking latchbolts.
 4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
 5. No exposed screws to show through glass doors.
 6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
 7. Releasable in normal operation with 5-lb. maximum operating force.
 8. Flush end cap design as opposed to typical "bottle-cap" design end cap.
 9. Comply with CBC Section 11B-309.4.

2.5 CLOSERS

- A. Surface Closers:
1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
 2. ISO 2000 certified. Units stamped with date-of-manufacture code.

3. Independent lab-tested 10,000,000 cycles.
4. Non-sized and adjustable. Place closers inside building, stairs and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Advanced Variable Backcheck (AVB): where scheduled, these units commence backcheck at approximately 45 degrees.
7. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
8. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
9. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units. EDA arms: rigid main and forearm, reinforced elbow.
10. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
11. Exterior doors do not require seasonal adjustments in temperatures from 120 degrees F to -30 degrees F, furnish data on request.
12. Non-flaming fluid, will not fuel door or floor covering fires.
13. Pressure Relief Valves (PRV): unsafe, not permitted.

2.6 OTHER HARDWARE

- A. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- B. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- C. Door Stops: Provide stops to protect walls, casework or other hardware.
 1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
 2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.

- D. Seals: Finished to match adjacent frame color. Resilient seal material: polypropylene, nylon brush, or solid high-grade neoprene. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability. Proposed substitutions: submit for approval.
 - 1. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
 - 2. Non-corroding fasteners at in-swinging exterior doors.

- E. Thresholds: As scheduled and per details. Comply with CBC Section 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
 - 1. Exteriors: Seal perimeter to exclude water and vermin. Use Dow Corning 795 Silicone or approved equal. Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
 - 2. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

- F. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

- G. Through-bolts: Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.

- H. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

2.7 FINISH:

- A. Generally BHMA 626 Satin Chromium.
 - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.

- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

2.8 KEYING REQUIREMENTS:

- A. Key System: Schlage Primus high-security utility-patented keyway, interchangeable core throughout. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s), keybow styles, structure, and degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system.
 - 1. Existing master key system.
 - 2. Primus Level 3
 - 3. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
 - 4. Temporary cylinders/cores remain Supplier's property.
 - 5. Furnish 10 construction keys.
 - 6. Furnish 2 construction control keys.
- B. Key Cylinders: furnish 6-pin solid brass construction.
- C. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.
- D. Permanent keys: use secured shipment direct from point of origination to Owner.
 - 1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
- E. Bitting List: use secured shipment direct from point of origination to Owner at completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

- A. Experienced craftsman with a resume of successful projects. Can readily differentiate between number 2 and number 3 phillips-drive screws and screwdrivers. Can readily differentiate between #10-24 machine screws and drywall screws, and can explain correct usages of these items.

3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
 - 1. Notify Architect of any code conflicts before ordering material.
 - 2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 34 inches to 44 inches above the finished floor, per CBC Section 11B.2.7.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
 - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
 - 2. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
 - 3. Replace fasteners damaged by power-driven tools.

- B. Locate floor stops no more than 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- D. Drill pilot holes for fasteners in wood doors and/or frames.

3.4 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
 - 1. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.
 - 2. Adjust doors to fully latch with no more than 1 pound of pressure.

3.5 DEMONSTRATION:

- A. Demonstrate mechanical hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.

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Legend:

 Link to catalog cut sheet

 Electrified Opening

Hardware Group No. 001

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	PANIC HARDWARE	CDSI-AX-98-NL-OP-110MD		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX		626	SCH
2	EA	PRIMUS CORE	20-740		626	SCH
1	EA	DOOR PULL	VR910 NL		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111HEDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER AND JAMB SEALS BEFORE RIM STRIKE
DOOR CLOSER MOUNTING - ST1631

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/24
2022 CBC

Hardware Group No. 002

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	PANIC HARDWARE	LD-AX-98-NL-OP-110MD		626	VON
1	EA	RIM CYLINDER	20-057 ICX		626	SCH
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	DOOR PULL	VR910 NL		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111EDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER AND JAMB SEALS BEFORE RIM STRIKE

Hardware Group No. 003

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	STOREROOM LOCK	L9080T LLL 06A L283-150		626	SCH
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	DOOR PULL	VR900		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111HEDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/24
2022 CBC

Hardware Group No. 004

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	CLASSROOM SEC HOLDBK	L9077T LLL 06A L283-150		626	SCH
2	EA	PRIMUS CORE	20-740		626	SCH
1	EA	DOOR PULL	VR900		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111HEDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER

Hardware Group No. 005

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	ELEC PRIVACY LOCK	CO-200-MS-40-PRK-RHO-R 4B BATTERY OPERATED	 ✎	626	SCE
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111EDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/24
2022 CBC

Hardware Group No. 006

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	OFFICE/ENTRY LOCK W/ INSIDE INDICATOR	L9050T 06A L583-363 IS-LOC		626	SCH
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	LOCK GUARD	LG10		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111HEDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER

Hardware Group No. 007

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	700		630	IVE
1	EA	CLASSROOM SEC HOLDBK	L9077T LLL 06A L283-150		626	SCH
2	EA	PRIMUS CORE	20-740		626	SCH
1	EA	DOOR PULL	VR900		630	IVE
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111HEDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	SET	JAMB SEALS	700ES		AL	NGP
1	SET	HEAD SEAL	700SA		CL	NGP
1	EA	DOOR SWEEP	200NA		CL	NGP
1	EA	THRESHOLD	613 MS/LA		AL	NGP

INSTALL HEAD SEAL BEFORE CLOSER

NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District

24001
7/31/24
2022 CBC

Hardware Group No. 008

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	ND40S RHO		626	SCH
1	EA	SURFACE CLOSER	4111EDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/438 AS REQ'D		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 009

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ELEC PRIVACY LOCK	CO-200-MS-40-PRK-RHO-R 4B BATTERY OPERATED	 ✈	626	SCE
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	SURFACE CLOSER	4111EDA X ST1631		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	FLOOR STOP	FS436/438 AS REQ'D		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 010

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		626	SCH
1	EA	PRIMUS CORE	20-740		626	SCH
1	EA	FLOOR STOP	FS436/438 AS REQ'D		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

**NEW CLASSROOM WING AT SUNSET ELEMENTARY SCHOOL
Coalinga-Huron Unified School District**

**24001
7/31/24
2022 CBC**

Hardware Group No. 011

For use on Door #(s):

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	MANUAL FLUSH BOLT	FB457		626	IVE
1	EA	MANUAL FLUSH BOLT	FB457 24"		626	IVE
1	EA	DUST PROOF STRIKE	DP1/2 AS REQ'D		626	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	PRIMUS CORE	20-740		626	SCH
2	EA	OH STOP	450S		630	GLY
2	SET	ASTRAGAL	570/572/574 AS REQ'D		AL	NGP
2	EA	SILENCER	SR64		GRY	IVE

TOP - MANUAL FLUSH BOLT DOWN 24"

BOTTOM - MANUFAL FLUSH BOLT 12"

END OF SECTION 08 7100

SECTION 08 8100 - GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide glazing and glazing accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 07 9210: Sealants and caulking.
 - 3. Section 08 1110: Glazing for vision panels in metal doors and frames is specified in this Section.
 - 4. Section 08 1400: Glazing for vision panels in wood doors is specified in this Section.
 - 5. Section 09 9100: Field painting of metal panels.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation.
 - 3. Samples: Submit 2 samples, 4" x 4" in size, of each type of glass and gasket proposed for use.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures for each type of glazing panel.

1.3 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in:
 - 1. Flat Glass Marketing Association:
 - a. "Glazing Sealing Systems Manual";
 - b. "Glazing Manual".
- B. Identification of Safety Glazing:
 - 1. Identify each light of safety glass material installed in hazardous locations as defined in CBC 2406.3 by a label that complies with CBC 2403.1 and which will specify the labeler, whether manufacturer or installer, and state that safety glazing material has been utilized in such installations.
 - 2. The label shall be legible and visible from the inside of the building after installation and shall be acid etched, sand blasted, ceramic fired laser etched, or embossed.
- C. Provide tinted or coated glazing panels by one and the same manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 6600.
- B. During storage and handling of glass, provide cushions at edges to prevent impact damage.

1.5 SPECIAL WARRANTY

- A. In addition to the warranty requirements of the Contract Documents, submit 2 original copies of glazing manufacturer's written warranty, countersigned by the glazing subcontractor and the Contractor, covering warranties listed below and including removal of the failed or deteriorated glazing, furnishing the matching replacement glazing, and properly installing the matching replacement glazing.
 - 1. Coated Single Pane Glass: Warranty glass for **10 years** against coating deterioration.
 - 2. Sealed Insulating Glass Units: Warranty units for **5 years** against seal failure, interpane dusting or misting.
 - 3. Laminated Glass: Warranty glass for **5 years** against failure of lamination. Failure of lamination shall include, but shall not be limited to, evidence of delamination, loss of transparency, change in color, change in light transmittance, deterioration of concealed glass coating or plastic sheet coating if provided, loss of acoustic rating, and other forms of deterioration due to defective materials or workmanship.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 GLASS

- A. General:
 - 1. For all glass, provide the type and thickness shown on the Drawings or specified herein.
 - 2. Where type or thickness, or both, are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect.
- B. Primary Glass:
 - 1. Provide primary glass complying with ASTM C1036.
 - 2. Clear Float Glass: Type I, class 1 (transparent), quality q3 (glazing select).
 - 3. Tinted Float Glass: Type I, class 2 (heat absorbing and light reducing), quality q3 (glazing select), of tint as indicated or specified.
- C. Tempered Glass: Grade B (fully tempered), style I (uncoated surfaces), type I (float), class 1 (transparent), quality q3 (glazing select). All tempered glass is to be safety glass and meet human impact loads indicated below.
 - 1. Tints: Tints as indicated or specified.
 - 2. Sizes and Cutting:
 - a. Prior to tempering, cut glass to required sizes as determined by accurate measurements of the openings to be glazed, making allowances for required edge clearances.
 - b. Cut and process edges in accordance with the glass manufacturer's recommendations.
 - c. Do not cut or treat edges in the field.
- D. Human Impact Loads: Individual glazed areas, including glass mirrors, in hazardous locations as defined by CBC Section 2406.4 shall comply with CBC Sections 2406.1 through 2406.5.

2.3 OTHER MATERIALS

- A. Provide other materials, including but not limited to shims, setting blocks, glazing tape, etc., not specifically described but required for a complete and proper installation, as recommended by the manufacturer.

2.4 EXTERIOR GLAZING ASSEMBLIES

- A. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure air barrier:
 - 1. In conjunction with joint sealer materials described in other sections.
 - 2. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier seal.
 - 3. To maintain a continuous air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.5 GLAZING PANEL TYPES

- A. **Type A:** 1/4" thick, clear, fully tempered glass.
- B. **Type B:** 1" thick clear insulating glass unit; fully tempered.
 - 1. Outdoor Lite: 1/4" fully tempered clear glass with PPG Solarban 60 Low-E coating inside facing surface.
 - 2. Air Space: 1/2" air space filled with gas (90% Argon, 10% air).
 - 3. Indoor Lite: 1/4" clear fully tempered glass.
 - 4. NFRC U-Value: 0.24 BTU/hr ft² °F (winter nighttime).
 - 5. Solar Heat Gain Coefficient: 0.39 maximum.
 - 6. Light to Solar Gain: 1.79.
 - 7. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - 8. Edge Spacers: Aluminum, bent and soldered corners; color as selected by Architect.
 - 9. Edge Seal: Glass to elastomer with supplementary silicone sealant.
 - 10. Purge interpane space with dry hermetic air.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Clean glazing channels, stops, and rabbets to receive the glazing materials, making free from obstructions and deleterious substances which might impair the work.
 - 1. Remove protective coatings which might fail in adhesion or interfere with bond of sealants.
 - 2. Comply with manufacturers' instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.
 - 3. Prime surfaces to receive glazing compounds in accordance with manufacturers' recommendations.

3.2 INSTALLATION

- A. Inspect each piece of glass immediately prior to start of installation.
 - 1. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded, or damaged in any other manner.
 - 2. Do not remove labels from glass until so directed by the Architect.
 - 3. Install glass so distortion waves, if present, run in the horizontal direction.
- B. Locate setting blocks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.
 - 1. Use blocks of proper size to support the glass in accordance with the manufacturer's recommendations.
 - 2. Provide spacers for all glass sizes larger than 50 united inches, to separate glass from stops; except where

continuous glazing gaskets or felts are provided.

- a. Locate spacers no more than 24" apart, and no closer than 12" to a corner.
 - b. Place spacers opposite one another.
 - c. Make bite of spacer on glass 1/4" or more.
- C. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.
- D. Do not use two different glazing materials in the same joint system unless the joint use is approved by the Architect.
- E. Mask, or otherwise protect, surfaces adjacent to installation of sealants. Provide black continuous caulking sealant bead at all glass to metal frame joints, over exposed edge of tape, interior and exterior.
- F. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required.

3.3 PROTECTION

- A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons, or other items directly to the glass except as specifically directed by the Architect.

3.4 CLEAN-UP

- A. Clean glass thoroughly prior to final acceptance. Take special care not to remove materials which may scratch glass. **Scratched glass will be rejected and replaced prior to acceptance.**

END OF SECTION 08 8100

SECTION 08 9100 - LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide the work of this Section as indicated on the drawings and as specified.
- B. Related Sections:
 - 1. Documents affecting the Work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1100: Carpentry
 - 3. Section 07 9210: Perimeter sealant joints.
 - 4. Section 08 1110: Louvers in metal doors.
 - 5. Division 23 0000: Air-handling louvers connected to ductwork.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations, and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery, and other information to determine compliance with specified requirements.

1.3 QUALITY ASSURANCE

- A. Performance Requirements: Where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with Air Movement and Control Association (AMCA) Standard 500.
 - 1. Provide louvers with AMCA Certified Ratings Seal evidencing that product complies with the above requirement.
- B. SMACNA: Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- C. Field Measurements: Verify size, location and placement of louver units prior to fabrication.

1.4 SPECIAL WARRANTY

- A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's 5-Year warranty. Warrant coating against peeling, blistering, flaking, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Subject to compliance with requirements, provide products of 1 of the following:
 - 1. Airline Products Co.
 - 2. The Airolite Co.
 - 3. American Warming and Ventilating Co.
 - 4. Construction Specialties, Inc.
 - 5. Industrial Louvers, Inc.
 - 6. Ruskin Manufacturing Co.
 - 7. Louvers and Dampers, Inc.
 - 8. Architectural Louvers.
 - 9. Safe-air/Dowco.

2.2 HORIZONTAL BLADE LOUVERS

- A. Provide louvers of size and depth indicated, with blades of profile, slope and spacing indicated, or if not indicated, to meet performance requirements.
- B. Material: Aluminum extrusions, ASTM B2221, alloy 6063-T52.
- C. Extrusion Thickness: Not less than 0.081" for blades and frames.
- D. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% KYNAR 500 resin or HYLAR 5000 resin, 1.0 mil minimum dry film thickness.
- E. Furnish units complying with following performance requirements:
 - 1. Free area: Not less than 45% on a 48" x 48" sized louver.
 - 2. Static pressure loss: Not more than 0.15" of water gage at an airflow of 1000 fpm free air velocity.
 - 3. Water penetration: Not more than 0.05 oz. per sq. ft. of free area at an intake airflow of 100 fpm free area velocity.
 - 4. AMCA certification: Furnish units bearing AMCA Certified Ratings seal.

2.3 LOUVER SCREENS

- A. Provide removable bird screens for exterior louvers of 1/2" mesh, 0.063" aluminum wire.
- B. Fabricate screen frames of same metal and finish as louver units to which secured. Provide frames consisting of U-shaped metal for permanently securing screen mesh.
- C. Locate screens on inside face of louvers. Secure screens to louver frames with machine screws spaced at each corner and at 12" on center between.

2.4 FASTENERS

- A. Provide stainless steel or aluminum screws of types, gages, and lengths to suit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.5 FABRICATION

- A. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including

application of sealants in joints between louvers and adjoining work.

- B. Provide supports, anchorages, and accessories required for complete assembly.
- C. Provide vertical mullions of type and at spacing indicated but no further apart than recommended by manufacturer or 72" on center, whichever is less. At horizontal joints between louver units provide horizontal mullions except where continuous vertical assemblies are indicated.
- D. Provide sill extensions and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.
- E. Join frame members to one another and to louver blades by welding except where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate and place louver units plumb, level, and in proper alignment with adjacent work.
- B. Use concealed fasteners wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers.
- D. Protect galvanized and aluminum surfaces against corrosion and galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metal.

END OF SECTION 08 9100

SECTION 09 0560 - COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide floor preparation and moisture testing as specified herein and as needed for a complete and proper flooring installation. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:
 - 1. Resilient sheet.
 - 2. Broadloom carpet.
 - 3. Carpet tile.
- B. This Section includes:
 - 1. Preparation of new and existing concrete floor slabs for installation of floor coverings.
 - 2. Testing of concrete floor slabs for moisture and pH.
 - a. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- C. The Owner's independent testing shall conduct the following tests:
 - 1. Vapor Emissions Testing.
 - 2. Relative Humidity Testing.
 - 3. Ph (Alkalinity) Testing.
- D. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 01 2100: Cash allowances.
 - 3. Section 03 3300: Cast-in-place concrete floor slabs.
 - 4. Section 09 6110: Moisture control treatment for flooring (cash allowance).
 - 5. Section 09 6500: Resilient flooring.
 - 6. Section 09 6800: Carpeting.

1.3 CASH ALLOWANCE

- A. Refer to Section 01 2100 for cash allowance requirements related to moisture control for flooring.

1.4 REFERENCES

- A. All work shall be performed in accordance with the Drawings and Specifications, and with the following standards:
 - 1. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens); 2008.
 - 2. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2008.
 - 3. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2010.
 - 4. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2009.

5. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; May 2011.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.6 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 1. Moisture and pH limits and test methods.
 2. Manufacturer's required bond/compatibility test procedure.
- C. Testing Agency's Report: Include:
 1. Description of areas tested; include floor plans and photographs if helpful.
 2. Summary of conditions encountered.
 3. Moisture and pH test reports.
 4. Copies of specified test methods.
 5. Recommendations for remediation of unsatisfactory surfaces.
 6. Submit report to Architect.
 7. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Copy of RFCI Recommended Work Practices for Removal of Resilient Floor Coverings.

1.7 QUALITY ASSURANCE

- A. Moisture and pH testing will be performed by an independent testing agency employed and paid by Owner.
- B. Contractor may perform adhesive and bond test with his own personnel or hire a testing agency.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 1. Provide access for and cooperate with testing agency.
 2. Confirm date of start of testing at least 10 days prior to actual start.
 3. Allow at least 4 business days on site for testing agency activities.
 4. Achieve and maintain specified ambient conditions.
 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

PART 3 - EXECUTION

3.1 ORDER OF OPERATIONS

- A. Perform following operations in the order indicated:
 - 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
 - 2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
 - a. Do not attempt to remove coating or penetrating material.
 - b. Do not abrade surface.
 - 3. Preliminary cleaning.
 - 4. Moisture vapor emission tests.
 - 5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 6. pH tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 - 7. Specified remediation, if required.
 - 8. Patching, smoothing, and leveling, as required.
 - 9. Other preparation specified.
 - 10. Adhesive bond and compatibility test.
 - 11. Protection.
- B. Remediations:
 - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
 - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
 - 3. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.3 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.4 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows:
 - 1. Place 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

3.6 pH TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements. This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range pH paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the pH paper into the water, remove it, and compare immediately to chart to determine pH reading.
 - 3. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value is over 10.

3.7 PREPARATION

- A. See individual floor covering section(s) for additional requirements.

- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Concrete Subfloors:
 - 1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8" in 10'-0" variation from level or slopes shown on the Drawings.
 - 2. Clean cracks, control joints, and other non-moving joints.
 - 3. Broom clean or vacuum the surfaces to be covered, and inspect the subfloors.
 - 3. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
 - 4. Seal patching compound with sealer recommended by the manufacturer and compatible with the flooring products specified.
 - 5. Do not fill expansion joints, isolation joints, or other moving joints.
 - 6. Prohibit traffic until patching compound is cured and sealed.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.9 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION 09 0560

SECTION 09 2400 - CEMENT PLASTER

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide lath and plaster where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1000: Plywood sheathing.
 - 3. Section 07 6200: Flashing and sheet metal.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 3. Samples:
 - a. Submit samples of the proposed accessories.
 - b. Provide 24" x 24" finish coat samples (on 1" foam board) of each plaster texture for approval by Architect 14 days prior to commencing work.

1.3 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with materials handling and workmanship provisions of the "Reference Specifications" of the California Lathing and Plastering Contractors Association. Interior and exterior lath and plaster shall comply with CBC Chapter 25.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where Finish Schedule specifies a manufacturer's standard color or finish, Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Colors: Where Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 SPECIAL WARRANTY

- A. In addition to the warranty requirements of the Contract Documents, submit 2 original copies of a warranty from the acrylic finish coat manufacturer for fading, delamination, and defective materials with an extended correction period of **3-years**.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 LATH

- A. Provide corrosion resistant lath and lath accessories.
- B. Welded Wire Metal Lath: ASTM C933; galvanized, self-furring.
 - 1. Wood and Metal Vertical Supports:
 - a. 16" On-center: 1.00 lb/sq yd, 1-1/2" square openings; Structalath III by Structa Wire Corp., IAPMO ER 2017.
 - b. 24" On-center: 2.2 lb/sq yd, 2" square openings; V-Truss Wall & Ceilings by Structa Wire Corp., IAPMO ER 2017.
 - 2. Wood and Metal Horizontal Supports:
 - a. Maximum 24" On-center: 2.2 lb/sq yd, 2" square openings; V-Truss Wall & Ceilings by Structa Wire Corp., IAPMO ER 2017.
- C. Paper Backing (Water Resistive Barrier): Asphalt-impregnated Type "D" paper; CBC Section 2510.6.
- D. Self-Furring Lath:
 - 1. Use of self-furring lath is permitted subject to satisfactory job-site demonstration of installation.
 - 2. Lath shall be furred out 1/4" when installed over solid surfaces such as plywood; DSA IR 25-4.
- E. Lath Fasteners:
 - 1. Staples:
 - a. At vertical wood supports: Minimum 16 gauge, minimum 3/4" crown, of sufficient length to penetrate sheathing and framing members minimum of 1" into wood structural members.
 - b. At horizontal wood supports: Minimum 9 gauge, barbed, minimum 3/4" crown, of sufficient length to penetrate sheathing and framing members minimum of 1-1/2" into wood structural members.
 - 2. Nails: 6d common or roofing nail with 7/16" head, 3/4" minimum embedment into stud exclusive of sheathing; ASTM C1063.
 - 3. Screws: 7/16" pan wafer head, Type S, 0.120" shank; ASTM C1002 and/or C 954.
 - a. Into Wood: #12 zinc pan head; 5/8" minimum penetration into wood.
 - 1) 1-1/4" minimum penetration into stud where applying lath over insulation board.
 - b. Into Metal: Self-drilling and tapping; penetrate steel thickness plus 3 threads.
 - 4. Powder Actuated Fasteners: Use fastener recommended for the specific use intended.
 - a. For concrete and masonry substrates only.
 - b. Factory washer (disc).
 - c. Demonstrate a minimum 50 pound pull out value.
 - d. 1-1/4" minimum embedment.

2.3 METAL ACCESSORIES

- A. Metal Corner Beads: Prefabricated, No. 1A expanded metal corner bead, small nose corner beads fabricated from zinc alloy, with expanded flanges of large mesh diamond lath to allow full encasement by plaster.
- B. Casing Beads: Prefabricated, No. 66 short flange casing bead, square-edged style, with short flange, zinc-coated galvanized steel.

- C. Control Joints - One Piece Type: Prefabricated, No. 15 expansion joint; Folded pair of non-perforated screeds in M-shaped configuration, with expanded flanges, zinc-coated galvanized steel.
- D. Weep Screed: Prefabricated, No. 7 foundation sill screed o J-weep; zinc-coated galvanized steel with nailing flange.
- E. Inside Corner Control Joint: Prefabricated No. 30, folded pair of non-perforated screeds in W-shaped configuration, with expanded flanges.
- F. Vent Screed: Stockton Products SBS BugStop Soffit Vent, 1/8" diameter holes.
- G. Reveal Screed: Stockton Products SVR - No Vent.

2.4 PLASTER

- A. Comply with ASTM C926 for Portland cement plaster base and finish coat mixes as applicable bases, materials and other requirements indicated.
 - 1. Portland Cement, ASTM C150, Type II or IV.
 - 2. Plastic Cement: ASTM C1328; no additional lime or plasticizer shall be added.
 - 3. Sand Aggregate for Base Coat: ASTM C897.
- B. Portland Cement Plaster Base Coat Mixes and Compositions: Proportion materials for respective base coats in parts by volume for cementitious material and in parts by volume per sum of cementitious materials for aggregates to comply with the following requirements for each method of application and plaster base indicated. Adjust mix proportions below within limits specified to attain workability.
 - 1. Three coat work over metal lath.
 - 2. Scratch Coat: 1 part Portland cement plaster, 2-1/2 to 4 parts sand.
 - 3. Brown Coat: 1 part Portland cement plaster, 3 to 5 parts sand.
- C. Polymer-Based Exterior Finish Coat: 100% acrylic polymer finish coat with integral color as indicated on the Finish Schedule, applied over stucco brown coat; Standard Finish by Dryvit Systems, Inc., Senerflex Finish by Senergy, or Sto Powerwall Finish by Sto Corp.

2.5 OTHER MATERIALS

- A. Water for Mixing and Finishing Plaster: Drinkable, free of substances capable of affecting plaster set or of damaging plaster, lath or accessories.
- B. Bonding Agent for Portland Cement Plaster: ASTM C932.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WATER-RESISTIVE BARRIER INSTALLATION

- A. General: Install 2 layers water resistive barrier over all sheathing, or continuous insulation where occurs.
 - 1. Install layers independently of each other such that each layer provides a separate continuous plane and any flashing is directed between the layers.
 - 2. Install with minimum 2" horizontal laps and 6" vertical laps.
 - 3. Water resistive barrier is not required on ceilings or soffits.

- B. Integrate water resistive barrier with flashings such that water resistive barrier always laps over flashing.
- C. Install water resistive barrier taut with a minimum of wrinkles and with care to eliminate punctures, tears or rips during application and the application of metal lath.
- D. Repair holes, tears or rips.

3.3 LATH INSTALLATION

- A. Lath: CBC Section 2507.3 and 2510.
 - 1. Welded Wire Lath: Fasteners shall engage vertical cross wires at the furring crimps, at the intersection of longitudinal wire and cross wire, or at any point along the longitudinal wire.
- B. Fastener Spacing:
 - 1. Space fasteners at 6" on center along supports.
 - 2. Bend common nails over to engage not less than 3 strands of lath.
- C. Soffit Earthquake Nailing: At horizontal soffits, provide additional fasteners along each support and within 3" of the edge of each sheet; 9 gage ring-shank hook staple, 3/4" wide hook, 1-1/2" long.

3.4 INSTALLATION OF PLASTERING ACCESSORIES

- A. Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated.
 - 1. Miter or cope accessories at corners; install with tight joints and in alignment.
 - 2. Attach accessories securely to plaster bases to hold accessories in place and alignment during plastering.
- B. Corner Bead: Install at external corners.
- C. Casing Beads: Install at termination of plaster work unless otherwise indicated.
- D. Control Joints: Install control joints at locations indicated, or if not indicated, at locations complying with the following criteria and approved by the Architect.
 - 1. Where expansion or control joint occurs in construction directly behind plaster membrane.
 - 2. Where distance between control joints in plastered surface exceeds 144" in either direction.
 - 3. Where area within Portland Cement panels exceed 100 sq. ft.
 - 4. Where Portland Cement plaster panel sizes or dimensions change. Extend joints full width or height of plaster membrane.
 - 5. At corners of door and window frames.
 - 6. Directly over changes in substrate materials.
- E. Install accessories flush with metal frames and other built-in items unless otherwise indicated.

3.5 PLASTER APPLICATION

- A. Comply with all provisions of CBC Section 2512.
- B. Portland Cement Plaster Application Standard: Apply Portland Cement plaster materials, compositions, and mixes to comply with ASTM C926. In addition to specified standards, apply plaster as follows:
 - 1. Scratch coat: Score scratch coat horizontally only to achieve a mechanical bond with the brown coat.
 - 2. Cold Joints: Cold joints in plaster will not be permitted within a panel, or between screeds, joints, or reveals.

- C. Tolerances: Do not deviate more than 1/8" in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straightedge placed at any location on surface.
- D. Plaster flush with metal frames and other built-in metal items or accessories which act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal by casing beads, cut base coat free from metal before plaster sets and groove finish coat at the junctures with metal.
- E. Walls: Provide 7/8" thick three 3-coat plastering method on walls (3/4" base + 1/8" finish).
- F. Ceilings and Soffits: Provide 3/4" thick three 3-coat plastering method on ceilings and soffits.
- G. Concealed Plaster: Where plaster application will be concealed by wood paneling, above suspended ceilings and similar locations, finish-coat may be omitted; where concealed behind cabinets and similar furnishings and equipment, apply finish-coat; where used as a base for adhesive application of tile and similar finishes, omit finish-coat and coordinate thickness with overall dimension as shown, and comply with tolerance specified.
- H. Number of Coats: Apply Portland Cement plaster, of composition indicated, using 3-coat work over the following plaster bases: Metal lath, scratch coat, brown coat, finish coat.

3.6 CURING

- A. Moist cure Portland Cement plaster base and finish coats to comply with ASTM C926, including recommendations for time between coats and during in "Annex A2 Design Considerations".
- B. Keep cement basecoat hydrated and allow the cement to chemically cure and harden. Moist cure as needed, morning and evening as required to produce a hard basecoat.
- C. Basecoat shall be allowed to cure a minimum of 7 days before applying a finish coat. If feasible allow the basecoat to cure 14 days prior to applying the finish coat.
- D. Plastered walls with excessive shrinkage cracks in the basecoat due to a failure to water cure shall be skim coated with a polymer-based cement coat prior to applying a finish coat.

3.7 FINISH COAT

- A. Finish Coat Application:
 - 1. Apply finish coat to match mock-ups in color and texture.
 - 2. Acrylic Finish Coat: Apply a primer coat for light colored finishes or provide full prime coverage for all "putz" or "swirl" textures.
 - 3. Provide sufficient crew size to maintain a wet edge; scaffold lines shall be kept to a minimum.
 - 4. Maintain consistency and uniformity in application procedures and techniques.
 - 5. Leave adjacent surfaces clean and free of plaster materials.
 - 6. Leave protection of the plaster in place until finish coat is set.
 - 7. Repair scaffold tie-ins to maintain water-resistance of plaster assembly and blend with finish coat.
- B. Texture:
 - 1. Acrylic Finish Coat and Texture: "Sandblast" as illustrated by Dryvit Systems, Inc.
- C. Protect finish coat in compliance with manufacturer's recommendations.

3.8 CLEANING UP

- A. Promptly wipe metal accessories, and other surfaces which are not to be plastered, clean after application of each coat.
- B. In addition to other protection, protect and clean adjacent surfaces from the accidental application of plaster.
- C. In addition to other requirements for cleaning, immediately upon completion of this portion of the Work visually inspect adjacent surfaces and remove all traces of spilled and splashed plaster.

3.9 FIELD QUALITY CONTROL

- A. Lath Inspection: No lath or lath attachments shall be covered or finished until it has been inspected and approved by the Project Inspector or special inspector.

END OF SECTION 09 2400

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide gypsum drywall and accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Section includes:
 - 1. Gypsum wallboard and accessories.
 - 2. Joint treatment and accessories.
- C. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 06 1100: Rough carpentry.
 - 3. Section 07 8400: Firestopping of penetrations of fire-rated construction.
 - 4. Section 09 0175: Preparation of existing surfaces for painting and wall covering.
 - 5. Section 09 2115: Shaft wall assemblies.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop drawing indicating proposed control joint layout.

1.3 REFERENCES

- A. All work shall be performed in accordance with the Drawings and Specifications, and with the following standards:
 - 1. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association; 2007.
 - 2. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2007.
 - 3. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association.
 - 4. GA-600 - Fire Resistance Design Manual; Gypsum Association.

1.4 QUALITY ASSURANCE

- A. Drywall installer shall coordinate with General Contractor to ensure that substrates at the ceiling line, base, and door/window frames are within a tolerance of straight, not-to-exceed 1/8" in 10', as indicated by a 10' straight edge. General Contractor shall shim as required prior to drywall installer accepting substrates. Failure to maintain the tolerances will require removal and reinstallation at no additional cost to the Owner.
- B. Mock-Ups:
 - 1. At a location on the site where approved by the Architect, provide a mock-up gypsum wallboard panel.
 - a. Make the panel approximately 2'-0" square.
 - b. Provide one mock-up panel for each gypsum wallboard finish used on the Work.
 - c. Revise as necessary to secure the Architect's approval.

2. The mock-up panels, when approved by the Architect, will be used as datum points for comparison with the remainder of the work of this Section for the purpose of acceptance or rejection.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 GYPSUM WALLBOARD

- A. Fire-Resistant Gypsum Wallboard: Paper-faced gypsum panels, ASTM C1396; sizes to minimize joints in place; edges tapered, ends square cut; Type X, 5/8" thick in all locations unless otherwise noted.

2.3 METAL ACCESSORIES

- A. Finishing Accessories: ASTM C1047; galvanized steel or rolled zinc, unless otherwise indicated.
- B. Casing Beads:
 1. Provide channel shapes with an exposed wing, and with a concealed wing not less than 7/8" wide.
 2. Provide bullnose shapes where shown on Drawings, as manufactured by Flannery, Inc., Clinch-On Corner Bead Co.
- C. Corner Beads:
 1. Provide angle shapes with wings not less than 7/8" wide and perforated for nailing and joint treatment at horizontal edges.
 2. Provide bullnose shapes at vertical edges and where indicated on the Drawings.
- D. Control Joints:
 1. Provide with 1/4" wide center channel with removable tape strip and wings perforated for nailing and joint treatment at horizontal edges as manufactured by Clark Dietrich, 093 Vinc Control Joint (ZNCJ).
- E. Edge Beads at Ceiling Perimeter:
 1. Provide angle shapes with wings not less than 3/4" wide.
 2. Provide concealed wing perforated for nailing, and exposed wing edge folded flat.
 3. Exposed wing may be factory finished in white color.
- F. Reveals: Extruded aluminum, alloy 6063-T5, with prepunched mounting flanges tapered to receive joint bedding, tape and top coat. Factory chromate conversion coating. As manufactured by Fry Reglet Corp., Gordon Inc., MM Systems Inc.

2.4 FASTENING DEVICES

- A. Wood Framing: No. 6 Type W, bugle-head screws, length as required for single or multi-layer application; ASTM C1002.
- B. Metal Framing: No. 6 Type S, bugle-head screws, length as required for single or multi-layer application; ASTM C1002.

2.5 JOINTING SYSTEM

- A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on the Work. ASTM C 475.
- B. Jointing compound may be used for finishing if so recommended by its manufacturer.
- C. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

2.6 TEXTURE

- A. Primer: Manufacturer's recommended acrylic latex coating. Tuff Hide by USG.
- B. Texture Material: Manufacturer's recommended product for the finish texture specified.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. General:
 - 1. Install gypsum wallboard in accordance with the Drawings and with separate boards in moderate contact but not forced in place.
 - 2. At internal and external corners, conceal cut edges of the boards by overlapping covered edges of abutting boards.
 - 3. Stagger boards so that corners of any four boards will not meet at a common point except in vertical corners.
- B. Ceilings:
 - 1. Install gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.
 - 2. Maximum Fastener Spacing: 12" on center for screw fastening.
- C. Walls:
 - 1. Install gypsum wallboard in vertical direction, plumb and square and in full height single piece sheets wherever possible.
 - a. Gypsum wallboard may be installed in horizontal direction behind vinyl covered tackboard panels.
 - 2. Make end joints, where required, over framing, furring members, or solid backing.
 - 3. Butt factory edges together. Do not butt a factory edge with a cut edge.
 - 4. Maximum Fastener Spacing: 16" on center for screw fastening.

3.4 JOINT TREATMENT

- A. General:

1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
 2. Unless specified otherwise, treat all joints on gypsum face panels. Refer to level of finish required below.
 3. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.
 4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.
- B. Embedding Compounds:
1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
 2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.
 3. After this treatment has dried, apply the number of coats of embedding compound to joints and fastener heads for the level of finish specified for the surface, spreading in a thin uniform coat to not less than 6" wide at joints, and feather edged.
 4. Sand between coats as required.
 5. When thoroughly dry, sandpaper to eliminate ridges and high points.
- C. Finishing Compounds:
1. After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to joints and fastener heads.
 2. Feather the finishing compound to not less than 12" wide.
 3. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff the paper surface of the wallboard or raise the nap of the gypsum board paper facing.
- D. Backing Board: 5/8" Type "X" gypsum board, unless otherwise noted.
1. Treat all joints behind fiberglass reinforced panels.
 2. Joints behind vinyl covered tackable panels are not required to be treated.

3.5 LEVELS OF FINISH

- A. The following descriptions of levels of finish are in accordance with GA-214. Finish gypsum board and tackboard in accordance with the Gypsum Construction Handbook as published for the construction industry by United States Gypsum Company.
- B. **Level 1:** Embed tape in joint compound at all joints and interior angles. Surface free of excess joint compound. Tool marks and ridges are acceptable.
1. Provide Level 1 finish on surfaces hidden above a ceiling or soffit at sound walls, fire-rated walls, and exterior walls.
 2. Provide Level 1 finish on surfaces hidden behind tack board.
- C. **Level 3:** Embed tape in joint compound, and provide one additional coat of compound, over all joints and interior angles. Provide two separate coats of compound over accessories and fasteners. All joint compound shall be smooth and free of tool marks and ridges.
1. Provide Level 3 finish on all exposed finished or unfinished gypsum board surfaces not specified to receive Level 4 or 5 finish.
 2. Provide Level 3 finish behind fiberglass reinforced panels installed over gypsum backing board.
- D. **Level 4:** Embed tape in joint compound, and provide two additional coats of compound, over all joints and interior angles. Provide three separate coats of compound over accessories and fasteners. All joint compound shall be smooth and free of tool marks and ridges. All joint compound shall be smooth and free of tool marks and ridges.

1. Provide Level 4 finish where vinyl wall covering or dry-erase wall covering is installed on gypsum board surfaces.
- E. **Level 5:** Embed tape in joint compound, and provide two additional coats of compound, over all joints and interior angles. Provide three separate coats of compound over accessories and fasteners. All joint compound shall be smooth and free of tool marks and ridges. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.
 1. Provide Level 5 finish on all tackboard surfaces to receive field-applied vinyl wallcovering.

3.6 CORNER TREATMENT AND METAL ACCESSORIES

- A. Internal Corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit neatly into the corner.
- B. External Corners:
 1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.
 2. Space the fasteners approximately 6" on centers, and drive through the wallboard into the framing or furring member.
 3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for level of finish specified for the surface, feathering the joint compound out from 8" to 10" on each side of the corner.
- C. Control Joints:
 1. Walls and ceilings: Install at 30'-0" o.c. maximum spacing in either direction when planes exceed 30'-0" in length.
 2. Unless locations are specifically indicated on the Drawings, Contractor shall submit a control joint plan for the architect's review.

3.7 OTHER METAL TRIM

- A. General: The Drawings do not purport to show all locations and requirements for metal trim. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in this Work.

3.8 TEXTURE

- A. Exposed Wall Surfaces for Paint: Provide fine orange peel finish approved by Architect on exposed gypsum board surfaces.
- B. Exposed Ceiling and Soffit Surfaces for Paint: Provide fine orange peel finish approved by Architect on exposed gypsum board surfaces.
- C. Provide the manufacturer's recommended primer/sealer to surfaces to receive texture prior to texturing.

3.9 MARKING AND IDENTIFICATION (CBC 703.7)

- A. At all accessible concealed floors, floor-ceilings and/or attic spaces with fire walls, fire barriers, fire partitions, smoke barriers and/or smoke partitions or any other wall required to have protected openings or penetrations provide signs or stencil as follows:
 1. Located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition.

2. Letting shall be not less than 3 inches in height with a minimum 3/8 inch stroke in contrasting color stating, "FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".

3.10 CLEANING UP

- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris, and surplus material of this Section.

END OF SECTION 09 2900

SECTION 09 3000 - TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide tile where called for on the Drawings, as specified herein, and as needed for a complete and proper installation. Section includes:
 - 1. Tile for floor applications
 - 2. Tile for wall applications
 - 3. Tile wall base
 - 4. Backer board as tile substrate
 - 5. Trim, accessories and setting materials
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Samples:
 - a. Tile: Submit sufficient samples of each size, color, and texture to demonstrate the maximum range of sizes, colors, textures, and flatness. Tiles delivered to the job or installed in the Work, and which do not fall within the accepted range, shall be removed from the site and be replaced promptly with acceptable materials.
 - b. Trim shapes and base: Review any unusual installation conditions with the Architect for approval prior to commencing the work.
 - 4. **Verify availability of all parts, in all colors required, at time of submittal.**
- B. Contract Closeout Submittals: Submit in accordance with Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Applicable Standards: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this Specification to the extent they are specified herein. Unless otherwise specified, use the latest edition.
 - 1. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile - Version; 2014.
 - 2. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2022.
 - 3. Tile Council of America (TCA): Comply with the Handbook for Ceramic Tile Installation.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as

other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.

3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

C. Blending:

1. Require the tile manufacturer to blend tiles at the factory.
2. Provide additional blending at the job site as needed to secure the Architect's approval.
3. All materials of each specific type and color **shall be from the same dye-lot or run.**
4. Provide additional lighting if necessary prior to starting tile installations.

- D. Provide only tile cartons which have been grade-sealed by the manufacturer in accordance with ANSI A137.1, and with grade-seals unbroken.

- E. On manufactured grouts, provide labels certifying compliance with the referenced standards.

1.4 SITE CONDITIONS

- A. Install mortar, and set and grout the tile, only when temperature is at least 50° F and rising in the space.

B. Protection:

1. Protect adjacent surfaces during progress of the work of this Section.
2. Close rooms and spaces to traffic of all types until mortar and grout have set for 72 hours.

- C. Illuminate the work area during installation, providing the same level and angle of illumination as will be available for final inspection.

1.5 EXTRA MATERIALS

- A. Materials: Provide for the Owner's use, an extra stock of approximately 3% of each type, color, pattern, and size of material installed. Package each type of material separately, distinctly marked, and protected against deterioration and damage.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.
- B. Manufacturers: As indicated on the Finish Schedule.

2.2 CERAMIC TILE

- A. Except as may be otherwise specified or approved by the Architect, provide floor tiles **with coefficient of friction of 0.42** or higher in accordance with pertinent provisions of ASTM C1028.
- B. Ceramic Mosaic Floor Tile, Unglazed:

1. Type: Ceramic Mosaic
 2. Size: 2"x 2"
 3. Catalog number and/or color: See Finish Schedule
 4. **Note:** Provide ceramic mosaic with 7.5% abrasive content at shower floors.
- C. Interior Wall Tile, Glazed:
1. Type: Glazed Ceramic
 2. Size: 4-1/4" x 4-1/4"
 3. Catalog number and/or color: See Finish Schedule
- D. Exterior Wall Tile, Clearglazed:
1. Type: Glazed Porcelain
 2. Size: 3" x 3" with 1/8" grout joints
 3. Colors: D175 - 50%, D322 - 30%, D179 - 20%, with Prism #502 grout by Custom Building Products.
 4. Pattern: Random blend.
- E. Provide standard trim shapes as required.
1. Provide all bases, caps, stops, returns, trimmers, and other shapes indicated or required to produce a completely finished installation.
 2. Unless otherwise noted on the Drawings, provide color and finish matching the adjacent tile.
 3. **All interior and exterior wall corners shall be standard bullnose units** unless otherwise noted.
 4. Verify with Architect any conflicting conditions prior to installation.

2.4 INSTALLATION MATERIAL

- A. All materials, including mortar bed, metal lath, membranes, bond coats, etc. shall be in strict compliance with the CTA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar Bed: Provide materials in accordance with ANSI A108.1 and the TCA setting method specified below.
1. Membrane: 15 pound roofing felt or 4 mil polyethylene film (required in wet areas only)
 2. Portland Cement: ASTM C150, Part 1.
 3. Lime: ASTM C206, Type S or ASTM C207, Type S.
 4. Sand: ASTM C144.
 5. Water: Potable.
- C. Bond Coat:
1. Latex-Portland Cement Mortar: ANSI A118.4. Ardex X77 Microtec fiber reinforced tile and stone mortar by Ardex Americas, Super Flex by TEC, ReFlex by Bostik, 254/255 by Laticrete, or Kerabond/Keralastic by Mapei, with manufacturers recommended acrylic latex additive.
 2. Epoxy: 100% solids; chemical, stain, and shock resistant; ANSI A118.3. Ardex WA Epoxy adhesive and grout by Ardex Americas, AccuColor EFX Epoxy by TEC, ExPoxy Ezclean by Bostik, Latapoxy 300 by Laticrete International, or Kerapoxy by Mapei Corp.
- D. Grout:
1. Epoxy Grout: 100% solids; chemical, stain, and shock resistant; ANSI 118.3. Ardex WA Epoxy grout and adhesive by Ardex Americas, AccuColor EFX Epoxy by TEC, EzPoxy Exclean by Bostik, Latipoxy 300 by Laticrete, or Kerapoxy by Mapei.

2.5 METAL TRIM

- A. Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive; by Schluter-Systems or Profilitec.

1. Applications:
 - a. Open edges of wall tile.
 - b. Open edges of floor tile.
 - c. Wall corners, inside and outside.
 - d. Transitions between floor finishes of different height.
 - e. Thresholds at door openings.
 - f. Borders and other trim as indicated on the Drawings.

2.6 CAULKING

- A. Ceramic Tile Caulk:
 1. Sanded: Polyblend Ceramic Tile Caulk by Custom Building Products, Ardex SX 100% Silicone sealant for tile and stone by Ardex Americas or approved equal.
 2. Non-Sanded: Polyblend Ceramic Tile Caulk by Custom Building Products, Ardex SX 100% Silicone sealant for tile and stone by Ardex Americas or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. **Do not proceed until unsatisfactory conditions are corrected.**
- B. Coordinate with other trades as needed to assure that proper substrata are provided to receive the work of this Section.
- C. Where a Portland cement mortar setting bed will be installed, do not commence installation of the setting bed until substrata are within the following tolerances:
 1. Horizontal surfaces: Level within 1/4" in ten ft in all directions;
 2. Vertical surfaces: Plumb within 1/4" in eight ft in all directions.
- D. Where tile units will be thin-set directly to the substrata, do not commence installation of the tile units until substrata are within the following tolerances:
 1. Horizontal surfaces: Level within 1/8" in 10'-0" in all directions;
 2. Vertical surfaces: Plumb within 1/8" in 8'-0" in all directions.
- E. Condition of surfaces to receive tile:
 1. Verify that surfaces to receive mortar setting bed and tile are firm, dry, clean, and free from oily or waxy films and curing compounds.
 2. Verify that grounds, anchors, plugs, recess frames, bucks, electrical work, mechanical work, and similar items in or behind the tile have been installed before proceeding with installation of mortar bed or tile.
- F. Tile at Dissimilar Materials:
 1. Where tile will be set over dissimilar substrates, i.e. wood and masonry in the same plane, provide and install Dal-Seal CIS - Crack isolation sheet membrane, or approved equal.
 2. Provide for 1/4" full depth gap between tile and metal door frames. Fill with mildew resistant silicone sealant.
 3. Provide for movement of dissimilar substrate materials by using mildew resistant silicone sealant at nearest grout joint.

3.2 SETTING METHOD

- A. Use setting method of the types indicated and required in accordance with TCA Handbook of Ceramic Tile Installation as specified below.
- B. Interior Walls:
 - 1. **Wood or Metal Stud with Mortar Bed:** W231 with latex Portland cement bond coat on a cured mortar bed; membrane, plain lath, mortar bed and scratch coat - ANSI A108.1A, tile - ANSI A108.1B, and grout - ANSI A108.3. Provide expansion joints and cold joints at all interior and exterior corners in accordance with TCA Movement Joint Design Essentials EJ171.
- C. Interior Floors:
 - 1. **Concrete:** F112 with latex Portland cement mortar bond coat on a cured mortar bed; mortar bed bond coat, mortar bed - ANSI A108.1a, tile - ANSI A108.1B, and grout - ANSI A108.3.
 - 2. **Concrete (Thin-set):** F115 with epoxy cement bond coat; bond coat - ANSI A118.4, tile - ANSI A108.1B, and grout - ANSI A108.3. Provide expansion joints and cold joints at all interior and exterior corners in accordance with TCA Movement Joint Design Essentials EJ171.
- D. Interior Base Only, No Wall Tile Above:
 - 1. **Studs and Gypsum Board:** W221 with latex Portland cement mortar bond coat on a cured mortar bed; membrane, self-furring metal lath, mortar bed with scratch coat - ANSI A108.1B, tile - ANSI A108.1B, and grout - ANSI A108.10.

3.3 TILE INSTALLATION

- A. General:
 - 1. **Prior to installation, verify layout of patterns and transitions with the architect for approval.**
 - 2. Comply with pertinent provisions of the referenced standards and the product manufacturer's installation recommendations, except as otherwise directed by the Architect or specified herein.
 - 3. Maintain minimum temperature limits and installation practices recommended by materials manufacturers.
 - 4. Do not install tile floors over membrane until the membrane has been tested and accepted.
 - 5. Mix and use proprietary materials in strict accordance with the manufacturers' printed instructions.
 - 6. Prepare the surfaces, set, fit, grout, and clean the work of this Section in strict accordance with the referenced standards and the manufacturers' recommendations.
 - 7. Provide adequate lighting to assure workman visibility for uniform tile setting.
- B. Install in accordance with pertinent provisions of the standards listed in 1.3 above, pressing and beating tile into place to obtain 100% coverage by mortar on back of each tile. Back-butter tiles if necessary to achieve 100% coverage.
- C. Limits of Tile:
 - 1. Extend tile into recesses and under equipment and fixtures to form complete covering without interruptions.
 - 2. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
- D. Joining Pattern:
 - 1. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.
 - 2. **Align joints** when adjoining tiles on floor, base, trim, and walls are the same size.
 - 3. Layout tile work, and center the tile fields both directions in each space or on each wall area.
 - 4. Adjust to minimize tile cutting.
 - 5. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size.
 - 6. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

- E. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes, and alignments shown:
 - 1. Horizontal surfaces: 1/8" in ten ft in all directions;
 - 2. Vertical surfaces: 1/8" in eight ft in all directions;
 - 3. Adjacent tiles flush.

3.4 THRESHOLDS

- A. EDGE STRIPS: Install edge strips at openings where threshold has not been called for, but where tile floor abuts other flooring material at same level.
- B. Where thresholds are detailed to be installed over tile, install with a full bedding of bonding mortar.

3.5 GROUTING

- A. General:
 - 1. Do not begin grouting floor tiles until they are firmly set and, in no case, in less than 48 hours after they have been installed.
 - 2. Remove spacers, ropes, glue, and similar foreign matter prior to grouting.
 - 3. When using proprietary grout, adhere strictly to the manufacturer's directions unless otherwise specified or approved by the Architect.
- B. Installation:
 - 1. Mix grout by hand or with a slow-speed drill motor not exceeding 300 rpm, achieving a stiff non-slumping, uniform consistency, and using the minimum amount of liquid to achieve a workable mix.
 - 2. Force the maximum amount of the approved grout into joints in accordance with pertinent recommendations contained in ANSI standards specified.
 - 3. Fill the joints of cushion-edge tile to depth of the cushion; fill joints of square-edge tile flush with the surface.
 - 4. Fill all gaps and skips.
 - a. Do not permit mortar or mounting mesh to show through grouted joints.
 - b. Provide hard finished grout which is uniform in color, smooth, and without voids, pin holes, or low spots.
 - 5. Leave tile clean.

3.6 CAULKING

- A. Locations:
 - 1. Caulk all tiled inside and outside corners with sanded caulking, color to match grout, in lieu of grout.
 - 2. Caulk transition from wall tile to ceiling and wall with sanded caulking, color to match grout, in lieu of grout.
 - 3. Caulk intersection of wall and ceiling tile to door and window frames with sanded caulking, color to match grout, in lieu of grout.

3.7 CURING

- A. Damp cure all tile installations, including portland cement grouts, for 72 hours minimum.
 - 1. Cover with 40 pound kraft paper.
 - 2. Do not use polyethylene sheets directly over tile on horizontal surfaces.

3.8 CLEANING AND POLISHING

- A. After completion of setting and grouting, thoroughly clean and polish the tile.
 - 1. Do not use acid or acid cleaners to clean tile.

2. When epoxy resin grout is thoroughly cured, steam clean paraffin coating per manufacturer's recommendations.
3. When the tile is thoroughly clean and dry, polish glazed tile with clean dry cloths.

3.9 PROTECTION AND REPLACEMENT

- A. Protect finished tile work while other work in the area is in progress. Do not permit traffic on tile floors for 7 days after laying tile. Protect tile floors from traffic with heavy, non-staining paper held in place with non-staining masking tape.
- B. Replace cracked, chipped, broken, and otherwise defective tiles.
- C. Remove work not complying with requirements of the Contract Documents or the referenced standards, and promptly replace with work which does comply.

END OF SECTION 09 3000

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide acoustical ceilings where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 01 3560: High Performance Criteria Summary
 - 3. Section 09 2900: Gypsum Wallboard System

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Samples: Submit four 4" x 4" samples of all acoustic ceiling tiles and/or panels specified. Submit two samples of all ceiling suspension system components. If other than components and manufacturer specified are submitted, provide four samples of each component system.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Comply with ASTM C636 and E580, CBC Section 1616A1.21 and DSA IR 25-2.13.
- B. Fire Performance Characteristics: Provide acoustical ceiling components identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by an independent testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of testing and inspection agency.
 - 1. Surface Burning Characteristics:
 - a. Flame Spread: 0-25; ASTM E84.
 - b. Smoke Developed Index: 0-450; ASTM E84.
- C. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings at no additional costs to the Owner.
 - 3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable at no additional costs to the Owner.

- D. Ceiling grid installer shall coordinate with General Contractor to insure that substrates at the ceiling line are within a tolerance of straight, not-to-exceed 1/8" in 10', as indicated by a 10' straight edge. General Contractor shall shim as required prior to ceiling installer accepting substrates. Failure to maintain the tolerances will require removal and reinstallation at no additional cost to the Owner.

1.4 EXTRA MATERIALS

- A. Materials: Provide for the Owner's use, an extra stock of 2 full boxes of each type, color, pattern, and size of material installed. Package each type of material separately, distinctly marked, and protected against deterioration and damage.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 SUSPENDED ACOUSTICAL CEILING SYSTEM

- A. Suspension Systems: ASTM C635 and E580 Section 5; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required for a complete suspension system.
- B. Acceptable Suspension System Products:
 - 1. Series 1250 heavy-duty by Chicago Metallic Corp., ESR-2631:
 - a. Main runner: No. 270.
 - b. Cross runner: No. 1254 or 1274.
 - c. Perimeter clip: No. 1496.
 - 2. Prelude XL Heavy-duty by Armstrong, ESR-1308:
 - a. Main runner: No. 7301.
 - b. Cross runner: No. XL-7342.
 - c. Perimeter clip: BERC-2.
 - 3. Color:
 - a. White at 2' x 4' grid
- C. Acceptable Acoustical Ceiling Panel Products: ASTM E1264, Class A.
 - 1. **Type "A"**: School Zone Fine Fissured - No. 1714 (NRC 0.70) by Armstrong; 24"x24"x3/4"; square edge lay-in; flame spread 0-25; color white.
 - 3. **Type "B"**: GRAPHIS Rustex by Armstrong; 24"x24"x3/4"; square edge lay-in; flame spread 0-25; color white.
 - 3. All acoustical ceiling panels within the same room shall come from the same die lot.

2.3 ACCESSORIES

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans wherever possible.

3.3 SUSPENSION SYSTEM INSTALLATION

- A. Except as modified by requirements of governmental agencies having jurisdiction, recommendations of the manufacturer as approved by the Architect, or specific directions of the Architect, install in accordance with ASTM C636 and E580 Section 5, CBC Section 808, and pertinent UL design requirements.
- B. Hanger Wires:
 - 1. Provide 12 gauge minimum hanger wires for up to and including 4'-0" x 4'-0" grid spacing along main runners. Splices are not permitted in any hanger wires unless specifically approved by DSA.
 - 2. Provide 12 gauge hanger wires at ends of all main and cross runners within 8" from the support and within 1/4 of length of end tee, whichever is least, for perimeter of ceiling area. End connections for runners which are designed and detailed to resist the applied horizontal forces may be used in lieu of 12 gauge hanger wires, subject to DSA review and approval.
 - 3. Provide trapeze or other supplementary support members at obstructions to main hanger spacing.
 - 4. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas.
 - 5. Provide counter-sloping wires for hanger wires which are more than 1 in 6 out of plumb.
- C. Perimeter Attachment:
 - 1. Ceiling grid members may be attached to not more than two adjacent walls. Ceiling grid members shall be at least 3/4" free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners shall be free and a minimum of 3/4" clear of wall.
 - 2. At perimeter of ceiling area where main or cross runners are not connected to adjacent wall, provide interconnection between runners at free end to prevent lateral spreading.
 - a. Metal strut or a 16 gauge wire with a positive mechanical connection to the runner may be used.
 - b. Where the perpendicular distance from the wall to the first parallel runner is 12" or less, this interlock is not required.
- D. Bracing Wires: Provide sets of four 12 gauge splayed bracing wires oriented 90 degrees from each other at following spacing:
 - 1. Provide sets of bracing wires at a spacing not more than 12'-0" x 12'-0" on center.

2. Provide bracing wires at locations not more than 6'-0" from each perimeter wall and at edge of vertical ceiling offsets.
 3. Slope of splayed bracing wires shall not exceed 45 degrees from plane of ceiling and shall be taut without causing ceiling to lift. Splices in bracing wires shall not to be permitted without special DSA approval.
 4. Fasten a strut to main runner at the convergence of the splayed wires, extended to and fastened to roof or floor structural members above or to such other framing deemed acceptable to enforcement agency.
 - a. Place these vertical restraint points not more than 12'-0" x 12'-0" on center.
 - b. Provide vertical struts at locations not more than 6'-0" from each perimeter wall and at the edge of vertical ceiling offsets.
- E. Compression Struts:
1. Metal stud material shall conform to ASTM A653, or other equivalent sheet steel listed in Section A3.1 of the North American Specification for the Design of Cold-Formed Steel Structural Members, (AISI S100). Material 43 mil (18 gauge) thick and lighter shall have minimum yield strength of 33 ksi. Material 54 mil (16 gauge) thick and heavier shall have a minimum yield strength of 50 ksi. **See allowable length chart on drawings.**
 2. Electrical Metallic Tube (EMT) shall conform to ANSI C80.3/UL 797 carbon steel with G90 galvanizing. EMT shall have minimum yield strength of 30 ksi and minimum ultimate strength of 48 ksi. **See allowable length chart on drawings.**
- F. Hanger and Bracing Wire Fastening:
1. Fasten hanger wires with not less than 3 tight turns.
 2. Fasten bracing wires with 4 tight turns.
 3. Make all tight turns within a distance of 1-1/2 inches for bracing wire and 3 inches for hanger wire.
 4. Install hanger or bracing wire anchors to the structure in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.
- G. Hanger and Bracing Wire Separation: Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4 inches nominal diameter, to hanger wires using connectors acceptable to DSA.
- H. Light Fixtures:
1. Attach all light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.
 2. Flush or recessed light fixtures and air terminals or services weighing **less than 56 pounds** may be supported directly on the runners of heavy-duty grid system but, in addition, shall have a minimum of two 12 gauge slack safety wires attached to fixture at diagonal corners and anchored to structure above. All 4'-0" x 4'-0" light fixtures shall have slack safety wires at each corner.
 3. All flush or recessed light fixtures and air terminals or services weighing **56 pounds or more** shall be independently supported by not less than 4 taut 12 gauge wires each attached to fixture and to structure above regardless of the type of ceiling grid system used. The four taut 12 gauge wires, including their attachment to the structure, above shall be capable of supporting four times weight of the unit..
- J. Wall Angles:
1. Install wall angles and edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
 2. Screw attach moldings to substrate at intervals not over 16" on center and not more than 3" from ends.
 3. Leveling with ceiling suspension system to tolerance of 1/8" in 12'-0".
 4. Miter corners accurately and connect securely.

3.5 FIELD TESTING

- A. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for **hanger wires, 1 out of 10 shall be field tested for 200 pounds of tension.**

- B. When drilled-in concrete anchors are used for **bracing wires, 1 out of 2 shall be field tested for 440 pounds in tension.** Shot-in anchors in concrete are not permitted for bracing wires. If any shot-in or drilled-in anchor fails, all adjacent anchors shall be tested.
- C. Drilled-in or shot-in anchors require special DSA approval when used in prestressed concrete.

3.6 ACOUSTICAL CEILING PANEL INSTALLATION

- A. Arrange acoustical units and orient directionally-patterned units with pattern running in one direction.

3.7 CLEANING UP

- A. In addition to other stipulated requirements for cleaning, completely remove finger prints and traces of soil from the surfaces of grid and acoustical materials, using only those cleaning materials recommended for the purpose by the manufacturer of the material being cleaned.
- B. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 5100

SECTION 09 6110 - MOISTURE CONTROL TREATMENT FOR FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Under a cash allowance, provide moisture control treatment applied over new or existing interior concrete slabs where resilient flooring, carpeting, are indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
2. The Owner's independent testing laboratory shall conduct vapor emission, relative humidity, and pH testing before application of the moisture control treatment as specified herein.

B. Related Sections:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Section 01 2100: Cash allowances.
3. Section 03 3300: Cast-in-place concrete floor slabs.
4. Section 09 0560: Common work results for flooring preparation; pH, relative humidity, and vapor emission testing.
5. Section 09 6500: Resilient flooring.
6. Section 09 6800: Carpeting.

1.2 ALLOWANCES

- A. Cash Allowance for Moisture Control for Flooring: The Work of this Section is included in the cost of the moisture control treatment cash allowance specified in Section 01 2100.

1.3 DEFINITIONS

- A. As used in this Section, "pounds" shall be defined as "pounds of water per 1,000 square feet per 24 hour period" as described in ASTM E907 and F1869.
- B. Alkalinity shall be expressed as a "pH range of 1-14" as described in ASTM F710.

1.4 SYSTEM DESCRIPTION

- A. Moisture control treatment shall form adhesion to damp, dry and wet concrete surfaces to restrict water vapor emission levels to a maximum of 3.0 pounds and allow adhesion to alkaline environments.
- B. Moisture control treatment shall be compatible with all types of floor covering products and systems.
- C. Application includes:
1. Concrete preparation
 2. Moisture control treatment, minimum of 2 coats.
 3. Cementitious top coat under carpet and resilient flooring.

1.5 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.

1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 3. Installer Certification: Submit wet signature certification from manufacturer certifying that Installer is approved by manufacturer for installation of specified system for this project and is certified to install each component of the specified system.
 4. Certified Testing: Submit manufacturers ASTM performance testing completed within 3 years of project application per ASTM E96, ASTM D1308, and ASTM D4541.
 5. Warranty: Submit a copy of the actual warranty which will be issued for the Work; a sample warranty will not be acceptable. Submit full disclosure of all warranty exclusions and conditions. When warranty exclusions and conditions are not written on the actual warranty document, submit separate endorsement.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
1. Special Warranty: In addition to the warranty requirements of the Contract Documents, provide manufacturer's 10-year labor and material warranty.
 2. Installer Certification: Provide certification signed by the system installer and countersigned by the system manufacturer certifying that the moisture control treatment was installed in accordance with the Contract Documents and the manufacturer's written instructions.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Firm regularly engaged in manufacture of moisture control treatment.
- B. Installer: Company specializing in application of moisture control treatment, trained by the manufacturer of the products, and certified to install each component of the specified system.
1. Provide references including project name and location, telephone number and name of Owner and General Contractor, size of project, and date of completion.
 2. Evidence of success shall include project pictures and pH and calcium chloride test results performed by an independent testing laboratory after installation of the system.
- C. Environmental Requirements: Material and equipment shall comply with current regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).

1.7 PREINSTALLATION MEETING

- A. Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.8 SPECIAL WARRANTY

- A. In addition to the warranty requirements of the Contract Documents, provide a 10-year labor and material warranty, non-prorated.
- B. Application of product shall yield water vapor emission, relative humidity, and an alkalinity rate less than flooring manufacturer tolerances during the warranty period.
- C. The manufacturer shall warrant the moisture control treatment against failure due to alkalinity and/or moisture emanating from the concrete. Warranty shall cover labor and material for repair or replacement of treatment, floor coverings or resinous materials, adhesives and patching compounds damaged by moisture, alkalinity, or improper system application at no cost to Owner.

- E. Warranty shall not exclude concrete shrinkage cracks after application, non-compatibility with specified admixtures, concrete silicates or resin treatments, or ACI 318 or ACI 201 limitations.
- F. Warranty shall be extended to future flooring updates or changes a cementitious topcoat is applied. Moisture control treatment manufacture shall provide written acceptance of the flooring change.

PART 2 - PRODUCTS

2.1 MOISTURE CONTROL TREATMENT

- A. Moisture Control Treatment: Manufacturer's formulation of chemicals and resins mechanically restricting water vapor emission up to 95%, capillary action of up to 25.0 lbs., alkaline resistant; and capable of application on damp, dry and wet concrete substrates; crack treatment; minimum thickness recommended by the manufacturer.
 - 1. Synthetic30fs by Synthetics International, (866) 646-0356.
 - 2. Diamond-VRS by Diamond Stone Products, LLP, (888) 817-8663.
 - 3. Vapor-Guard DC by Advanced Moisture Control, (949) 788-1490.
 - 4. VAP I 2000 by Koester American Corporation, (757) 425-1206.
 - 5. Substitutions: Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Physical Characteristics:
 - 1. ASTM E96 Water Vapor Transmission, wet method: 0.60 US perms.
 - 2. ASTM D4541 Concrete Adhesion: 600 psi (100% concrete cohesive failure).
 - 3. ASTM D1308 Acid/Alkali Resistance: 14pH solution - 100% Resistant.
 - 4. ASTM F1869 Calcium Chloride Testing: 3.0 pounds per 1,000 square feet or less.

2.2 CEMENTITIOUS TOP COAT

- A. Self-leveling, Portland cement based coating, minimum 4,000 psi at 28 days, as recommended by moisture control treatment manufacturer to provide a smooth flooring substrate.

PART 3 - EXECUTION

3.1 VAPOR EMISSIONS, RELATIVE HUMIDITY, AND ALKALINITY PRE-TESTING

- A. The Owner's independent testing shall provide testing materials and conduct vapor emissions, relative humidity, and pH (alkalinity) testing in accordance with Section 09 0560.
- B. On the basis of testing results, and at the Owner's direction, proceed with the work of this Section under Section 01 2100 - Cash Allowances.

3.2 SURFACE PREPARATION

- A. Slab surfaces shall be solid, free from loose particles, cracks, pits rough projections, and foreign matter detrimental to the vapor emissions and alkalinity control system.
- B. Cracks, joints, low spots, and high spots shall be prepared as recommended by the system manufacturer.

- C. Shot blast concrete surfaces to remove surface contaminants, curing products, and hard dense non-porous layers to an ICRI#3 (100 grit) texture. Grind near walls and edges by industrial grinder with vacuum connection. Vacuum and remove dust, sand and debris.
- D. Vacuum, blow and remove dust, sand and debris from slab surface and joints.

3.3 MOISTURE CONTROL TREATMENT INSTALLATION

- A. Joint and Crack Treatment: Coat cracks and joints. Apply manufacturer approved crack and joint compound in accordance with manufacturer's installation instructions.
- B. Apply moisture control treatment product over entire surface to produce maximum penetration, alkalinity resistance and specified vapor reduction level in accordance with the manufacturer's written instructions. Coverage rate shall be as recommended by the manufacturer.
- C. Cementitious Topcoat: Apply at a rate of up to 1/8" thickness to promote flooring adhesion using a non-porous primer. Primer shall be capable of securing product to moisture control treatment surface.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Manufacturer's representative shall visit the construction site for:
 - 1. Preinstallation meeting; and
 - 2. During installation to inspect product installation for compliance with the manufacturer's instructions.

3.5 PROTECTION

- A. Protect the finished installation from damage.
- B. Repair damage to moisture control treatment surfaces prior to installation of finished flooring.

END OF SECTION 09 6110

SECTION 09 6500 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide resilient flooring, base, and accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 1. Section 09 0560: Floor preparation and moisture testing.
 - 2. Section 09 6110: Moisture control treatment (contract allowance).
- C. **Special Coordination Requirements: Coordinate finish flooring manufacturer's concrete slab requirements with the work of Section 03 3000 - Cast-in-Place Concrete.**

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturers recommended installation procedures.
 - 3. Samples: Submit 4 samples of each resilient flooring product specified on the Finish Schedule (including rubber transition strips).
 - 4. Shop Drawings: Submit shop drawings showing location of sheet flooring seams and locations and types of accessories for Architect approval.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux (CRF): Not less 0.45 watts / sq. cm.; ASTM E648.
 - 2. Flame Spread: Not more than 75 per ASTM E84.
 - 3. Smoke Developed: Not more than 450 per ASTM E84.
 - 4. Smoke Density: Not more than 450 per ASTM E662.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Colors: Where Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 SPECIAL WARRANTY

- A. Special Sheet Vinyl Flooring Warranty: In addition to the warranty requirements of the Contract Documents, submit 3 original copies of a special sheet flooring warranty, signed by the subcontractor/installer and the Contractor with an extended correction period of **2 years**.
- B. Special Sheet Linoleum Flooring Warranty: In addition to the warranty requirements of the Contract Documents, submit 3 original copies of a special sheet linoleum flooring warranty, signed by the subcontractor/installer and the Contractor with an extended correction period of **5 years**.

1.5 EXTRA MATERIALS

- A. Materials: Provide for the Owner's use, an extra stock of materials as follows:
 - 1. Sheet Products: Provide an extra stock of each type, color, pattern, and size of material installed in following quantities:
 - a. Minimum of 2 sq.yd. for quantities less than 50 sq.yd.
 - b. Minimum of 10 sq.yd. for quantities more than 50 sq.yd.
 - 2. Base, Edge, and Stair Tread/Nosings: Provide an extra stock of approximately 5% of each type, color, and size of material installed.
 - 3. Package separately, distinctly marked, and protected against deterioration and damage.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Provide colors and patterns as selected by the Architect from standard colors and patterns of the approved manufacturer in the specified type.
- C. Except as may be otherwise specified or approved by the Architect, provide resilient flooring **with coefficient of friction of 0.60** or higher; ASTM D2047.
- D. High Performance Criteria: See Section 01 3560.

2.2 RESILIENT MATERIALS

- A. Sheet Vinyl:
 - 1. See Finish Schedule for types and patterns.
 - 2. Provide cove accessory items, including metal or vinyl trim edge, as required for a complete installation.
 - 3. Coefficient of friction greater than 0.5 per ASTM D2047.

2.3 RESILIENT ACCESSORIES

- A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style B cove, by Roppe.
 - 1. Size and color as shown on Drawings and Finish Schedule.
 - 2. Provide longest lengths possible for minimum splicing. Provide premolded corners at outside square

- corners, including base cabinet alcoves and outside corners.
- 3. Provide continuous base around radius corners to a minimum of 6" before any splice.

2.4 OTHER MATERIALS

- A. Provide edge strips and other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. Adhesives: Provide waterproof and stabilized type adhesive as recommended by the manufacturer of the resilient materials; low-VOC.
 - 1. Allowable moisture limit of 90% internal relative humidity.
 - 2. Appropriate for the pH conditions of the substrate.
- C. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
 - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109 or ASTM C472, whichever is appropriate.
- D. Concrete Slab Primer: Provide non-staining type as required and as recommended by the manufacturer of the material being installed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and Ph.
 - 1. Test in accordance with Section 09 0560.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
 - 3. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 0560.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

- C. Concrete Subfloors:
 - 1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8" in 10'-0" variation from level or slopes shown on the Drawings.
 - 2. Clean cracks, control joints, and other non-moving joints.
 - 3. Broom clean or vacuum the surfaces to be covered, and inspect the subfloors.
 - 4. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
 - 5. Seal patching compound with sealer recommended by the manufacturer and compatible with the flooring products specified.
 - 6. Do not fill expansion joints, isolation joints, or other moving joints.
 - 7. Prohibit traffic until patching compound is cured and sealed.
- D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION

- A. General:
 - 1. Install materials only after finishing operations, including painting, have been completed and after permanent air conditioning system is operating.
 - 2. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as marked in the subfloor. Use chalk or other non-permanent marking device.
 - 3. Inspect flooring materials to be installed. Defective materials will be subject to rejection and such rejection shall not be considered as grounds for additional compensation or time extension.
- B. Starting installation constitutes acceptance of sub-floor conditions.
- C. Sheet Vinyl Installation:
 - 1. Cut sheet material into required lengths and sizes.
 - 2. Layout and cut to achieve minimum number of seams and for pattern match between abutting edges. Double-cut if required.
 - 3. Lay cut sheets flat and allow to come to room temperature prior to installation.
 - 4. Install the sheets, and roll the floor surface to work wrinkles and air pockets out past the outer edges.
 - 5. Fit the sheet vinyl neatly and tightly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.
 - 6. Where integral base is called for:
 - a. Provide cove strip to ease transition at intersection between floor and wall;
 - b. Cut, fit, and miter-weld at internal and external corners.
 - c. Cap exposed edge with metal trim securely fastened in place, with top edge of trim level, and with all trim joints mitered. Color as selected by Architect from manufacturer's standard trim.
 - 7. Finish all seams by means of chemical welding flush to the floor and free from voids and raised areas. Clean seams prior to welding. Use flooring manufacturer's recommended seaming products and finish seams in strict accordance with the manufacturer's written recommendations.

3.4 BASE INSTALLATION

- A. Installation:
 - 1. Install base where indicated on drawings.
 - 2. Use factory-preformed exterior corners at square vertical outside corners only and factory-preformed or job-mitered interior corners.
 - 3. Apply adhesive to insure contact not more than 1/4" from top of base.
 - 4. Apply base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where

base is required.

5. Provide minimum length pieces of 12".
6. Take precautions to eliminate telegraphing of adhesive through the surface of installed base material.

3.6 CLEANING AND PROTECTING

- A. Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.
- B. Resilient Sheet Flooring:
 1. Clean, seal, finish and buff flooring to a clean and uniform appearance, using cleaner, sealer, and finish in accordance with the manufacturer's written recommendations, and as approved by the Owner.
 2. Provide the manufacturer's recommended number of coats of recommended sealer/wax and procedures on floor, then buff to a uniform appearance.

END OF SECTION 09 6500

SECTION 09 6800 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide carpeting and carpet accessories as specified herein, and as needed for a complete and proper glue-down installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 1. Section 09 0560: Floor preparation and moisture testing.
 - 2. Section 09 6110: Moisture control treatment.
- C. **Special Coordination Requirements: Coordinate finish flooring manufacturer's concrete slab requirements with the work of Section 03 3000 - Cast-in-Place Concrete.**

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Submit 3 copies of flammability rating for each type of carpet used.
 - 3. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 4. Samples: Submit 4 samples (12" x 12" each) of the carpets specified on the Finish Schedule.
 - 5. Shop Drawings: Submit shop drawings showing location of seams and locations and types of carpet metal and accessories for Architect's approval.
- B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
 - 1. Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Flammability Rating: CBC Section 804.
 - 1. Carpet Wainscot shall have a flame spread of 25 or less, Class A.
 - 2. Flooring Carpet shall have a flame spread of 75 or less, Class B.
 - 3. Minimum Critical Radiant Flux: Class II.
- B. Accessibility: Provide glue-down or firm cushion installation that complies with CBC Section 11B-302.2.
 - 1. Level loop, textured loop, level-cut, or level-cut/uncut pile texture and maximum pile height of ½".
 - 2. Carpet edges shall comply with CBC Section 11B-303.
- C. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Colors: Where Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 SPECIAL WARRANTY

- A. Wear Warranty: Submit 3 original copies of the manufacturer's **10-year** Edge Ravel and Delamination Warranty, **10-year** Color Fastness Warranty and Wear Warranty. The warranties shall be dated, referenced to this project, and directed to the subcontractor and Contractor. They shall be signed by the carpet manufacturer, territorial representative, and the technical department head.
- B. Special Project Warranty: In addition to the warranty requirements of the Contract Documents, submit 3 original copies of a special project warranty signed by the subcontractor/installer and the Contractor providing an extended correction period of **2 years**.

1.5 EXTRA MATERIALS

- A. Materials: Provide for the Owner's use, an extra stock of approximately 2% of each type, color, and pattern of material installed and in addition, allow Owner to inspect and select from scrap carpet pieces remaining after installation. Bundle and wrap in burlap all extra material and Owner selected scraps.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

2.2 CARPET

- A. Provide carpets, colors as noted on Finish Schedule.
- B. Provide all material from a single dye-lot.

2.3 RESILIENT ACCESSORIES

- A. Refer to Resilient Flooring Specifications 09 6500 for Topset Rubber Base.
- B. Rubber Edge Guards and Reducers: ASTM F2169, Type TS rubber, vulcanized thermoset; by Roppe.
 - 1. Provide edge or transition units in longest possible lengths.
 - 2. Color and style from manufacturers standard selections to be selected by Architect unless shown in Drawings.

2.4 OTHER MATERIALS

- A. Adhesives: Provide waterproof and stabilized type adhesive as recommended by the manufacturer of the resilient materials; low-VOC.
 - 1. Allowable moisture limit of 90% internal relative humidity.
 - 2. Appropriate for the pH conditions of the substrate.
- B. Provide seam adhesive as recommended by the manufacturer.

- C. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 SURFACE PREPARATION

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 0560.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Immediately prior to installation of the work of this Section, thoroughly clean substrata and remove oil, grease, paint, varnish, hardeners, and other items which would adversely affect the bond of adhesive.
- D. Make substrata level and free from irregularities. Assure one constant floor height after carpet is installed, filling low spots and grinding high spots as required.

3.3 CARPET INSTALLATION

- A. General:
 - 1. Glue directly to the floor, using no pads and no foam.
 - 2. Scribe the carpet accurately to vertical surfaces.
 - 3. Align the lines of carpet, as woven, using no fill strips, laying all carpet in the same direction unless specifically directed otherwise by the Architect.
 - 4. Where carpeting is used on the walls, install as directed by the manufacturer, and trim all edges with a silver cap approved by the Architect.
- B. Seams:
 - 1. Locate seams only where shown on the approved Shop Drawings, or where specifically otherwise approved by the Architect.
 - 2. Locate seams to the maximum extent practicable out of the way of traffic.
 - 3. Fabricate seams by the compression method, using a butt joint, and properly bead and seal.
 - 4. Do not stretch seams.
- C. In addition to the cleaning requirements stated elsewhere, thoroughly clean carpet and adjacent surfaces prior to final acceptance of the carpeted areas by the Owner.

3.4 RUBBER BASE INSTALLATION

- A. Install rubber base where indicated on drawings.
- B. Use factory-preformed exterior corners at square vertical outside corners only and factory-preformed or job-mitered interior corners.
- C. Apply adhesive to insure contact not more than 1/4" from top of base.

3.5 PROTECTION

- A. Provide a heavy non-staining paper or plastic walkway as required over carpeting in direction of traffic, maintaining intact until carpeted space is accepted by the Owner.

END OF SECTION 09 6800

SECTION 09 7210 - DRY ERASE WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide dry erase wall covering where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Samples: Submit 4 samples of each type of dry erase wall coverings and accessories required.
- B. Contract Closeout Submittals: Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Provide finish selections indicated in the Finish Schedule.
 - 1. Manufacturers: Provide each type of dry erase wall covering required produced by one manufacturer. Refer to Section 01 2500 for substitution requirements.
 - 2. Installer: Installation by skilled commercial wall covering contractor with no less than three years of documented experience installing dry erase wall covering of the types and extent required.
- B. Gypsum Association GA-214-M-97 Recommended Levels of Gypsum Board Finish.

1.4 MOCK-UPS

- A. Provide a mock-up dry erase wall covering installation at a location approved by the Architect. Include seaming and corner installation methods for each type of wall covering. When approved, the mock-up will be the standard of quality and used as the basis for acceptance or rejection of the remainder of the work of this Section.

PART 2 - PRODUCTS

2.1 DRY ERASE WALL COVERINGS

- A. Dry Erase Wall Coverings:
 - 1. Basis of Design: Walltalkers mag-rite II wall coverings as manufactured by Koroseal Interior Products, 855-753-5474. Smooth, magnetic receptive, low gloss vinyl surface for projection and dry erase markers.
 - 2. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Flame Spread Characteristics: Provide materials bearing UL label and marking indicating fire hazard

classification of wall covering as determined by ASTM E84 or UL 723.

1. Flame Spread: Class A; 25 or less.
2. Smoke Developed Index: Class A; 0 to 450.

2.2 TRIM AND TRAY

- A. Aluminum Tray: Clear satin, anodized aluminum, snap-on marker and eraser tray with clips.
- B. End Caps: Anodized tray end cap set for marker and eraser tray.
- C. J Cap Wall Covering Trim: Clear satin, anodized aluminum, low profile trim.

2.3 ACCESSORIES

- A. Adhesives: Heavy-duty clear or clay based premixed vinyl adhesive.
- B. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wall coverings.
- C. Presentation Starter Kit: Provide one Walltalkers starter kit containing eight dry erase markers, one eraser, two dry erase cleaning cloths, one empty bottle for water, and one 8 ounce bottle liquid surface cleaning solution for each room installed with dry erase wall covering.
- D. Broad Tip Dry Erase Markers:
 1. EC12-99: Chisel BLK - 12CT.
 2. EC04-00: Set of four colors: red, blue, green, black.
- E. Eraser:
 1. DEFE-99: Dry erase felt eraser.
 2. DECC-Y1: Dry erase cleaning cloth - yellow.
- F. Liquid Surface Cleaner: RCC8: 8 ounce (.23kg) bottle liquid surface cleaner.
- G. Magnets: MAG1: Heavy duty magnet - black.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Acclimate wallcovering in the area of installation a minimum of 24 hours before installation.
- B. Examine all materials for pattern, color, quantity and quality, as specified for the correct location prior to cutting.
- C. Install dry erase wall coverings in accordance with the manufacturer's written installation instructions.
- D. As the work progresses, clean the surplus adhesive from wall covering surfaces and adjacent surfaces.

- E. Visually inspect to verify that installed wall covering is secure, smooth, clean, without wrinkles, and with no gaps or overlaps

END OF SECTION 09 7210

SECTION 09 7720 - VINYL-COVERED TACKBOARD PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide vinyl covered tackboard where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work: Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections in Division - 1 of these specifications.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Submit manufacturer's recommended installation procedures.
 - 3. Samples: Submit 4 samples of each vinyl-covered tackboard specified on the Finish Schedule.
- B. Contract Closeout Submittals: Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Provide each type of tackboard as produced by a single manufacturer including recommended primers, adhesives, and sealants.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Patterns and Colors: Where the Finish Schedule indicates a specific manufacturer's pattern and/or colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 EXTRA MATERIALS

- A. Materials: Provide for the Owner's use, an extra stock of approximately 10% of each type, color, and pattern of material installed with an appropriate amount of the proper adhesive. Package each type of material separately, distinctly marked, and protected against deterioration and damage.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acceptable Manufacturers:
 - 1. Koroseal, (888) 520-2810.
 - 2. Global Products Tackboard by Western Building Materials, (559) 454-8500.
 - 3. Lamvin Inc., (800) 446-6329.
 - 4. Chatfield-Clarke, (714) 823-4297.
 - 5. Nelson Adams (NACO), (909) 879-0421.
 - 6. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Vinyl Covered Tackboard:
 - 1. Vinyl Wall Covering:
 - a. Heavy duty (VWC-MD), Type II, total weight not less than 20 oz. per sq. yd., vinyl coating with Koroklear coating, fabric backing of osnaburg or drill.
 - b. Pattern/texture: Woven fabric look.
 - c. Color: As indicated on the Finish Schedule.
 - 2. Panel Sizes: 1/2" thick; 8, 9 or 10 foot lengths (as required for minimum horizontal joints); depending on ceiling height; width of 48" minimum; cut panel size in any direction.
- C. Flame Spread Characteristics: Provide materials bearing UL label and marking indicating fire hazard classification of wall covering as determined by ASTM E84 or UL 723. Provide materials with the following flame spread ratings:
 - 1. Vinyl Covering: Class A; Flame spread of 25 or less, smoke-developed less than 450.
- D. Accessory items:
 - 1. Adhesives: Provide manufacturer's recommended adhesive, primer, and sealer, produced expressly for use with selected wall covering on substrate as shown on drawings. Provide materials which are mildew-resistant and non-staining.
 - 2. Plastic Moldings and Trim: Provide moldings and trim around door and window frames and around all other building features which penetrate vinyl covered tackboard (such as fire extinguisher cabinets).
 - a. Plastic edge moldings shall be covered with factory applied veneer to match color and texture of vinyl wall covering.
 - b. Provide plastic moldings at the bottom of tackboard panels where shown in the detail drawings.
 - c. Provide manufacturers standard moldings for outside and inside corners and end caps at exposed edges.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine substrates and conditions under which work of this section will be performed. Correct conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Maintain constant minimum temperature of 60 degrees F (16 degrees C) at areas of installation for at least 72 hours before and 48 hours after application of materials.

- B. Illuminate areas of installation using buildings' permanent lighting system; temporary lighting alone will not be acceptable.
- C. Acclimatize board materials by removing from packaging in area of installation not less than 24 hours before application.
- D. Remove switch plates, wall plates, and surface-mounted fixtures in areas where board is to be applied.

3.3 INSTALLATION

- A. All vinyl wall covering shall be factory installed on 1/2" thick tackboard.
- B. Corners of edge moldings around doors and windows shall be carefully cut at 45 degrees to provide tight fitting mitered corners. Sloppy corners will be not be permitted. Putty fill of gaps is not acceptable.
- C. Provide metal edge moldings at outside corners.
- D. Apply glue to backside of panels or to gypsum board in a uniform coat completely covering entire surface. Provide all temporary bracing required to ensure that vinyl covered tackboard is totally adhesive to gypsum board underlayment.
- E. Cut the fiberboard backing, where required, so that the vinyl covering is left longer than the backing. Wrap the vinyl around the cut surface and glue. All finished panels shall have all edges wrapped.
- F. Where vinyl covered tackboard is to be covered with rubber base, the maximum "gap" between concrete slab and tackboard shall be 3/8" the minimum "gap" shall be 1/8" (to prevent moisture from wicking up into tackboard). Provide non porous (metal or hardwood) backing for rubber base in resulting gap).
- G. **Tackboard shall extend behind all blackboards and future cabinet work.** Tackboard **shall not** extend behind cabinet work that is part of this contract unless Drawings say otherwise.
- H. Horizontal joints shall not be permitted unless indicated on the Drawings.

3.4 ADJUST AND CLEAN

- A. Replace removed plates and fixtures; verify cut edges of wall coverings are completely concealed.
- B. Remove surplus materials, rubbish, and debris resulting from wall covering installation upon completion of work, and leave areas of installation in neat, clean condition.
- C. Remove and reglue any panels which show movement when "pushed" toward wall plain.

END OF SECTION 09 7720

SECTION 09 7730 - FIBERGLASS REINFORCED PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide fiberglass wall panels where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 09 9100: Priming of gypsum board and CMU surfaces.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
- B. Contract Closeout Submittals: Manufacturer's recommended cleaning procedures.

PART 2 - PRODUCTS

2.1 WALL PANELS

- A. Textured Gloss Panels shall be finished panels 4' x 8' or 10' x 3/32" as required for installation with no horizontal seams, color as indicated on finish schedule. See Drawings for location.
 - 1. Panels shall be solid fiberglass reinforced polyester construction. Class A; Flame spread of 25 or less, smoke-developed less than 450.
 - 2. Adhesive shall be per manufacturer's standards, meeting requirements of ASTM C557-65T, non-toxic, non-flammable and per State Fire Marshal Standards.
 - 3. Color: As noted on the Finish Schedule
- B. Available 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. Glasbord by Crane Composites, Inc.
 - 2. FiberLite FRP - Wall Panels by Nudo.
 - 4. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 OTHER MATERIALS

- A. Provide manufacturer's standard prefinished vinyl clad moldings and trim in harmonizing colors at all joints, corners, and edges.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Securely install the approved products in accordance with the manufacturer's recommendations as approved by the Architect, setting panels straight, plumb, level, and true to the lines and levels shown on the Drawings, and as specified to the by the manufacturer.
- B. Install maximum length materials wherever possible.
- C. Finish butt joints, wall juncture, wall/ceiling and wall/curb joints with the manufacturer's standard trim pieces and the specified sealant, tooling to a smooth finish.
- D. When installed as a wainscot, position panels in a horizontal railroad style to minimize seams.
- E. When indicated to be installed backside (smooth side) out, select panels free of mars and scratches.

3.2 CLEANING

- A. Upon completion of each buildings work, remove all debris from building and site. Remove all excess mastic and caulking materials from finished surfaces and adjacent surfaces.

END OF SECTION 09 7730

SECTION 09 9100 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. General: Paint and finish all exposed surfaces using the combination of materials listed on Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.
 - 1. Surface preparation, priming, and painting specified in this Section are in addition to shop priming and surface treatment specified in other sections.
 - 2. Paint exposed surfaces whether or not colors are designated in schedules. Paint exposed surfaces to match adjacent materials or areas, in the color selected by the Architect.
- B. Work Included: The following list is not totally inclusive and does not exclude work not stated herein but required to be painted in the specifications, Finish Schedule, and drawings. Unless otherwise specified, work to be painted under this Section includes, but is not limited to:
 - 1. Work specifically noted as requiring a paint finish in the drawings and specifications, and on the Finish Schedule.
 - 2. Priming of gypsum.
 - 3. Concrete, sealer where indicated.
 - 4. Exposed structural steel.
 - 5. Interior and exterior metal fabrications, both galvanized and shop primed.
 - 6. Interior and exterior ferrous metal.
 - 7. Interior and exterior galvanized metal.
 - 8. Galvanized flashings and sheet metal.
 - 9. Roof vents, fire vents, and roof accessories.
 - 10. Metal doors and frames.
 - 11. Wood doors.
 - 13. Cement plaster.
 - 14. Gypsum board.
 - 15. Acoustical ceilings/surfaces.
 - 16. Exposed surfaces of glazing stops, including those visible after glazing is installed.
- C. Work Not Included:
 - 1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.
 - 2. Surfaces of prefinished metals, anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this Section unless indicated on the Drawings.
 - 3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts, unless otherwise indicated.
 - 4. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
 - 5. Do not paint concrete which has been sandblasted unless specifically noted for painting.
 - 6. Do not paint galvanized gratings.
- D. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.
 - 3. Section 07 9210: Joint sealants.
 - 4. Section 32 1720: Painting for pavement markings.

- E. Definitions: "Paint," as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Samples: Following the selection of colors and glosses by the Architect, submit Samples for the Architect's review.
 - a. Provide four Samples of each color and each gloss for each material on which the finish is specified to be applied, approximately 8" x 10" in size.
 - b. Provide wood stain samples on specified wood for color selection or approval.
 - c. If so directed by Architect, submit Samples during progress of the Work in the form of actual application of the approved materials on actual surfaces to be painted.
 - d. Revise and resubmit each Sample as requested until the required gloss, color, and texture are achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
 - e. Do not commence finish painting until approved Samples are on file at the job site.
- B. Contract Closeout Submittals: Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Comply with applicable codes and regulations of governmental agencies having jurisdiction, including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this specification, comply with the more stringent provisions.
- B. Paint Coordination:
 - 1. Provide finish coats which are compatible with the prime coats actually used and specified.
 - 2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
 - 3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
 - 4. Provide barrier coats over noncompatible primers, or remove the primer and reprime as required.
 - 5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General:
 - 1. Do not store flammable materials inside buildings.
 - 2. Mix paint in a location and manner that will protect the environment and facilities.
 - 3. Provide ventilation needed to comply with OSHA requirements.

1.5 SITE CONDITIONS

- A. Do not apply exterior materials during fog, rain, or mist, or when inclement weather is expected within the dry time specified by the manufacturer. No exterior or interior painting shall be performed until the surfaces are thoroughly dry and cured. Do not apply paint when temperature is below 50 deg F. Avoid painting surfaces when exposed to direct sunlight.

1.6 EXTRA MATERIALS

- A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 5% of each color, type, and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and location where used.
- B. Deliver materials to the Inspector of Record along with an inventory list of items provided. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS

- A. Products specified are for establishing the type, design, and quality required and are based on products of **Dunn-Edwards**. Other product systems approved for use are by Pittsburg Paints, Sherwin-Williams, and Frazee. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
 - 1. Where products are proposed other than Dunn-Edwards, submit a new painting schedule compiled in the same format used for the Painting Schedule included in this Section.
 - 2. Approved specifications of materials for the other referenced manufacturers may be obtained from the Architect.
- B. Undercoats and Thinners:
 - 1. Provide undercoat paint produced by the same manufacturer as the finish coat, unless specified otherwise.
 - 2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.
 - 3. Provide undercoat, finish coat, and thinner material as parts of a unified system of paint finish.
- C. Paint Systems: The specified standard is 100% acrylic premium top-of-the line paint, except where surfaces are specified to receive industrial coatings.

2.2 COLOR SCHEDULES

- A. Refer to the Finish Schedule on the Drawings.

2.3 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and in accordance with all current Environmental Protection Agency standards and regulations.

2.4 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

- A. Mix, prepare, and store painting and finishing materials in accordance with the manufacturer's written recommendations.

3.3 SURFACE PREPARATION

- A. General:
 - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations.
 - 2. Remove removable items which are in place and are not scheduled to receive paint finish.
 - 3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
 - 4. Clean each surface to be painted prior to applying paint or surface treatment.
 - 5. Remove dirt and other foreign substances. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F, prior to start of mechanical cleaning.
 - 6. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.
- B. Metal:
 - 1. Thoroughly clean surfaces until free from dirt, oil, and grease per SSPC-SP 1. Remove all mill scale, rust formation, etc.
 - 2. On galvanized surfaces, use solvent for the initial cleaning, and then treat the surface thoroughly with etching solution. Remove etching solution completely before proceeding. **Prime etched metals the same day cleaning was performed.** If any oxidation (white rust) has formed, sand and remove all forms of contamination. If the galvanized has been passivated or stabilized, the surface must be abraded, i.e. Brush-Off Blast Clean per SSPC-SP7 or chemically treated.
 - 3. Allow to dry thoroughly before application of paint.
 - 4. Primers specified for structural steel and metal fabrications are standalone systems. Apply full paint system as specified in this Section even if metal comes preprimed or shop primed.
- C. Prefinished Metal:
 - 1. Solvent clean per SSPC-SP 1. Abrade substrate to remove gloss and obtain minimum surface profile of 1.0 mil. Solvent wipe to remove dust.
- D. Concrete:
 - 1. Thoroughly clean surfaces.
 - 2. Prior to painting, the material shall be dry to the extent that a proper, long lasting, and non-blistering bond will be assured. Should the dryness of the substrate be in question, test the substrate in the presence of the paint manufacturer's representative. Do not paint substrate in question until dryness condition improves to meet the paint manufacturer's requirements.
 - 3. Where floors are to be sealed, provide surface preparation per SSPC-SP13/NACE 6.
- E. Masonry and Cement Plaster:
 - 1. Allow to dry at least 30 days prior to cleaning in preparation for painting.
 - 2. Remove glaze, efflorescence, laitance, surface deposits, and other foreign matter.
- F. Gypsum Board: Remove all sanding dust.

- G. Wood, Painted Finish:
 - 1. Remove surface deposits of sap and pitch by scraping and cleaning with mineral spirits.
 - 2. Seal all knots and pitch pockets with the paint manufacturer's recommended materials prior to prime coat.
 - 3. Sand smooth all wood surfaces exposed to view, using the proper sandpaper and remove dust. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
 - 4. After prime coat is dry, fill cracks, holes, and scratches with suitable wood filler or spackling compound. When dry, sand flush with surface.
 - 5. Do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture meter.
- H. Wood, Stained Finish:
 - 1. Apply paste wood filler to open grained wood prior to sanding.
 - 2. Sand smooth all wood surfaces exposed to view, using the proper sandpaper and remove dust. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
 - 3. Apply wash coat of sealer, sand and remove dust.
 - 4. Lightly sand and clean between finish coats as recommended by the paint manufacturer.
 - 5. Seal tops, bottoms, and edges of cutouts on wood doors.

3.4 PAINT APPLICATION

- A. General:
 - 1. Touchup or reprime shop-applied prime coats which have been damaged, and touchup bare areas prior to start of finish coats application.
 - 2. Slightly vary the color of succeeding coats.
 - a. Do not apply additional coats until the completed coat has been inspected and approved.
 - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
 - 3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
 - 4. On removable panels and hinged panels, paint the back sides to match the exposed sides.
 - 5. Finish to be smooth.
- B. Priming: Primers specified for structural steel and metal fabrications are standalone systems. Apply full paint system as specified in this Section even if metal comes preprimed or shop primed.
- C. Drying: Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
- D. Brush Applications:
 - 1. Brush out and work the brush coats onto the surface in an even film.
 - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.
 - 3. Ferrous and non-ferrous metals may be sprayed on first coat(s) but final coat shall be applied with brush or roller.
- E. Spray Application:
 - 1. Except as specifically otherwise approved by the Architect, confine spray application to wall surfaces, large expanse areas and similar surfaces where hand brush work would be inferior.
 - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
 - 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
 - 4. Ferrous and non-ferrous metals may be sprayed on first coat(s) but final coat shall be applied with brush

or roller.

- F. Roller Application:
 - 1. Apply paint with short nap roller on all metal doors. Color as specified (same interior and exterior).
 - 2. Remove all surface applied door trim prior to painting.
 - 3. Roller marks, lap marks, runs, sags, fuzz, lint or other surface imperfections will not be acceptable.
 - 4. Ferrous and non-ferrous metals may be sprayed on first coat(s) but final coat shall be applied with brush or roller.
- G. For completed work, match the approved Samples as to texture, color, and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.
- H. Exposed Mechanical and Electrical Items:
 - 1. Finish electric panels, access doors, conduits, pipes, ducts, grilles, registers, vents, exposed plumbing vents and flues, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
 - 2. Paint visible duct surfaces behind vents, registers, and grilles flat black.
 - 3. Exposed vents and flues: Apply two coats of heat-resistant paint approved by the Architect.
 - 4. Factory finished items that match color scheme may be approved for leaving unpainted by Architect.
- I. Exposed Pipe and Duct Insulation:
 - 1. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on such surfaces when unprepared.
 - 2. Match color of adjacent surfaces unless otherwise noted.
 - 3. Remove band before painting, and replace after painting.
- J. Hardware: Paint prime coated hardware to match adjacent surfaces, unless otherwise noted. Paint metal portions of head seals, jamb seals, and astragal seals to match the color of the door frame unless otherwise directed by the Architect.
- K. Wet Areas:
 - 1. In toilet rooms and contiguous areas, add an approved fungicide to paints.
 - 2. For oil base paints, use 1% phenolmercuric or 4% tetrachlorophenol.
 - 3. For water emulsion and glue size surfaces, use 4% sodium tetrachlorophenate.
- L. Miscellaneous:
 - 1. Use "stipple" finish where enamel is specified.
 - 2. Ferrous Metal: When metal comes shop primed or preprimed, always reprime with a solvent primer or Direct-to-Metal (DTM) primer. Sand or remove all visible rust.
 - 3. Wood Trim: Backprime exterior wood trim prior to installation with the paint manufacturer's recommended exterior wood primer.
 - 4. Touch-up shall be performed using the same application method as the original final coat application.

3.5 PROTECTION

- A. Protect floors, furnishings, equipment, finish hardware, name or information plates, dials, gauges, tile, or other such surfaces not requiring painting from spotting, spillage, or damage of any kind. Clean, repair, or replace any damaged surfaces as directed by the Architect.
- B. Remove, loosen, or mask hardware, fixture canopies, outlet covers, switch plates, and other similar items as required for painting work and then replace.
- C. Using workmen skilled in these trades, move equipment adjacent to walls to permit wall surfaces to be painted, and following completion of painting, replace and reconnect.

3.6 CLEANING

- A. Upon completion of all paint work, clean paint from all glass surfaces leaving a sharp clean line.
- B. Remove paint spots, oil, or stains.

3.7 PAINTING SCHEDULE

- A. General: Provide paint systems as specified below.
 - 1. Products specified in this schedule are based upon products of **DUNN-EDWARDS** and are specified for establishing the type and quality of products required. Refer to Paragraph 2.1.A of this Section.
 - 2. See Finish Schedule for colors and gloss.
 - 3. Abbreviations: (F) = Flat, (LL) = Low Luster, (SGE) = Semi-Gloss Enamel; (ESE) = Eggshell Enamel; (GE) = Gloss Enamel; (SL) = Stain/Lacquer
- B. Exterior Metal, Ferrous (SGE):
 - 1. First coat: BLOC-RUST Premium, Rust-Preventative Metal Primer (BRPR00 Series)
 - 2. Second coat: ARISTOSHIELD® Interior/Exterior Semi-Gloss Paint (ASHL50)
 - 3. Third coat: ARISTOSHIELD® Interior/Exterior Semi-Gloss Paint (ASHL50)
 - 4. **Note:** No clear, tint, or deep base. Only blending bases or factory ground colors will be allowed.
- C. Exterior Metal, Galvanized and Aluminum (SGE):
 - 1. Pretreatment: Krud Kutter Metal Clean and Etch
 - 2. First coat: ULTRASHIELD® Galvanized Metal Primer (ULGM00)
 - 3. Second coat: ARISTOSHIELD® Interior/Exterior Semi-Gloss Paint (ASHL50)
 - 4. Third coat: ARISTOSHIELD® Interior/Exterior Semi-Gloss Paint (ASHL50)
 - 5. **Note:** No clear, tint, or deep base. Only blending bases or factory ground colors will be allowed.
- D. Exterior Metal, Prefinished Aluminum (SGE):
 - 1. First coat: Carboline Rustbond
 - 2. Second coat: Carboline Carbothane 133 VOC
 - 3. Third coat: Carboline Carbothane 133 VOC
- E. Exterior Metal, Prefinished Ferrous (SGE):
 - 1. First coat: Carboline Rustbond
 - 2. Second coat: Carboline Carbothane 133 VOC
 - 3. Third coat: Carboline Carbothane 133 VOC
- F. Exterior Cement Plaster and Concrete (LL):
 - 1. First coat: EFF-STOP Premium, Masonry Primer/Sealer (ESPR00)
 - 2. Second coat: EVERSIELD, Exterior Flat Paint (EVSH10)
 - 3. Third coat: EVERSIELD, Exterior Flat Paint (EVSH10)
- G. Exterior Concrete Block (F):
 - 1. First coat: Smooth BLOCFIL Premium, Interior/Exterior Concrete Block Filler (SBPR00)
 - 2. Second Coat: EVERSIELD, Exterior Flat Paint (EVSH10)
 - 3. Third coat: EVERSIELD, Exterior Flat Paint (EVSH10)
- H. Exterior Wood (SGE):
 - 1. First coat: E-Z Prime (EZSL00)

2. Second coat: EVERSIELD, Exterior /Interior Semi-Gloss Paint (EVSH50)
3. Third coat: EVERSIELD, Exterior /Interior Semi-Gloss Paint (EVSH50)
- I. Exterior Wood - Solid Color Stain (F):
 1. First coat: Deck, Fence & Siding Stain, 100% acrylic stain (STSE10)
 2. Second coat: Deck, Fence & Siding Stain, 100%, acrylic stain (STSE10)
- J. Interior Primer Only behind FRP or VWC:
 1. Gypsum Drywall: Zinsser Shieldz Universal Wallcovering Primer (SHZ-02)
 2. Concrete Block: Smooth BLOCFIL Premium, Interior/Exterior Concrete Block Filler (SBPR00)
- K. Interior Flat Wall Paint (F):
 1. Gypsum Drywall:
 - a. First coat: (VINYLASTIC Premium, Interior Pigmented Sealer (VNPR00)
 - b. Second coat: SUPREMA, Interior Flat Paint (SPMA10)
 - c. Third coat: SUPREMA, Interior Flat Paint (SPMA10)
 2. Concrete Block:
 - a. First coat: Smooth BLOCFIL, (SBPR00)
 - b. Second coat: SUPREMA, Interior Flat Paint (SPMA10)
 - c. Third coat: SUPREMA, Interior Flat Paint (SPMA10)
 3. Acoustic Surfaces:
 - a. First Coat: W615 Acoustikote, latex ceiling paint
 - b. Second Coat: W615 Acoustikote, latex ceiling paint (If required for complete coverage)
- L. Interior Egg-Shell Enamel (ESE):
 1. Gypsum Drywall:
 - a. First coat: VINYLASTIC Premium, Interior Pigmented Sealer (VNPR00)
 - b. Second coat: EVEREST Interior Eggshell Paint (EVER30)
 - c. Third coat: EVEREST Interior Eggshell Paint (EVER30)
 2. Concrete Block:
 - a. First coat: Smooth BLOCFIL Premium, Interior/Exterior Concrete Block Filler (SBPR00)
 - b. Second coat: SUPREMA, Interior Eggshell Paint (SPMA40)
 - c. Third coat: SUPREMA, Interior Eggshell Paint (SPMA40)
 3. Cement Plaster:
 - a. First coat: VINYLASTIC Premium, Interior Pigmented Sealer (VNPR00)
 - b. Second coat: SUPREMA, Interior Eggshell Paint (SPMA30)
 - c. Third coat: SUPREMA, Interior Eggshell Paint (SPMA30)
 4. Ferrous Metal:
 - a. First coat: BLOC-RUST Premium, Rust-Preventative Metal Primer (BRPR00 Series)
 - b. Second coat: EVEREST Interior Eggshell Paint (EVER30)
 - c. Third coat: EVEREST Interior Eggshell Paint (EVER30)
 5. Galvanized Metal:
 - a. Pretreatment: Solvent clean, then acid etch with Krud Kutter Metal Clean & Etch
 - b. First coat: ULTRA-GRIP Premium, Acrylic Multi Purpose Primer (UGPR00 Series)
 - c. Second coat: EVEREST Interior Eggshell Paint (EVER30)
 - d. Third coat: EVEREST Interior Eggshell Paint (EVER30)
- M. Interior Semi-Gloss Enamel (SGE):
 1. Ferrous Metal:
 - a. First coat: BLOC-RUST Premium, Rust-Preventative Metal Primer (BRPR00 Series)
 - b. Second coat: EVEREST Interior Semi-Gloss Paint (EVER50)
 - c. Third coat: EVEREST Interior Semi-Gloss Paint (EVER50)
 - d. Note: Where trim paint is an extension of or same as exterior color, use the same paint specified

- under "Exterior Metals".
- 2. Galvanized Metal:
 - a. Pretreatment: Solvent clean, then acid etch with Krud Kutter Metal Clean & Etch
 - b. First coat: ULTRA-GRIP Premium, Acrylic Multi Purpose Primer (UGPR00 Series)
 - c. Second coat: EVEREST Interior Semi-Gloss Paint (EVER50)
 - d. Third coat: EVEREST Interior Semi-Gloss Paint (EVER50)
 - e. Note: Where trim paint is an extension of or same as exterior color, use the same paint specified under "Exterior Metals".
- 3. Wood Doors and Trim:
 - a. First coat: DECO-PRIME Interior Cabinet, Door & Trim Primer (DCPR00)
 - b. Second coat: SUPREMA, Interior Semi-Gloss Paint (SPMA50)
 - c. Third coat: SUPREMA, Interior Semi-Gloss Paint (SPMA50)
- 4. Concrete Block:
 - a. First coat: Smooth BLOCFIL Premium, Interior/Exterior Concrete Block Filler (SBPR00)
 - b. Second coat: SUPREMA, Interior Semi-Gloss Paint (SPMA50)
 - c. Third coat: SUPREMA, Interior Semi-Gloss Paint (SPMA50)
- 5. Gypsum Drywall:
 - a. First coat: VINYLASTIC Premium, Interior Pigmented Sealer (VNPR00)
 - b. Second coat: EVEREST Interior Semi-Gloss Paint (EVER50)
 - c. Third coat: EVEREST Interior Semi-Gloss Paint (EVER50)
- N. Interior Gloss Enamel (GE):
 - 1. Ferrous Metal:
 - a. First coat: BLOC-RUST Premium, Rust-Preventative Metal Primer (BRPR00 Series)
 - b. Second coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - c. Third coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - 2. Galvanized Metal:
 - a. Pretreatment: Solvent clean, then acid etch with Krud Kutter Metal Clean & Etch
 - b. First coat: ULTRA-GRIP Premium, Acrylic Multi Purpose Primer (UGPR00 Series)
 - c. Second coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - d. Third coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - e. Note: Where trim paint is an extension of or same as exterior color, use the same paint specified under "Exterior Metals".
 - 3. Wood Doors and Trim:
 - a. First coat: DECO-PRIME Interior Cabinet, Door & Trim Primer (DCPR00)
 - b. Second coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - c. Third coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - 4. Concrete Block:
 - a. First coat: Smooth BLOCFIL Premium, Interior/Exterior Concrete Block Filler (SBPR00)
 - b. Second coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - c. Third coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - 5. Gypsum Drywall:
 - a. First coat: VINYLASTIC Premium, Interior Pigmented Sealer (VNPR00)
 - b. Second coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
 - c. Third coat: EVERSIELD, Exterior /Interior Gloss Paint (EVSH60)
- O. Stain and Lacquer (SL):
 - 1. Wood Doors and Trim (transparent):
 - a. Stain: (tint as selected by Architect) Gemini Craftsman Stain
 - b. First coat: Gemini Sanding Sealer (210-0222-1)
 - c. Second coat: Gemini Gem Coat Semi-Gloss Lacquer (510-0275-1)
 - d. Third coat: Gemini Gem Coat Semi-Gloss Lacquer (510-0275-1)

- 2. Wood Trim (opaque):
 - a. First coat: W703 Acri-Hues, acrylic latex stain
 - b. Second coat: W703 Acri-Hues, acrylic latex stain

- P. Acoustic Surfaces:
 - 1. First coat: W615 Acoustikote
 - 2. Second coat: W615 Acoustikote as required for complete coverage

- Q. Exposed (Sealed) Concrete Floors:
 - 1. "Rainguard Regular": Coatings as required to seal the floor.

END OF SECTION 09 9100

SECTION 10 1400 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide identifying devices where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
 - 1. Restroom signage.
 - 2. Room identification signage (room name, room number).
 - 3. Tactile exit signage.
 - 4. Room occupancy signage.
 - 5. Accessibility signage.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 10 1410: Project plaque.
 - 3. Section 10 1420: Dimensional letter signage.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings showing details of installation and anchorage sufficient to enable proper interface with the work of other trades.
 - 4. Samples:
 - a. Provide color chip samples to match colors specified.
 - b. Provide sample of sign for example of quality and design characteristics.

1.3 QUALITY CONTROL

- A. Code References:
 - 1. Raised Characters: 11B-703.2.
 - 2. Braille: Section 11B-703.3.
 - 3. Visual Characters: Section 11B-703.5.
 - 4. Pictograms: Section 11B-703.6.
 - 5. Symbols of Accessibility: Section 11B-703.7.
 - 6. International Symbol of Accessibility: Section 11B-703.7.2.1.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

- B. Acceptable Products: Design of plexiglass signs is based on the use of manufacturer's standard products: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
1. ASI Sign Systems.
 2. Inland Pacific.
 3. Innerface Architectural Signage, Inc.
 4. Mohawk Sign Systems.
 5. Vomar Products, Inc.
 6. Best Signs, Inc.

2.2 SIGNS

A. **Type "A" - Restroom Signs:**

1. Type A1: MEN - 12" equilateral triangle.
2. Type A2: WOMEN - 12" diameter circle.
3. Type A3: UNISEX - 12" diameter circle with equilateral triangle inscribed. Triangle color shall contrast with circle color. Circle color shall contrast with door color.
4. Type A4: Restroom, with raised wheelchair logo, 3/4" high raised text and braille.
 - a. Braille: Contracted (Grade 2) braille symbols on sign A4 per CBC Section 11B-703.3.
5. Material:
 - a. Types A1, A2, and A3: 1/4" thick acrylic plastic, 1/4" radius corners.
 - b. Type A4: 1/8" acrylic plastic base plaque, integral color (single piece, not laminated), 1/4" radius corners, 1/32" raised letters and numbers.
6. Color: Black with white silk screened lettering and graphic, see detail.
7. Attachment: Epoxy and vandal resistant screws.
8. Text: See graphics/text detail on the drawings.
9. Letter Style: Calibri, all capital letters.

B. **Type "B" - Room Name, Room Number, or Tactile Exit Signs:**

1. Type B1: 4"H x Length as Required (LAR).
2. Type B2: 4"H x LAR.
3. Type B3: 5-1/2"H x LAR.
4. Type B4: 4"H x LAR, text: "EXIT"
5. Material: 1/8" acrylic plastic base plaque, integral color (single piece, not laminated), 1/4" radius corners, 1/32" raised letters and numbers.
6. Color: Black with white lettering.
7. Attachment:
 - a. Exterior: Epoxy and minimum of 2 vandal resistant screws
 - b. Interior: Epoxy
8. Letter style: Calibri, all capital letters.
9. Text: Refer to the Door Schedule and related details on the Drawings.
10. Numeral height: 2".
11. Letter height: 1". Except at access doors for automatic sprinkler riser rooms and fire pump rooms which require 2" minimum height with a minimum stroke of 3/8".
12. Braille: Contracted (Grade 2) braille symbols on all room name and number signs per Section 11B-703.3.

C. **Type "C" - Building Access Sign:**

1. Material: 1/8" acrylic plastic base plaque, integral color (single piece, not laminated), 1/4" radius corners, 1/32" raised letters and numbers.
2. Color: International Blue with white International Symbol of Accessibility logo.
3. Attachment: Epoxy with vandal resistant screws.
4. Size: 8" x 8"
5. Braille: Contracted (Grade 2) braille notation per CBC Section 11B-703.3.

D. **Type "D" - Room Occupancy Signs:**

1. Size: 12" x Height as required.
2. Material: 1/8" acrylic plastic base plaque, integral color (single piece, not laminated), 1/4" radius corners, 1/32" raised letters and numbers.
3. Color: Black with white letters
4. Attachment: Double stick tape four edges with 4 vandal resistant screws.
5. Letter style: Calibri, all capital letters.
6. Letter size: As required by the State Fire Marshal.
7. Text: As indicated on the Drawings.

F. **Type "F" - Listening Assistance Sign:**

1. Size: 10" x 8".
2. Material: 1/8" acrylic plastic base plaque, integral color (single piece, not laminated), 1/4" radius corners, 1/32" raised letters and numbers.
3. Color: International Blue with white symbols and text.
4. Attachment: Double stick tape four edges with 4 vandal resistant screws.
5. Letter style: Calibri, all capital letters.
6. Letter height: 5/8".
7. Text: As indicated on the Drawings.

2.3 BRAILLE REQUIREMENTS

A. Braille Symbols:

1. Contracted (Grade 2) braille.
2. Braille Dots:
 - a. Base diameter: 0.059" to 0.063".
 - b. Distance between two dots in the same cell: 0.100".
 - c. Distance between corresponding dots in adjacent cells: 0.300".
 - d. Raise dots 0.025" to 0.037" above the background.
 - e. Distance between corresponding dots from one cell directly below: 0.395" to 0.400".
 - f. Dots shall have domed or rounded tops.

2.4 TACTILE CHARACTER REQUIREMENTS

A. Raised Character Proportions per CBC Section 11B-703.2.4 and 11B-703.2.6:

1. Width of upper-case letter "O" shall be a minimum of 60% and a maximum of 110% of the height of the upper-case letter "I".
2. Stroke thickness of upper-case letter "I" shall be 15% maximum of the height of the character.

B. Visual Character Proportions per CBC Section 11B-703.5.4 and 11B-703.5.7:

1. Width of upper-case letter "O" shall be a minimum of 60% and a maximum of 110% of the height of the upper-case letter "I".
2. Stroke thickness of upper-case letter "I" shall be a minimum of 10% and a maximum of 20% maximum of the height of the character.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, using only the approved mounting materials, and locating all components firmly into position, level and plumb.
- B. Mounting Location and Height. Install signs on the nearest wall adjacent to the latch side of the door. Where there is no wall or space on the latch side, including at double doors, place signs on the nearest adjacent wall, preferably on the right.
 - 1. Mount signs 48" minimum above the finish floor or ground surface, measured from the baseline of the lowest line of Braille and 60" maximum above the finish floor or ground surface measured from the baseline of the highest line of raised characters.
 - 2. Determine mounting location such that a person may approach within 3" of signage without encountering protruding objects or standing within the swing of the door.
- C. At locations where an exit sign and a room identification sign are back to back on glass, align both signs and make signs the same size.
- D. At locations where a sign is mounted on glass with no opposing sign, provide blank sign of the same size to conceal mounting adhesive.
- E. Where signs are mounted on split-faced masonry, grind masonry to provide smooth surface to mount signs.

END OF SECTION 10 1400

SECTION 10 1410 - PLAQUES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide project plaque where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 10 1400: Signage.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings showing details of installation and anchorage sufficient to enable proper interface with the work of other trades.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500
- B. Design is based on use of standard products manufactured by:
 - a. Ark Ramos.
 - b. Metal Arts.

2.2 BUILDING PLAQUE

- A. Provide and install a building plaque with the following attributes:
 - 1. Plaque size: 18" x 24" bronze
 - 2. Letter sizes: To be determined.
 - 3. Letter style: Calibri.
 - 4. Type border: Flat band edge (Metal Arts designation).
 - 5. Field texture: Leatherette.
 - 6. Color/Finish: Black oxidized field, satin polished letter faces and border, 2 coats clear metal lacquer.
 - 7. Type mounting: Concealed.
 - 8. Text: To be determined, allow for 300 letters and numerals.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, using only the approved mounting materials, and locating all components firmly into position, level and plumb.

END OF SECTION 10 1410

SECTION 10 1420 - DIMENSIONAL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide dimensional signage where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 10 1400: Signage.
 - 3. Section 10 1410: Project plaque.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings showing details of installation and anchorage sufficient to enable proper interface with the work of other trades.
 - 4. Samples:
 - a. Provide color chip samples to match colors specified.
 - b. Provide sample of signage for example of quality and design characteristics.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Acceptable Products: Design of solid letters is based on the use of manufacturer's standard products: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Metal Arts.

2.2 SOLID LETTERS

- A. Solid Letters:
 - 1. Letter style: Helvetica Medium, "CAPS"
 - 2. Vertical height: As indicated on the Drawings.
 - 3. Material: 1" deep, cast aluminum, with 2 coats baked-on acrylic urethane enamel.
 - 4. Text: As indicated on the Drawings.
 - 5. Color: As selected by the Architect from the manufacturer's standard colors.
 - 6. Attachment: Concealed with mechanical anchors with epoxy adhesive.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, using only the approved mounting materials, and locating all components firmly into position, level and plumb.
- B. Mounting Location. Install dimensional signage where indicated on the Drawings.

END OF SECTION 10 1420

SECTION 10 2125 - COMPOSITE TOILET PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide floor anchored, overhead braced, composite toilet partitions and wall mounted urinal screens where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 10 2810: Toilet accessories and grab bars.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with adjacent trades.
 - 4. Color Charts: Submit 4 color charts or samples showing colors selected by the Architect.
- B. Contract Closeout Submittals: Manufacturer's recommended cleaning procedures.

1.3 QUALITY ASSURANCE

- A. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- B. Colors: Provide finish selections indicated in the Finish Schedule.
 - 1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 6200 for substitution requirements.
 - 2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
 - 3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.
- C. Performance Requirements:
 - 1. Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578-00 Standard Practice for Determination of Graffiti Resistance in accordance with Section 9, "Graffiti Removal Procedure Using Manual Solvent Rubs":
 - a. Cleanability: Five (5) required staining agents shall be cleaned off material.
 - 2. Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2197-98(2002) Standard Test Method for Adhesion of Organic Coating by Scrape Adhesion, using Gardner Stock #PA-2197/ST pointed stylus attachment on scrape tester:
 - a. Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.

3. Impact Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2794-93(1999)e1 Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using .625" hemispherical indenter with 2-lb impact weight:
 - a. Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.
4. Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
 - a. Smoke Developed Index: Not to exceed 450.
 - b. Flame Spread Index: Not to exceed 75.
 - c. Material Fire Ratings:
 - i. National Fire Protection Association (NFPA): Class B.
 - ii. International Code Council (ICC): Class B.

1.4 SPECIAL WARRANTY

- A. In addition to the warranty requirements of the Contract Documents, submit 2 original copies of the manufacturer's written **25-year limited warranty** for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Acceptable Manufacturers:
 1. 1092.67 (toilet) and 1093 (urinal screen) Sierra Series by Bobrick.
 2. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Provide floor-mounted, overhead braced, composite toilet partitions and urinal screens as indicated on the Drawings, in the dimensions and arrangements shown, and with the following attributes.
 1. Door panels, partitions, and pilasters: Not less than 3/4" thick panel.
 - a. Provide 36" wide clear door opening at accessible stall.
 2. Colors indicated on the Finish Schedule.
 3. Wall and Pilaster Brackets: Continuous "U-channel", 18 Ga. full height Type 304 stainless steel at pilaster and wall attachments.
 4. Bracket Fasteners:
 - a. Continuous Wall bracket at masonry: #14 x 2-1/2" long Stainless Steel phillips pan head screws and plastic #14 anchors at 9" o.c. vertical spacing
 - b. Continuous Wall bracket at wood: #14 x 2-1/2" long Stainless Steel phillips pan head screws at 12" o.c. vertical spacing into 2 x 6 solid wood blocking min.
 5. Base anchor: (2) 3/8" threaded rod floor anchors with leveling device and stainless steel shoe.
 6. Threaded Inserts: Concealed threaded inserts for institutional hardware.
 7. Clearance below accessible stall side panels and doors shall be a minimum of 9".
- C. Hardware:
 1. Door hinge: Continuous hinge full height of door, type 304 stainless steel, extra heavy-duty 16 gage out-swinging door equipped with self-closing hinge.
 2. Fasteners: Stainless steel bolts, screws, nuts and expansion anchors. Provide one-way, vandal resistant anchors at exposed locations.
 3. Closer: Adjustable cam to allow door to be fully closed or partially open when compartment is unoccupied. Accessible stall shall be self-closing.

4. Attach to door and stile by theft-resistant, pin-in-head Torx stainless steel machine screws.
- D. Compartments:
 1. Standard Compartment:
 - a. Coat hook/bumper mounted at +48".
 - b. Slide latch: Type 304 stainless steel, 14 gage, slide on nylon track; requires less than 5-lb force to operate; twisting latch operation not acceptable.
 2. Accessible Compartment:
 - a. Coat hook/bumper mounted at +48".
 - b. Slide latch: Type 304 stainless steel, 14 gage, slide on nylon track; requires less than 5-lb force to operate; twisting latch operation not acceptable.
 - c. Wall stop.
 - d. U-shaped or loop handle on each side of the door.
- E. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use, plumb, level, and square.
- C. Except for compartments for the handicapped, adjust doors to remain at a uniformly open position when unlocked.
- D. Touchup scratches and abrasions to be permanently and completely invisible to the unaided eye from a distance of five feet.

END OF SECTION 10 2125

SECTION 10 2810 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide toilet accessories where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit dimensioned drawings as required to depict the space required for these items, and their interface with the work of other trades.
- B. Contract Closeout Submittals: Operation and Maintenance manuals in accordance with requirements of Section 01 7820.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES

- A. Basis of Design: Bobrick Contura Series.
 - 1. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Provide all listed products by one manufacturer:

FSS: Folding Shower Seat, solid plastic laminate slats, stainless steel tubing frame; Bobrick B-5181.

GB-1: Grab Bar constructed of 18 gauge type 304 satin-finish stainless steel, horizontal 2-wall type, concealed mounting, stainless steel, 1-1/2" outside diameter; Bobrick B-6897 .

GB-2: Grab Bar constructed of 18 gauge type 304 satin-finish stainless steel, concealed mounting, stainless steel, 1-1/2" outside diameter; Bobrick B-6806-48". Length as noted on plan.

GM-1: Tempered Glass Mirror; satin finish stainless steel angle frame with corners mitered, ground, and polished smooth; No. 1 quality, 1/4" thick tempered select float glass selected for silvering and electrolytically copper plated by the galvanic process; concealed theft resistant mounting. Bobrick B-2908. Sizes as indicated.

HD-3: World Dryer, VERDEdri Q-973A2, 110-120V, 8.3A, 950 watts, surface mounted, brushed stainless steel cover and die-cast aluminum wall mounting plate. The cover shall be attached to the wall mounting plate with tamper-proof screws.

PT-1: Paper towel dispenser, with Towelmate surface mounted satin-finish stainless steel; tumbler lock on top of cabinet radius contoured front door, with one piece drawn cover; Bobrick B-4262.

SD-1: Liquid Soap Dispenser surface mounted; dispenses all-purpose soap corrosion resistant valves, contoured front with drawn cover satin stainless steel, with vessel attached to back; Bobrick B-4112.

TP-1: Toilet Paper Dispenser surfaced mounted multi-roll dispenser; with contoured front, with one piece drawn cover and theft resistant heavy duty spindles; Bobrick B-4288.

TSC-1: Toilet Seat Cover Dispenser; satin stainless steel contoured front, beveled flanges, no exposed corners or edges; Bobrick B-4221.

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. All fixtures shall be provided with vandal-resistant screws and attachments.
- C. General Contractor shall provide solid wood, metal or masonry backing as required for all wall-mounted fixtures.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install each item in its proper location, firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.

END OF SECTION 10 2810

SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide fire protection specialties where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings as needed to depict the space required for these items, and their interface with the work of other trades.
- B. Contract Closeout Submittals: Manufacturer's recommended operating instructions in accordance with requirements of Section 01 7820.

1.3 DEFINITIONS

- A. Light (Low) Hazard Location: Locations where total amounts of Class A combustibles is of minor quantity, including offices, classrooms, and assembly halls.
- B. Extra (High) Hazard Location: Locations where the total amounts of Class A combustibles or Class B flammable are present in storage, production, or use, and/or finished product over and above those expected and classed as Ordinary (Moderate) Hazards, including laboratories, woodworking and vehicle repair.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 SURFACE MOUNTED FIRE EXTINGUISHER BRACKETS

- A. J.L. Industries No. MB810 or MB818.

2.3 FIRE EXTINGUISHER CABINETS AT LIGHT (LOW) HAZARD LOCATIONS

- A. Semi-recessed Cabinets at 2 X 4 Walls: J.L. Industries Cosmopolitan 8137W17, 2-1/2" projection, stainless steel, #4 satin finish, rolled edge construction with corners welded and ground smooth.
- B. Recessed Cabinets at 2 X 6 (and larger) Walls: J.L. Industries Cosmopolitan 8135W17, 3/8" projection, stainless

steel with #4 satin finish, flat trim construction with corners welded and ground smooth.

- C. Where cabinets occur in fire-rated construction, provide J.L. Industries FIRE-FX option; ASTM E814, labeled for 1-hour combustible and 2-hour non-combustible construction. WHI- TEST# 631-021201 / 631-021202

2.4 FIRE EXTINGUISHERS

- A. Light (Low) Hazard Locations: Provide one multi-purpose, dry chemical, 5 lb. fire extinguisher, **UL rating of 3A-40BC** at each cabinet.
 - 1. Heavy duty steel cylinder, metal valve and siphon tube, replaceable molded valve stem seal, corrosion and impact resistant epoxy finish, visual pressure gauge, pull pin, upright grip operation.
 - 2. JL Industries, Cosmic 5E or approved equal.
- D. Service, charge, and tag each fire extinguisher not more than five calendar days prior to the Date of Substantial Completion of the Work as that Date is established by the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Owner, anchoring all components firmly into position for long life under hard use.
- C. Locate bracket-mounted extinguishers where directed by the Owner and the Fire Department official.

END OF SECTION 10 4400

SECTION 21 0000 - FIRE SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS:

- A. The General Mechanical Provisions, Section 23 0000, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

- A. General: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The entire building shall be fire sprinklered. Note, all Science Classrooms shall be Ordinary Hazard, Group 2.
- B. Design/Calculations: The sprinkler system has been designed and sized by hydraulic calculations in accordance with 2022 NFPA No. 13 and fire authority requirements. Calculations have been included in submittals. Provide current fire flow information from flow test at nearest fire hydrant. Fire flow test shall be done within 6 months of installation of sprinkler system.
- C. Preparation of Drawings and Material Data Sheets: A complete fire sprinkler submittal (drawings, specifications, materials and hydraulic calculations) has been prepared. Hydraulic calculations shall conform to 2022 NFPA 13, paragraph 23.4.5 in all respects.
- D. Coordination Drawings: Contractor shall submit coordination drawings with Contractor title block to Engineer for review, in addition to materials submittals. Deviations between bid documents and coordination drawings shall be specifically noted on drawings (highlighted, clouded, etc.). Any contractor requested design changes to these documents, including layout, materials, or calculations, may be considered a substitution and shall comply with paragraph 1.4 below.

1.3 WORK SPECIFIED ELSEWHERE:

- A. Electrical wiring.
- B. Fire alarm system.
- C. Painting of exposed piping.

1.4 DESIGN CHANGES/SUBSTITUTIONS:

- A. General: Design changes or substitutions of fire sprinkler system shall be submitted to Engineer for review.
- B. Significant changes in design or substitution of materials may require a construction change document, requiring resubmission to DSA/FLS, as determined by the Engineer and/or DSA District Engineer. Contractor shall bear all expenses incurred due to preparation and processing of design substitutions, up to and including submission to, and obtaining approval from, DSA/FLS. Refer to Section 23 0000, 1.11, B, and DSA Policy PL 10-01 and Interpretation of Regulations IR A-6, available from <http://www.dsa.dgs.ca.gov>.

- C. **Any substitution of "Flexible" type piping in lieu of "Rigid" pipe or any changes to size, manufacturer or lengths of "Flexible" type piping will require resubmittal of piping plans, product data sheets and hydraulic calculations to DSA FLS for review and approval.**
- D. Contractor shall submit design or field change(s) through proper channels. Engineer shall have a minimum of 5 working days after receipt of design or field change(s) to submit to DSA. Architect and Engineer shall not be liable for any delays due to DSA review time scheduling, or Contractor's failure to identify changed areas and/or substituted materials in shop drawings and submittals.

PART 2 - PRODUCTS

2.1 STANDARDS:

- A. All materials shall be in accordance with 2022 NFPA No.13 "Standard for the Installation of Sprinkler Systems". Underground mains shall be in accordance with 2022 NFPA No. 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances".

2.2 PIPING MATERIALS:

- A. General: The pressure rating of all piping, valves, flanges and other piping accessories shall be in accordance with code and fire authority requirements. Pressure ratings shall exceed the highest possible working pressure.
- B. Piping:
 - 1. Underground: Polyvinyl chloride, DR 14, AWWA C900, with rubber ring joints, ASTM D1869. Cast or ductile iron fittings, AWWA C110 or C153, Class 250 or higher, with rubber ring joints, ASTM D1869.
 - 2. Above Grade:
 - a. 1-1/4" and Smaller: Threaded black steel pipe, ASTM A53, schedule 40. 175 psi WOG (min.) black cast iron threaded fittings, ANSI B16.4, UL listed. Unions shall be Class 150 malleable iron threaded, ANSI B16.3. 2" drain piping shall be threaded galvanized sch. 40.
 - b. 1-1/2" and Larger: Welded black steel pipe, ASTM A53, schedule 10. Standard weight carbon steel welding fittings, ANSI B16.9. Flanges shall be steel, ANSI B16.5. Roll grooved pipe couplings are acceptable and may also be used for assembling welded sections, Victaulic, Grinnell, Gruvlok.
- C. Gate Valve:
 - 1. 2" and Smaller: All bronze, rising stem. UL listed.
 - 2. 2-1/2" and Larger: Iron body, bronze mounted, outside screw and yoke. UL listed. (UL listed butterfly valves may be substituted for 4" and larger gate valves above grade.)
- D. Check Valve:
 - 1. 2" and Smaller: All bronze swing check. UL listed.
 - 2. 2-1/2" and Larger: Iron body, bronze mounted swing check. UL listed.
- E. Drain Valve: All bronze angle globe valve. UL listed.
- F. Anchors and Hangers: Shall comply with 2022 NFPA No. 13.

2.3 SPRINKLER HEAD:

- A. Automatic sprinkler head, concealed type in areas with finished ceilings and recessed or suspended lighting, semi-recessed in areas with finished ceilings and surface lighting, upright or pendent heads elsewhere (as

allowed by NFPA 13). Heads in finished areas shall be Victaulic FireLock V38 quick response concealed, Tyco RFI quick response concealed, or Globe Fire Sprinkler Corp., Quick Response GL Series Concealed Pendent, with chrome-finish metal cover plate. Heads elsewhere shall be quick response, Victaulic FireLock V27, Tyco, Model TY-FRB or Globe Fire Sprinkler Corp., Model GL Quick Response, with standard finish. UL listed. Temperature ratings shall be in accordance with NFPA No. 13. Provide extra heads (of each type installed) in accordance with code requirements. Exposed heads installed with deflector lower than 7'-6" above floor shall have wire guards.

2.4 ALARM VALVE ASSEMBLY:

- A. Standard wet type alarm valve assembly and electric bell complete with trim as required by the authority having jurisdiction. Provide flow switch for connection to alarm system. Provide tamper switch. UL listed. Coordinate electric bell with Division 28.

PART 3: - EXECUTION

3.1 PIPING INSTALLATION:

- A. General: Piping shall be concealed in walls, above the ceilings or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location shall be approved by the Architect. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. Depth of cover in traffic areas shall be 36 inches (minimum).
 - 1. Installer Certification: Installation shall be performed by certified fire sprinkler fitter(s) as required by CCR, Title 19, Divisions 1, Chapter 5.5. See CAL FIRE – Office of the State Fire Marshall Information Bulletin 17-002 for more information. The Bulletin can be downloaded from the following: http://osfm.fire.ca.gov/informationbulletin/pdf/2017/IB_AESCert_final_05_25_17.pdf
- B. Standards: All piping shall be installed in accordance with NFPA No. 13 "Standard for the Installation of Sprinkler Systems". Underground mains shall be installed in accordance with NFPA No. 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances".
- C. Miscellaneous:
 - 1. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings or floors in finished areas.
 - 2. Pattern: Sprinklers shall be installed in a symmetrical pattern with lighting fixtures and with ceiling pattern. Heads located in lay-in ceilings shall be centered in panel.
 - 3. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and smaller and 2" annular clearance for piping 4" and larger.
 - 4. Access: Provide access doors as required for all valves, devices, etc.
 - 5. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe, or pipe insulation sealed with fire rated materials in accordance with the requirements of 2022 CBC Section 714.
 - 6. Concrete Thrust Blocks: Shall be constructed at all valves, tees, elbows, bends, crosses, reducers and dead ends in loose-joint pipe. Blocks shall cure a minimum of 7 days before pressure is applied. Concrete shall be 3000 psi mix.
 - 7. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards, except where specifically allowed by CEC.

3.2 IDENTIFICATION:

- A. All controls, piping, valves and equipment shall be labeled for function and service in accordance with NFPA No. 13 and No. 24.

3.3 TESTS AND ADJUSTMENTS:

- A. Unless otherwise directed, tests shall be witnessed by a representative of the Architect and an inspector of the authority having jurisdiction. Contractor shall notify fire authority at least 48 hours prior to testing. At various stages and upon completion, the system must be tested in the presence of the enforcing agency. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and the entire work retested. Test all systems in accordance with fire authority requirements and NFPA No. 13 and No. 24.

3.4 CERTIFICATION:

- A. At completion of the project, Contractor's Material and Test Certificates for Underground Piping and for Above Ground Piping, indicating installation and testing in accordance with referenced standards, shall be completed. Copies shall be prepared by Contractor for the local fire authority, Architect, Owner (School District) and DSA. Deliver certificates to Owner through Architect.

END OF SECTION 21 0000

SECTION 22 0000 - PLUMBING

PART 1: - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS:

- A. The General Mechanical Provisions, Section 23 0000, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

- A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
1. Sanitary sewer system.
 2. Domestic water system.
 3. Drain system (including condensate drain).
 4. All equipment as shown or noted on the drawings or as specified.
 5. Demolition as indicated on drawings. Where demolition is called for, remove all equipment, piping, braces, housekeeping pads, supports and related items no longer required.
 6. Lead Free: All equipment, fixtures, valves and fixture stops providing water for human consumption installed after January 1, 2010, must meet the "Lead Free" requirements for the State of California.
- B. Work Specified Elsewhere:
1. Line voltage power wiring, disconnect switches and installation of all starters are included in the Electrical Section unless otherwise noted.
 2. Concrete and reinforcing steel unless specifically called for on the drawings or specifications.
 3. Painting unless specifically called for in the drawings or specifications.
 4. Carpentry.

PART 2: - PRODUCTS

2.1 PIPING MATERIALS:

- A. Sanitary Sewer:
1. Soil, Waste and Vent Piping (Non-Pressurized):
 - a. Inside Building Above Grade: Standard weight coated cast iron pipe and fittings. Plain end, CISPI 301, ASTM A888, or hub end with rubber gaskets, ASTM A74, ASTM C564. ABI, Tyler, Charlotte. Couplings shall be heavy-duty shielded couplings, Type 304 stainless steel, with neoprene gasket, ASTM C-1540. Husky HD 2000, Clamp-All 80, Mission HeavyWeight. MG Couplings are also acceptable. Size 2" and smaller above grade may be standard weight galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12. 2" and smaller exposed to view shall be galvanized steel, ASTM A53, with coated cast iron recessed drainage fittings, ANSI B16.12.
Below grade cast iron pipe and fittings shall have 8 mil (minimum) Polyethylene Encasement (Poly Wrap), Per ANSI/AWWA C105/A21.5.
 - b. Outside Building: Polyvinyl chloride (PVC), SDR-35, ASTM D3034 with PVC fittings with rubber ring joints. Piping within 10 feet of water piping shall be solid wall Schedule 40 PVC, ASTM D1785, D2665, with solvent weld DWV fittings, ASTM D2665, D3311. Piping with less than 24" of cover outside building walls shall be cast iron as specified above.

2. Cleanouts: Comparable models of Josam, Wade, Mifab or Zurn are acceptable. Grease plug prior to installation. Floor Cleanouts: Smith 4023 with nickel bronze top in finished areas; Smith 4223 in utility areas. Wall Cleanouts: Smith 4532 with stainless steel cover and screw. Pipe Cleanouts: Iron body with threaded brass plug. Site cleanouts more than 5' outside building may be PVC with PVC plug.
 3. Cleanout Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F8 in foot traffic areas; G5 in roadways. Provide with PVC pipe extension down to top of pipe.
- B. Storm Drain (Including Rain Water Leader, RWL) - Inside Building and Within Five Feet of Building Walls: Same as Soil, Waste and Vent Piping, except as otherwise noted on drawings. Where exposed to view on exterior of building, piping shall be galvanized steel with recessed drainage fittings.
- C. Water:
1. Hot and Cold Water Piping: Materials used in the water system, except valves and similar devices, shall be of like material, except where otherwise approved by Engineer and Authority Having Jurisdiction, prior to start of work.
 - a. Inside Building, Within Five Feet of Building Walls, and All Above Grade:
 - (1) Hard temper seamless copper, ASTM B88. Wrought copper fittings, ANSI B16.22. Type L with brazed joints (1100F, min.). 1-1/2" and smaller above grade may be soldered, lead-free silver solder. All nipples shall be lead-free red brass (85% copper). Branch piping from the cold water main above the ceiling to roof mounted hose bibbs shall be type "K" copper. Above grade fittings may be copper (1/2" to 2") or bronze (2-1/2" to 4") press fittings, ASME B16.18 or ASME B16.22. EPDM O-rings. Installation shall be in accordance with the manufacturer's installation instructions. ProPress, Apollo, Mueller Streamline.
 - b. Outside Building - Below Grade:
 - (1) Same as Inside Building. Galvanized steel shall have protective coating.
 - or- (2) 3" and Smaller: Schedule 80 Polyvinyl chloride (PVC), ASTM D1785, with Schedule 80 PVC solvent weld fittings, ASTM D2466 where approved by administrative authority.
 2. Valves and Specialties:
 - a. Valves:
 - (1) General: Manufacturer's model numbers are listed to complete description. Equivalent models of Crane, Kitz, Milwaukee, Nibco, Stockham, Walworth or Watts are acceptable. All valves of a particular type or for a particular service shall be by the same manufacturer. Butterfly valves may be substituted for 2-1/2" and larger gate valves above grade; see specification below. Provide a "T" handle for each system on site at the beginning of the installation of a particular system for emergencies, and the Construction Manager shall have access to these "T" handles and valves.
 - (2) Gate Valve: 2" and Smaller: All bronze. Non-rising stem. Threaded bonnet. Wedge disk. Malleable iron handwheel. 200 psi CWP. Nibco T-113-LF. 2-1/2" and Larger: Iron body, bronze mounted. Non-rising stem. Resilient wdg. 200 psi CWP. Flanged or AWWA hub end as applicable. Nibco F-619-RWS. Underground valves shall have square operating nut.
 - (3) Butterfly Valve: Ductile iron threaded lug body. Aluminum bronze disk. EPDM molded-in liner and seals. 416 stainless steel shaft. 6" and smaller valves shall have multi-position lever handle. 8" and larger valves shall have gear operator. Provide 2" extension neck at insulated pipes. Nibco LD-2000.
 - (4) Ball Valve: Full port. Lead free brass body, cap, stem, disk and ball. Screwed connection. Lever handle. PTFE seat and stem packing. Min. 400 psi CWP. CSA-US and UL listed. Nibco T-FP-600A-LF.

- (5) Valve Box: Precast reinforced concrete. Cast iron lid marked for service. Christy F8 in foot traffic areas; G5 in roadways. Provide with PVC pipe extension down to top of pipe.
 - b. Miscellaneous Specialties:
 - (1) Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.
 - (2) Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi. Unions for copper piping shall be copper or lead free cast bronze. Anvil. Size 2-1/2" and Larger: Grooved pipe, synthetic gasket, malleable iron housing. EPDM gasket, NSF 61 rated. Victaulic Style 77, Gruvlok.
 - (3) Dielectric Coupling: Insulating union or flange rated for 250 psig. Wilkins DUXL Series.
 - (4) Shock Absorber: Multiple bellows. All stainless steel construction. Designed and applied in accordance with PDI WH201. Amtrol, Smith, Wade, Zurn.
- D. Drain Piping (including Condensate): Same as inside building cold water piping.
- E. Miscellaneous Piping Items:
 - 1. Pipe Support:
 - a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendation. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Anvil, Unistrut.
 - b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco, Superstrut.
 - c. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Anvil, Unistrut.
 - 2. Flashing: Vent flashing shall be 4 lb/ft² lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Flashing for other piping through roof shall be prefabricated galvanized steel roof jacks with 16" sq. flange. Provide clamp-on storm collar and seal water tight with mastic. For cold process built-up roof, material shall be 4 lb/ft² lead instead of galvanized steel. For single-ply roofing, use the roofing manufacturer's recommended flashing material.

2.2 PIPING INSULATION MATERIALS:

- A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. Pre-Molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft²-F at a mean temperature of 50F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping to 140°F, thickness shall be 1" for pipe sizes less than 1"; 1-1/2" thickness for pipe sizes 1" and 1-1/2"; 2" thickness for 2" and larger. See Title 24, Part 6 "California Energy Code" for temperatures above 140°F. Knauf, Johns-Manville, Owens-Corning.
- C. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft²-F at a mean temperature of 50F. 1-1/2" thickness. Knauf, Johns-Manville, Owens-Corning.
- D. PVC Jacket (for pipe, fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.

- E. Vapor Barrier Coating: Childers CP-34, Foster 30-65. Permeance shall be 0.08 perms or less at 45 mils dry as tested by ASTM F1249.
- F. Aluminum Jacketing: Aluminum pipe and fitting jacketing. 0.016" thickness for straight pipe. 0.024" thickness for fittings. Stucco-embossed finish. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer. Childers.
- G. Outdoor Weather Barrier Mastic: Childers CP-10/11, Foster 46-50.
- H. Metal Jacketing/Flashing Sealant: Childers CP-76, Foster 95-44.
- I. Insulating Tape: Ground virgin cork and synthetic elastomeric. Black, odorless, and non-toxic. K factor 0.43 Btu-in/hr-ft²-F or less. Non-shrinking. For outdoor use, provide protective finish by same manufacturer. Halstead.
- J. Molded Closed Cell Vinyl (Piping Insulation Under Lavatories and Sinks): Fully molded closed cell vinyl, 1/8" thick, minimum. Thermal conductivity shall not exceed 1.17 BTU-in/hr-ft²-°F at an average temperature of 73°F. Weep hole in cleanout nut enclosure. Hinged cap over valve to allow access for servicing. Out of sight nylon fastening system and internal ribs on drain insulation to provide air gap (Lav-Guard Only). Truebro Lav-guard, McGuire Pro Wrap, Plumberex.

2.3 FIXTURES:

- A. General: Provide rough-in for and install all plumbing fixtures shown on drawings. Except in equipment rooms, all trim, valves and piping not concealed in wall structure, above ceiling or below floors, shall be brass with polished chrome plate finish, unless noted otherwise. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.
- B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures and trim. Manufacturer's model numbers are listed to complete description. Equivalent models of American Standard, Eljer, Elkay, Haws, Just, Kohler, Moen, T&S Brass, Willoughby or Zurn are acceptable. For drainage fixtures, equivalent models of Josam, Mifab, Smith, Wade or Zurn are acceptable.
- C. Stops and P-Traps: All fixtures shall be provided with stops and P-Traps as applicable. Wall mounted faucets, valves, etc. shall have integral stops or wall mounted stops.
 - 1. Stops: All hot and cold water supplies shall be 1/2" I.P.S. inlet angle stops with stuffing box, loose key lock shield, and brass riser (3/8" for 2-1/2 gpm and less, otherwise 1/2"). ¼ turn ball stops do not require stuffing box. Dahl, McGuire, Speedway.
 - 2. P-Traps: Semi-cast brass, ground joint. 17-gage. Clean-out plug. Unobstructed waterway. California Tubular, McGuire.
- D. Caulking: Caulk fixtures with white G.E. "Sanitary SCS1700", mildew resistant silicone sealant with EPA listed anti-microbial.

2.4 EQUIPMENT:

- A. General Requirements:
 - 1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
 - 2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed

- equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
3. Ratings - Electrical: Electrical equipment shall be in accordance with NEMA standards and UL or ETL listed where applicable standards have been established.
 4. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
 5. Electrical:
 - a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be manual reset, and shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.
 - b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.
 - c. Motors: Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip-proof, NEMA B design on pumps, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction, unless otherwise noted. Design shall limit starting inrush current and running current to values shown on drawings. Motors from 1 horsepower to 5 horsepower shall be the standard high efficiency type, Magnetek E-Plus. Motors 7-1/2 horsepower and larger shall be the premium efficiency type, tested according to IEEE Standard 112, Method B. Motors exposed to weather shall be TEFC. Vertical motors with exposed fans shall have rain caps.
 - d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.
 - e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
 - f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.
- B. Electric Water Heater: Electric. Glass lined tank with magnesium anode protection. 150 psi working pressure. Fully insulated. Automatic temperature control. High limit control. Provide ASME rated temperature and pressure relief valve sized in accordance with energy input, dielectric couplings and drain cock. UL listed. A.O. Smith, American Appliance, Bradford White, State Industries.
- C. Circulating Pump: In line centrifugal. 3-speed motor. Body: Lead Free bronze body, brass impeller. Mechanical seals. Bronze sleeve bearings. Integral thermal overload protection. Bell and Gossett/Xylem, Taco. -OR- Body: Aluminum housing. All parts exposed to fluid, stainless steel. Water lubricated ceramic shaft and bearings. Epoxy encapsulated windings. Grundfos.

PART 3: - EXECUTION

3.1 PIPING INSTALLATION:

A. General:

1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Architect. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted.
2. Joints:
 - a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
 - b. Welded or Brazed: Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100F. Welding or brazing shall be performed by a Certified Welder or Brazer as certified by an organization/institution that uses standards recognized by the American Welding Society (AWS) and meets the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
 - c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
 - d. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.
3. Fittings and Valves:
 - a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
 - b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
 - c. Unions: A union shall be installed on the leaving side of each valve, at all sides of automatic valves, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
 - d. Valves: All valves shall be full line size. Provide shut-off valve for each building and each equipment connection. Provide shut-off valve at each point of connection to existing piping. At equipment connections, valves shall be full size of upstream piping.
 - e. Valve Accessibility: All valves shall be located so that they are easily accessible. Valves located above ceilings shall be installed within 24" of the ceiling.
4. Pipe Support:
 - a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. Copper piping systems which protrude through a surface for connection to a fixture stop or other outlet shall be secured with a drop ell, Nibco 707-3-5, to a Holdrite Model #SB1 bracket; nipple through surface shall be threaded brass.
 - (1) Pressure Pipe:

Pipe Size (Inches)	Maximum Spacing* Between Supports (ft.)	
	Copper	Sch. 40 steel
1/2	6	6
3/4	6	8

1	6	8
1-1/4	6	10
1-1/2	6	10
2	10	10
2-1/2	10	10
3	10	10
4	10	10
6	10	10

*Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves or other fittings. Plastic piping shall be supported per the manufacturer's recommendations. Seismic requirements may reduce maximum spacing.

(2) Gravity Drain Pipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

- b. Hot and Cold Water Piping: All hot and cold water piping shall have isolating shield; no portion of this piping shall touch the structure without an isolating shield except at anchor points for fixture rough-in.
- c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

5. Miscellaneous:

- a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
- b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and smaller, otherwise 2" annular clearance.
- c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of 2022 CBC Section 714.
- d. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined, except that bronze valves may be installed in ferrous piping without dielectric couplings.

B. Sanitary Sewer Piping:

- 1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch. Bell and spigot piping shall be installed with barrel on sand bed; excavate hole for bell.
- 2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.
- 3. Vents: Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10' of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2' minimum from gutters, parapets, ridges and roof flashing.

C. Storm Drain (Including Rain Water Leader, RWL): Similar to Sanitary Sewer. Piping with less than 24" of cover outside building walls shall be cast iron.

D. Water Piping: Connections to branches and risers shall be made from top of main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Minimum pipe size shall be 1/2", unless otherwise noted. Exposed fixture stops and flush valves shall be installed with brass nipples for copper piping and galvanized nipples for galvanized piping. Nipples are to extend from outside of wall to fitting at header or drop behind finish wall surfaces. Pipe nipples shall be same size as stop or flush valve. Provide shut off for each building and each connection to equipment.

Shock absorbers shall be installed in a vertical position as indicated on drawings. Only equipment mounted on vibration isolators shall be connected with flexible connections. Underground hot water and cold water piping which run parallel to each other shall be installed a minimum of 3 feet apart.

- E. Drain Piping (Including Condensate): Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide TEE with clean-out plug at all changes of direction. Provide trap at each air handling unit to prevent air leakage. Only equipment mounted on vibration isolators shall be connected with flexible connection. Piping not concealed in wall structure, above ceilings or below floors shall be chrome plated brass, except in equipment rooms, piping shall be galvanized steel. P&T relief and water heater drain piping shall be galvanized steel. Provide secondary drain piping where required.
- F. Plastic Piping: Shall be cut square and assembled prior to solvent weld. Apply primer per manufacturer's recommendations. Coat male joint fully with solvent, make joint before solvent dries and wipe exterior clean.

3.2 PIPING INSULATION INSTALLATION:

- A. Domestic Hot Water:
 - 1. General: All domestic hot water piping, fittings and accessories shall be insulated.
 - 2. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied pressure sealing tape.
 - 3. Fittings and Valves:
 - a. Wrap all fittings and valves with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Solvent weld. Seal all joints with factory supplied pressure sealing vapor barrier tape with 1-1/2" (min.) overlap on both sides of joint. Insulate valves to stem. Do not insulate unions, flanges or valves unless water temperature exceeds 140F or the piping is exposed to weather.
 - b. For miscellaneous fittings and accessories for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the fiberglass blanket with stretchable glass fabric, one coat of lagging adhesive and a final coat of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.
 - 4. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather shall be given an additional finish of PVC jackets.
- B. Cold Water Piping-Freeze Protection: All cold water piping exposed to weather or other areas subject to freezing (i.e. ventilated attics, uninsulated exterior soffits, etc.) shall be insulated same as hot water piping. Cover with aluminum jacketing where exposed to weather. Short lengths of pipe and valves may be wrapped with insulating tape, 50% overlap. Cover valves to stem. Apply at least two coats of protective finish where exposed to weather.
- C. Piping Insulation Under Lavatories and Sinks: Exposed water piping, water stops and drain piping under accessible lavatories and sinks shall be insulated with 1/8" thick molded closed cell vinyl. Installation shall be in accordance with manufacturer's instructions.

3.3 FIXTURE INSTALLATION:

- A. Fixture Height: Shall be as indicated on Architectural drawings.
- B. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.

- C. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- D. Floor Mounted Fixtures: Shall be provided with proper support plates. Caulk floor mounted fixtures with white G.E. "Sanitary SCS1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- E. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

3.4 EQUIPMENT INSTALLATION:

- A. General: It shall be the responsibility of the equipment installer to insure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment. All equipment shall be securely anchored in place.
- B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

3.5 TESTS AND ADJUSTMENTS:

- A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Architect. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections, however, all connections between sections previously tested and new section shall be included in the new test.
- B. Gravity Systems:
 - 1. Sanitary Sewer: All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours.
 - 2. Drains (Including Condensate): Similar to Sanitary Sewer.
 - 3. Storm Drain: Similar to Sanitary Sewer.
- C. Pressure Systems:
 - 1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.
 - 2. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.
- D. Fixtures: Provide torque testing of water closet carrier anchor bolts in presence of Inspector. If Inspector is not available, a testing agency shall handle the inspection.

3.6 DISINFECTION:

- A. Disinfect all domestic water piping systems in accordance with 2022 CPC Section 609.10, and in accordance with administrative authority. Disinfection process shall be performed in cooperation with health department having jurisdiction and as required by applicable codes in presence of Inspector of Record (IOR). During procedure signs shall be posted at each water outlet stating, "Chlorination Do Not Drink". Contractor shall notify the IOR 48 hours prior to the need for testing so the IOR can make arrangements for

the testing laboratory to collect samples and test the water. Samples shall be taken at the furthest point of each building. Contractor shall obtain a copy of the test results from the Testing laboratory and shall provide copies to the Architect, IOR and Owner before project completion. If the water fails the bacteriological test, Contractor shall disinfect the piping again and pay for any retesting required, at no additional cost to owner. Contractor shall include copy of Bacteriological Test Results at closeout with operation and maintenance manuals.

END OF SECTION 22 0000

SECTION 23 0000 - GENERAL MECHANICAL PROVISIONS

PART 1: - GENERAL

1.1 GENERAL CONDITIONS:

- A. The preceding General and Special Conditions and Divisions 00 and 01 requirements shall form a part of this Section with the same force and effect as though repeated here. The provisions of this Section shall apply to all of the Sections of Divisions 21, 22 and 23 of these Specifications and shall be considered a part of these sections.

1.2 CODES AND REGULATIONS:

- A. All work and materials shall be in full accordance with current rules and regulations of all applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern. Applicable codes and regulations include, but are not necessarily limited to, the following:
 - 1. California Code of Regulations (CCR):
 - a. Title 8, Industrial Relations
 - b. Title 24, Part 1, Administrative Regulations
 - c. Title 24, Part 6, California Energy Code, 2022 Edition
 - d. Title 24, Part 11, California Green Building Code, 2022 Edition
 - 2. California Building Code - CBC - 2022
 - 3. California Mechanical Code - CMC - 2022
 - 4. California Plumbing Code - CPC - 2022
 - 5. California Fire Code - CFC - 2022
 - 6. California Electrical Code - CEC - 2022
 - 7. Air Diffusion Council - ADC
 - 8. American Gas Association - AGA
 - 9. Air Movement and Control Association - AMCA
 - 10. American National Standards Institute - ANSI
 - 11. Air Conditioning and Refrigeration Institute - ARI
 - 12. American Society of Heating, Refrigerating, and Air Conditioning Engineers - ASHRAE
 - 13. American Society of Mechanical Engineers - ASME
 - 14. American Society for Testing and Materials - ASTM
 - 15. American Water Works Association - AWWA
 - 16. Cast Iron Soil Pipe Institute - CISPI
 - 17. National Electrical Manufacturers Association - NEMA
 - 18. National Fire Protection Association - NFPA
 - 19. National Sanitation Foundation - NSF
 - 20. Occupational Safety and Health Act - OSHA
 - 21. Plumbing and Drainage Institute - PDI
 - 22. Sheet Metal and Air Conditioning Contractors National Association - SMACNA
 - 23. Underwriters' Laboratory - UL

1.3 PERMITS AND FEES:

- A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required by Section 01 1100. All charges shall be included in the work.

1.4 COORDINATION OF WORK:

- A. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interference with each other, or with structural, electrical, architectural or other elements. Verify the proper voltage and phase of all equipment with the electrical plans. If discrepancies are discovered between drawing and specification requirements, the more stringent requirement shall apply. All conflicts shall be called to the attention of the Architect and the Engineer prior to the installation of any work or the ordering of any equipment. No work shall be prefabricated or installed prior to this coordination. No costs will be allowed to the Contractor for any prefabrication or installation performed prior to this coordination.
- B. Mandatory Coordination and Shop Drawings:
1. Prepare or have prepared high level detailed Shop Drawings in plan view, with cross-sections as necessary, indicating the proposed installation plan for all HVAC, mechanical, fire sprinkler, and plumbing installations for the project. These Drawings should depict actual elevations and linear dimensions, as well as all routing changes, transitions, major offsets, deck and structural attachments deemed necessary to accomplish the installation. Individual Shop Drawings may be prepared for each trade working within the designated space or area; however, the coordination of the consolidated installation shall remain the responsibility of the Contractor. These Shop Drawings shall be provided to each Subcontractor having Work in each area for coordination. Any fittings, offsets or other changes due to coordination shall be at no additional cost to Owner.
 2. Whereas the Drawings are diagrammatic, showing only the general arrangement of the systems, Contractor shall have responsibility for the fitting of materials and equipment to other parts of the equipment and structure, and to make adjustments as necessary or required to resolve space problems, preserve service room, and avoid architectural and structural elements and the Work of other trades. Contractor may be required to identify certain areas to relocate installations within the spaces depicted on the Drawings, e.g., ductwork and/or piping may be shifted within the space shown to accommodate other systems. Such functional relocations shall not be deemed a change to the requirements of the Contract. In the event a major re-routing of a system appears necessary, Contractor shall prepare and submit for approval, Shop Drawings of the proposed rearrangement.
 3. Because of the diagrammatic nature and small scale of the Drawings, all necessary offsets, adjustments, and transitions required for the complete installation are not shown. Contractor shall carefully investigate the conditions affecting all the Work and shall arrange such Work accordingly, furnishing such fittings, equipment, valves, accessories, offsets, etc., as may be required, regardless of size or cost, to meet such conditions, at no additional cost to the Owner.
 4. Coordination changes are not design changes and shall be provided at no additional cost to Owner. Any guidance, drawing or clarification issued by the Architect or Engineer to assist the Contractor or their sub-contractors in their coordination during construction are not design changes and shall be provided at no additional cost to Owner.
 5. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of work between sections. The Contractor's decisions, if consistent with the Contract Documents, shall be final. The Architect and their Consultants are not required to coordinate work between sections and will not do so. Any changes required that affect the design intent shall be presented to and approved by the Architect and Engineer of Record.
 6. The coordinated Shop Drawings must be signed off by HVAC, Plumbing, Fire Sprinkler, Electrical, Framing, Ceiling Installation, and Data and Low Voltage Subcontractors.
 7. The signed off Shop Drawings shall be submitted to the Owner's Representative for review and approval prior to commencement of installation.
 8. Provide reviewed Shop Drawings to each Subcontractor having Work in each area.

1.5 GUARANTEE:

- A. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner through the Architect. Equipment that is started and operated prior to acceptance shall have the guarantee extended to cover that period. Owner guarantee shall start at acceptance.

1.6 QUIETNESS:

- A. Piping, ductwork and equipment shall be arranged and supported so that vibration is a minimum and is not transmitted to the structure.

1.7 DAMAGES BY LEAKS:

- A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

1.8 EXAMINATION OF SITE:

- A. The Contractor shall examine the site, compare it with Plans and Specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

1.9 COMPATIBILITY WITH EXISTING SYSTEMS:

- A. Any work which is done as an addition, expansion or remodel of an existing system shall be compatible with that system.

1.10 MATERIALS AND EQUIPMENT:

- A. Materials and equipment shall be new unless otherwise noted. Materials and equipment of a given type shall be by the same manufacturer. Materials and equipment shall be free of dents, scratches, marks, shipping tags and all defacing features at time of project acceptance. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance.

1.11 SUBMITTALS:

- A. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project (this includes deferred approval items). Material or equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:
 - 1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory. FAX submittals are not acceptable.
 - 2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the

specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings.

3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.
 4. Electronic Submittals: Where allowed by Division 01, electronic submittals are acceptable providing the following requirements are met. Electronic submittals which do not comply with these requirements will be rejected.
 - a. Submittal shall be a single file in PDF format, with bookmarks for table of contents and each tab, and sub-bookmarks for each item.
 - b. All text shall be searchable (except text that is part of a graphic).
 - c. Submittal shall include all items noted in 1 through 3 above, except a binder is not required.
 - d. Electronic submittals shall be processed through normal channels. Do not submit directly to the Engineer unless the Engineer is the prime consultant for the project.
 - e. Contractor shall provide Owner and Owner's Representative with hard copies of the final submittal. Coordinate exact number required with Owner through Architect/Engineer.
- B. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and features desired (where equipment is scheduled on the drawings, any equipment submitted other than scheduled equipment is considered a substitution). Unless otherwise noted, alternate manufacturers may be submitted for review by the Engineer. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items. At the Engineer's request, furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.
- C. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

1.12 MANUFACTURER'S RECOMMENDATIONS:

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

1.13 SCHEDULING OF WORK:

- A. All work shall be scheduled subject to the review of the Architect, Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work, and shall cause no delay to other Contractors engaged upon this project or to the Owner.

1.14 OPENINGS, CUTTING AND PATCHING:

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect.

1.15 EXCAVATION AND BACKFILL:

- A. General: Barrel of pipe shall have uniform support on sand bed. Sand shall be free from clay or organic material, suitable for the purpose intended and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No. 200 sieve. Unless otherwise noted, minimum earth cover above top of pipe or tubing outside building walls shall be 24", not including base and paving in paved areas.
- B. Excavation: Width of trenches at top of pipe shall be minimum of 16", plus the outside diameter of the pipe. Provide all shoring required by site conditions. Where over excavation occurs, provide compacted sand backfill to pipe bottom. Where groundwater is encountered, remove to keep excavation dry, using well points and pumps as required.
- C. Backfill:
 - 1. 6" Below, Around, and to 12" Above Pipe: Material shall be sand. Place carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator. Native soil may be used where allowed by Geotechnical (Soils) Report. Where native soil is used, trenching for gravity drain pipe shall be done using a laser-level and trencher.
 - 2. One Foot Above Pipe to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- D. Compaction: Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at top, bottom and one-half of the trench depth. Perform these tests at three locations per 100' of trench.

1.16 PROTECTIVE COATING FOR UNDERGROUND PIPING:

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru-Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. Johns-Manville. Protective coating shall be extended 6" above surrounding grade.

1.17 ACCESS DOORS:

- A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings. 16-gage steel frame and 14-gage steel door with paintable finish, except in ceramic tile, where door shall be 16-gage stainless steel with satin finish. Continuous hinge. Key and cylinder lock (except quick-opening type for Emergency Gas Shutoff Valve). Deliver doors to the General Contractor for installation. Milcor. Unless otherwise noted, the minimum sizes shall be as follows:

1 valve up to 1-1/2"	12" x 12"
1 valve up to 3"	16" x 16"

1.18 CONCRETE ANCHORS:

- A. Steel bolt with expansion anchor requiring a drilled hole - powder driven anchors, adhesive anchors and concrete screws are not acceptable. Re-use of screw anchor holes shall not be permitted. Minimum concrete embedment shall be 4-1/2 diameters. Minimum spacing shall be 12 diameters center to center and 6 diameters center to edge of concrete. Post-installed anchors in concrete used for component anchorage shall be pre-qualified for seismic application in accordance with ACI 355.2 and ICC-ES AC193. Post-installed anchors in masonry used for component anchorage shall be pre-qualified for seismic applications in accordance with ICC-ES AC01. Maximum allowable loads for tension and shear shall be as determined by Calculation in compliance with ACI 318-14, Chapter 17, and the anchor's ICC or IAPMO evaluation report. Hilti, Powers, Red Head.

1.19 EQUIPMENT ANCHORING:

- A. All equipment shall be securely anchored in accordance with ASCE 07-16, Chapter 13, as amended by CBC Section 1617A.1. All equipment mounted on concrete shall be secured with a concrete anchor as specified above at each mounting point. All air handlers shall be mounted on spring isolators. Secure base plate as indicated above.

1.20 SEISMIC SUPPORT AND RESTRAINT DESIGN SERVICE:

- A. All mechanical systems (equipment, ductwork, piping, etc.) shall be provided with supports and seismic restraints in accordance with ASCE 07-16, Chapter 13, as amended by CBC Section 1617A.1. Brace spacing shall be reduced by 50% for cast iron, plastic, no-hub, or other non-ductile piping. A copy of this manual shall be kept on site at all times during construction. **See also "General Notes" on drawing sheet M1.0 for additional support and seismic restraints information.**
- B. Contractor shall obtain the services of a Seismic Design service to provide engineered seismic supports and restraints for the project. Mason Industries, or pre-approved equal. **Note: Use of the "12 inch rule" does not exempt Contractor from this requirement.**
1. All seismic designs, including designs using HCAI pre-approvals, shall be submitted as project specific engineered designs sealed and signed by a licensed California structural engineer. All seismic designs shall include project / application specific seismic design demand calculations. Said seismic design demand calculations shall account for seismic forces in all applicable direction including axial, lateral, vertical tension, vertical compression, etc. Designs shall account for prying, eccentricity, uneven loading, weak axis bending, etc.
 2. Seismic restraint layouts for piping, ductwork and electrical raceways shall be furnished on shop drawings or added to the contractor's shop drawings and shall include:
 - a. The number, size and location of seismic braces.
 - b. Maximum support loads and seismic loads at the seismic brace locations.
 - c. Reference to specific details or pages from the HCAI pre-approved system (OPM).

- d. **If use of the "12 inch rule" is intended by Contractor, design service shall verify locations where it is intended to be used is feasible and specifically identify these locations on the shop drawings, along with appropriate hanger details.**

- 3. Installations not addressed by the OPM approval must be designed, detailed and submitted along with the shop drawings.
- 4. Submit seismic restraint layout drawings and special details for approval of the project structural engineer per the requirements listed in the HCAI pre-approval (OPM).
- 5. Seismic restraint layout drawings shall bear the stamp and signature of the registered professional structural engineer licensed in the state of California who designed the layout of the braces.

1.21 ASBESTOS CONTAINING MATERIALS AND ASBESTOS REMOVAL:

- A. No materials or material coatings containing asbestos shall be allowed on this project.
- B. All asbestos removal shall be by Owner. Asbestos is to be removed before the work is started. If the Contractor discovers asbestos which has not been removed, the Contractor shall immediately cease work in that area and promptly notify the Owner. Where the removal of asbestos shingles is necessary, the Contractor shall advise the Owner regarding the location and quantity of shingles to be removed.

1.22 SYSTEM IDENTIFICATION:

- A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by pre-printed markers or stenciled marking, and include arrows to show direction of flow. Pre-printed markers shall be the type that wrap completely around the pipe, requiring no other means of fastening such as tape, adhesive, etc. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches for equipment connections is not required.
- B. Below Grade Piping: Bury a continuous, pre-printed, bright-colored, metallic ribbon marker capable of being located with a metal detector with each underground pipe. Locate directly over buried pipe, 6" to 8" below finished grade.
- C. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-4) and identifies the area or space served by the equipment. Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the exterior of the unit.

1.23 CLEANING:

- A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work. This includes but is not limited to building surfaces, piping, equipment and ductwork, inside and out. Surfaces shall be free of dirt, grease, labels, tags, tape, rust, and all foreign material.
- B. At the end of each work day, the Contractor shall cover all open ends of piping and ductwork with protective plastic.

1.24 ACCEPTANCE TESTING:

- A. All acceptance testing as required by California Code of Regulations, Title 24, and as noted on the Certificate of Compliance form, (where applicable), shall be performed and documented by an Acceptance Test

Technician (ATT). These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP). The Contractor shall submit a copy of the documentation to the Engineer for review (hardcopy or electronic), prior to submitting to Administrative Authority.

1.25 OPERATION AND MAINTENANCE INSTRUCTIONS:

- A. Printed: Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts list for all faucets, trim, valves, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. AC-3). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Pumps, Fans, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included. Electronic O & M's shall comply with the Electronic submittal requirements in this Section.
- B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instructions that apply to the control system. The Engineer's office shall be notified 48 hours prior to this meeting.

1.26 RECORD DRAWINGS:

- A. The Contractor shall obtain one set of blue line prints for the project, upon which a record of all construction changes shall be made. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e. building, curbs, walks. In addition, the water, gas, sewer, underfloor duct, etc. within the building shall be recorded by offset distances from building walls. As part of the Contractor's overhead expense, request a full set of reproducible drawings to transfer the changes, notations, etc. from the marked-up prints to the reproducible drawings. The record drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review.

PART 2: - PRODUCTS (not used)

PART 3: - EXECUTION (not used)

END OF SECTION 23 0000

SECTION 23 0001 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1: GENERAL

1.1 GENERAL MECHANICAL PROVISIONS:

- A. The General Mechanical Provisions, Section 23 0000, shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

- A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
 - 1. Air distribution system.
 - 2. All equipment as shown or noted on the drawings or as specified. Furnish motor starters except where motor control centers are used. Coordinate with Division 26.
 - 3. Refrigeration system.
 - 4. System energy balance.
 - 5. Coordinate with Section 23 0923 (Direct Digital Control and Energy Management System) regarding location and installation of system sensors and to provide simultaneous start-up.
 - 6. Demolition as indicated on drawings. Where demolition is called for, remove all equipment, piping, ductwork, braces, supports, housekeeping pads, temperature controls and related items no longer required.
- B. Work Specified Elsewhere:
 - 1. Line voltage power wiring, disconnect switches and installation of all starters are included in the Electrical Section, unless otherwise noted.
 - 2. Connection of condensate drains to equipment.
 - 3. Concrete and reinforcing steel unless specifically called for in the drawings or specifications.
 - 4. Painting unless specifically called for in the drawings or specifications.
 - 5. Carpentry.
 - 6. Direct Digital Control and Energy Management System (DDC/EMS).

PART 2: PRODUCTS

2.1 PIPING MATERIALS:

- A. Refrigerant Piping: Hard drawn Type ACR copper, dried and capped, ASTM B280. Wrought copper fittings, silver alloy brazed, 1100°F, Silfos.
- B. Miscellaneous Piping Items:
 - 1. Pipe Support:
 - a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendations. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B Line, Anvil, Unistrut.
 - b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco.
 - c. Construction Channel: 12 gage, 1 5/8" x 1 5/8" galvanized steel channel. Single or multiple section. Self locking nuts and fittings. B Line, Anvil, Unistrut.

2. Flashing: Flashing for piping through roof shall be prefabricated galvanized steel roof jacks with 16" square flange around pipe. Provide clamp-on storm collar and seal water tight with mastic. Maintain dielectric separation between copper and galvanized materials. For cold process built-up roof, material shall be 4 lb/ft² lead instead of galvanized steel. For single-ply roofing, use the roofing manufacturer's recommended flashing material.

2.2 PIPING INSULATION MATERIALS:

- A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. PVC Jacket (for pipe, fittings and valves): Pre molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.
- C. Aluminum Jacketing: Aluminum pipe and fitting jacketing, 0.016" thickness for straight pipe. 0.024" thickness for fittings. Integral moisture barrier. Stucco-Embossed finish. Provide pre fabricated aluminum strapping and seals by same manufacturer. ITW or RPR.
- D. Metal Jacketing Sealant: Childers CP-76, Foster 95-44.
- E. Insulating Tape: Ground virgin cork and synthetic elastomeric. Black, odorless, and non-toxic. K factor 0.43 Btu-in/hr-ft²-°F or less. Non-shrinking. For outdoor use, provide protective finish by same manufacturer. Halstead.
- F. Foamed Plastic: Rubber based elastomeric preformed pipe insulation. Thermal conductivity shall not exceed 0.27 Btu in/hr ft² °F at a mean temperature of 70°F. 1/2" thick. Provide adhesive by same manufacturer. Armacell Armaflex.

2.3 DUCTWORK MATERIALS:

- A. General: All ductwork materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50. Shall comply with 2022 CMC.
- B. Metal Ductwork: Metal ductwork shall be galvanized sheet steel, lock forming quality, ASTM A-653, with gage and construction to match SMACNA Standard for pressure required (26 gage minimum).
- C. Flexible Ductwork: Insulated flexible ductwork. One pound per cubic foot glass fiber insulation, 1-1/2" thick (R-6), 2" thick (R-8) where ductwork is outside the building thermal insulation envelope. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft²-°F at a mean temperature of 75°F. Seamless metalized reinforced polyester vapor barrier jacket. Continuous internal liner bonded to galvanized steel wire helix. Duct shall be capable of continuous operation at 1-1/2" of positive water static pressure and 4,000 ft/min air velocity. Duct shall comply with NFPA 90A. JP Lamborn.
- D. Duct Sealants: All Joints Exposed to Weather: Sealant shall be water based, Foster 32-19/32-17, Childers CP-146/148, United Duct Sealer WB or G.E. "SilPruf" SCS2000 silicone sealant. Joints Not Exposed to Weather (Except Spiral Wound Exposed to View in Finished Areas): Fiber reinforced. White in color. Foster 32-17, Childers CP-148, Design Polymerics DP1030, Hardcast Versa-Grip 181, Hardcast CCWI-181. Spiral Wound Joints Not Exposed to Weather and Exposed to View in Finished Areas: Non fibrated. Gray in color. Foster 32-19, Childers CP-146, Design Polymerics DP 1010, or United Duct Sealer WB.

2.4 AIR TERMINALS AND DUCT FITTINGS:

- A. Grilles: (Grilles, Registers, Diffusers and Louvers)
1. Information on Drawings: Refer to Grille Schedule on the drawings for the list of grilles. Manufacturer's model numbers are listed to complete the description. Equivalent models of Anemostat or Krueger are acceptable. Refer to the floor plans for neck size, CFM, air diffusion pattern and fire damper, if required.
 2. Performance: Submit complete performance data (throw, pressure drop, noise level, etc.) for all grilles proposed, other than those scheduled. Testing shall be in accordance with ANSI/ASHRAE 70-1991. If, according to the certified data of the manufacturer of the proposed units, the sizes indicated on the drawings will not perform satisfactorily, the units shall be reselected by the Contractor for the proper diffusion, spread, pressure drop, throw and noise level.
 3. Frame and Accessories: Supply, return, and exhaust grilles shall not have an opposed blade volume control damper unless otherwise noted. All surface mounted grilles shall have a perimeter gasket and flanged edge. All grilles shall have frames suitable for mounting in the surfaces designated by the architectural drawings. Key or screwdriver operated, no slide bars.
 4. Finish: All ceiling and wall grilles and all louvers shall have a paintable white finish unless otherwise noted. Interior components (everything behind the face plate) shall be flat black. Floor grilles shall have an anodized aluminum finish unless otherwise noted.
- B. Louver Finish:
1. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
 - a. 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness.
3-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat and 0.45 mil clear topcoat, 1.25 mil total minimum thickness.
4-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat, plus 0.70 mil barrier coat, 0.70 mil color coat, and 0.45 mil clear topcoat, 2.0 mil total minimum thickness.
 - b. Color: As indicated on the Finish Schedule or as selected by Architect from the full range of industry colors and color densities.
 - c. Provide factory applied strippable plastic film for protection during fabrication and installation.
 2. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's 20-Year warranty. Warranty coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.
- C. Branch Duct Volume Damper: Volume control damper (VCD) in rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16-gage blade, 48" maximum length, nylon or oil impregnated bronze bearings, 1/2" diameter pin shaft, 16-gage channel frame, actuating rod and linkage out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with stamped steel handle, spring loaded shaft nut, cast body and serrated self-locking die cast core. Regulator for horizontal ducts overhead shall be mounted on sides or bottom of ducts. Secure a 12" length of brightly colored plastic ribbon to handle for ease of location. Where rectangular or round ductwork is insulated, slit insulation to allow handle to protrude. Ventlok 641 (with 607 end bearing for round ducts).
- D. Extractor: Curved blade turns in adjustable position rigid frame. Tuttle and Bailey Deflectrol.
- E. Turning Vanes: Double wall, hollow metal, air foil shape. Spacing in accordance with manufacturer's recommendations. Aero Dyne HEP.

- F. Flexible Connection: UL listed neoprene coated 30-ounce fiberglass cloth. 3" metal, 3" fabric, 3" metal. Ventglas.

2.5 DUCTWORK INSULATION MATERIALS:

- A. General: All ductwork insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. Fiberglass Blanket: **Installed** thermal resistance at a mean temperature of 75°F shall meet or exceed indicated value. 3/4 lb/ft³ or 1 lb/ft³, **R-6** where ductwork is within the building thermal insulation envelope. 3/4 lb/ft³ **R-8** where ductwork is outside the building thermal insulation envelope and/or above the roof. Faced with glass reinforced foil laminated to Kraft paper. Certaineed, Knauf, Johns-Manville, Owens-Corning.
- C. Acoustic Lining: Glass fiber duct liner, ASTM C1071 and C1104. Installed thermal resistance at a mean temperature of 75°F shall meet or exceed indicated value. One side coated to prevent fiber erosion up to 6000 ft/min. Average noise reduction coefficient of 0.80. 1.5 lb/ft³ density. 1" thick (**R-4.2**) where ductwork is within the building thermal insulation envelope. 2" thick (**R-8**) where ductwork is outside the building thermal insulation envelope and/or above the roof. Certaineed, Knauf, Johns-Manville, Owens-Corning.
- D. Bonding Adhesive: Design Polymeric DP2501, Foster 85-60.

2.6 EQUIPMENT:

- A. General Requirements:
 - 1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
 - 2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where Architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
 - 3. Ratings - Electrical: Electrical equipment shall be in accordance with NEMA Standards and UL or ETL listed where applicable standards have been established.
 - 4. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
 - 5. Electrical:
 - a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Manual and magnetic starters shall have ambient compensating running overcurrent protection in all ungrounded conductors. Magnetic starters shall be manual reset, shall have H-O-A switches and auxiliary contacts. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.
 - b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

- c. Motors: Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase induction unless otherwise noted. Design shall limit starting inrush current and running current to values shown on drawings. Motors 1 horsepower and larger shall be the premium efficiency type, tested according to IEEE Standard 112, Method B. Motors exposed to weather shall be TEFC. Motors in a fan air stream shall be TEFC or TEAO. Vertical motors outdoors shall be ODP or TEFC and shall have rain caps.
 - d. Starters: Motor starters shall be furnished for all equipment except where starter is in a motor control center as designated on the electrical drawings. Deliver starter to Electrical Contractor for installation and wiring.
 - e. Control Voltage: Equipment connected to greater than 240 volts shall be provided with 120 volt control circuit from integral protected transformer if separate source is not indicated on plans. 240 volt control is acceptable if confined within control panel.
 - f. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.
6. Fan Selection:
- a. Fan Curves: Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency toward increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM verses static pressure with constant brake horsepower, RPM and efficiency lines.
 - b. Static Pressure: Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure includes all ductwork, filter, coil, cabinet, damper and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.
7. Filters:
- a. General: Tested and rated in accordance with ASHRAE Standard 52.2 and Title 24, C.C.R. Furnish and install one complete change of all filters after air balance is completed and prior to acceptance.
 - b. Filter Media: 2" media. MERV-13. Clean filter resistance 0.41" water at 500 fpm. Throw-away frame. Class 2. Camfil AP-Thirteen.
8. Screens: All duct or louver openings to the outside shall be covered with 1/2", 16-gage, galvanized wire mesh screen.
9. Mixing Dampers: Opposed blade, 16-gage. Six-inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One-half inch diameter pin shaft. 16-gage channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream. Arrow.
10. Sound Ratings: Shall be in accordance with ASHRAE 36 - 72. Sound ratings shall not exceed scheduled values.
11. Drives: Unless noted as direct connected, drives shall be V-belt, rated at 150% of motor horsepower. Multiple drive belts shall be matched set. Drive sheaves shall be dynamically balanced, adjustable, range +/- 10%, selected at mid range. Adjustable relative movement shall be lockable to shaft. Belts shall be aligned within 1-1/2 degrees at all times. Open drives shall be provided with OSHA approved open mesh belt guards. Belt guards exposed to weather shall be weatherproof enclosure with louvered face for adequate ventilation. Driving motor shall be mounted on adjustable rails. T.B. Woods, Browning. Submit RPM range of driven machine with drive selection.

- B. Split System Heat Pump (IDU/ODU-1 thru 8):
1. General: Refer to Paragraph 2.6A for general requirements. Sealed hermetic compressor with internal vibration isolating mountings. Crankcase heater, suction line accumulator, recycling timer. Air cooled condenser with propeller fan, non ferrous finned DX coil, low ambient control to 45 degrees. Provide all starters and relays required for operation. Single phase units shall have compressor start assist kit. 24 volt control circuit from integral transformer. Weatherproof casing with baked enamel finish. ARI certified. Toshiba, Carrier.
 2. Outdoor Unit:
 - a. Compressor: Heavy duty type built for heat pump application. Filter drier. 5 year extended warranty on compressor(s).
 - b. Suction Line Accumulator: Install in refrigerant circuit to protect compressor against liquid flood back at all operating conditions.
 - c. Recycling Timer: 5 minute duration to prevent rapid cycling of compressor and to allow pressure equalization before restarting.
 - d. Outdoor Coil: Copper tube, aluminum fin.
 - e. Outdoor Fan: Propeller type with vertical discharge, direct drive, low RPM, resilient mounting.
 - f. Solid State Control: Shall include the following:
 - (1) Liquid Temperature Sensor for defrost control.
 - (2) Discharge Temperature Sensor for compressor protection.
 - (3) Defrost Terminal Connection to pressure differential switch for defrost only when required.
 - (4) Outdoor Sensor to provide low ambient control and monitor outdoor balance point thermostat.
 - (5) Balance Point Control adjustable outdoor thermostat to lock out supplemental heaters until they are required.
 - (6) Five Minute Timer as mentioned above.
 3. Indoor Unit:
 - a. Supply Fan: Direct driven, multi speed forward curve, high static centrifugal fan, resilient mounted.
 - b. Indoor Coil: Copper tube, aluminum fin, "A" style.
 - c. Electric Heater: Integral part of unit, complete with all operational and safety controls, single point wiring terminal, 5 year factory warranty, UL listed as a complete unit.
 - d. Condensate Pan: Install under complete coil area with standard and auxiliary drain connections.
 4. Control Interface: Provide 24v interface kit to allow DDC/EMS control.
- C. Split System Heat Pump (IDU/ODU-9 thru 13):
1. General: Refer to Paragraph 2.6A for General Requirements. Completely assembled and factory tested. Provide all starters and relays required for operation. All components by same manufacturer. Toshiba, Carrier.
 2. Outdoor Unit:
 - a. Compressor: Sealed hermetic rotary compressor with vibration isolator mountings. Crankcase heater, suction line accumulator, recycling timer. High and low head pressure/temperature protection. Motor overload protection, low ambient feature to 20F cooling mode. High and low side service valves. Recycling timer. Single phase start assist kit. 5-year extended warranty.
 - b. Fan and Coil: Finned tube non-ferrous coil. Propeller type fan, 1200 RPM maximum, direct drive. Totally enclosed motor, overload protected, permanently lubricated, resiliently mounted.
 - c. Cabinet: Weatherproof, factory paint.
 3. Indoor Unit:

- a. Supply Fan: Direct drive, multi-speed forward curve, centrifugal fan, resiliently mounted. Thermally protected motor.
 - b. Indoor Coil: Copper tube, aluminum fin, DX coil.
 - c. Electric Heaters: Integral part of unit, complete with all operational and safety controls, single point wiring terminal, 5-year factory warranty, UL listed as a complete unit.
 - d. Condensate Pan: Install under complete coil area with drain connections.
 - e. Filter: Washable media. Class 2 or better.
 4. Controls: Microprocessor control. Provide 24v interface kit to allow DDC/EMS control.
- D. Exhaust Fan:
 1. General: All exhaust and supply fans shall be tested and rated in accordance with AMCA Standard 210. Fans exposed to weather shall have ventilated weatherproof housing over motor and drive assembly. Refer to Paragraph 2.6A for general requirements. All direct drive fans shall be provided with unit mounted speed controllers. All exhaust and supply fans shall have a disconnect switch. All motors 1 horsepower and larger shall be the premium efficiency type.
 2. Roof Fan: Spun aluminum, roof mounted, direct driven, downblast centrifugal exhaust ventilator. Fan shall be of bolted and welded construction utilizing corrosion resistant fasteners and stainless-steel fasteners on cap. Spun aluminum structural components shall be constructed of minimum 16-gauge marine alloy aluminum, bolted to a rigid aluminum support structure. Aluminum base shall have continuously welded curb cap corners for maximum leak protection. Discharge baffle shall have a rolled bead for added strength. An integral conduit chase shall be provided through the curb cap and into the motor compartment to facilitate wiring connections. Motor shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Unit shall bear an engraved aluminum nameplate. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision machined cast aluminum hub. An aerodynamic aluminum inlet cone shall be provided for maximum performance and efficiency. Motor shall be heavy duty type with permanently lubricated sealed bearings and furnished at the specified voltage, phase and enclosure. Backdraft damper. Greenheck.

PART 3: EXECUTION

3.1 PIPING INSTALLATION:

- A. General:
 1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Architect. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Lines shall be adequately braced against vertical and lateral movement. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted. Pipe sizes shall not decrease in direction of flow, unless otherwise noted.
 2. Joints:
 - a. Threaded: Pipe shall be cut square, and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
 - b. Brazed: Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100°F. Brazing shall be performed by a Certified Brazer as certified by an organization/institution that uses standards recognized by the American Welding Society (AWS) and meets the requirements of the ASME Boiler and

Pressure Vessels Code, Section 9.

- c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
- 3. Fittings and Valves:
 - a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
 - b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
 - c. Unions: A union shall be installed on the leaving side of each valve, at all sides of automatic valves, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
- 4. Pipe Support:
 - a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below (based on straight lengths of pipe with couplings only). Provide additional supports for equipment, valves or other fittings. Seismic requirements may reduce maximum spacing.. Actual spacing requirements will depend on structural system. Refer to drawings for additional requirements and attachment to structure. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction.
 - b. Refrigerant Piping: Support insulated refrigerant line with construction channel and sheet metal support saddle or Cooper B-Line Armafix clamps. 5' spacing. Use isolation shield for uninsulated pipe. When using pre charged tubing, all changes of direction shall be made with bending tools producing neat uniform bends. Free hand bends will not be accepted.
 - c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.
- 5. Miscellaneous:
 - a. Escutcheons: Provide chrome plated escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
 - b. Pipe Sleeves: All piping passing through concrete or concrete block shall be provided with pipe sleeves. Allow 1" (nominal) clearance between sleeve and pipe or pipe insulation. Piping through walls or footings below grade shall be sealed with Link Seal.
 - c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of 2022 CBC Section 714.

- B. Refrigerant Piping: Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted and erected before brazing. Continuously purge with Nitrogen during brazing. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation shall not be less than 70°F. After evacuation, fill with dry nitrogen to 250 psi and maintain for two hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment.

3.2 PIPING INSULATION INSTALLATION:

- A. Refrigerant Piping: Cover piping with foamed plastic insulation. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendations. Cover all fittings, unions, valves and connections. Piping exposed to view shall be covered with PVC jacketing. Piping exposed to weather shall be covered with aluminum jacketing, install all joints and seams to prevent water entry, seal with 1/8" bead of gray metal jacketing sealant.

3.3 DUCTWORK INSTALLATION:

A. General:

1. Standards: Unless otherwise noted, all ductwork shall be constructed and installed in accordance with current SMACNA Standards. Ductwork shall be built to a pressure classification equal to or greater than the maximum operating pressure at that point in the ductwork. A copy of these standards shall be maintained at the job site at all times. Duct work and accessories shall be installed in a manner to prevent vibration and rattling.
2. Access: Provide duct access doors as required to adjust equipment and dampers. Provide wall or ceiling access panels, or remote actuators as required where equipment and dampers are not otherwise accessible. See detail on drawings for remote regulator.
3. Flexible Connections: Connection of ductwork to any vibrating equipment shall be with 3" (min.) flexible connection. Install with ample slack and uniform gap. There shall be no metal-to-metal contact across flexible connection. Flexible connections exposed to weather shall have a protective sheet metal cover.
4. Flanges and Escutcheon: Where ductwork penetrates walls, ceilings, or floors, furnish and install flange or escutcheon of same material as duct.

B. Low Velocity-Low Pressure (up to 2,000 ft/min and up to 2.0 in water):

1. Sheet Metal Ductwork:
 - a. Ells: Ells with less than standard radius and square ell shall be fitted with turning vanes.
 - b. Tees: Tees in supply ductwork shall be straight tap-in with extractor or 45 degree take-off as shown on drawings. Grilles or branches in supply ductwork shall be a minimum of 8 duct diameters downstream of tees.
 - c. Duct Joints and Seams: All joints and seams which are not exposed to weather shall be sealed airtight with duct sealant. All joints and seams exposed to weather shall be sealed air and water tight with silicone sealant. (See Part 2 of this Specification). All joints on spiral wound metal ductwork not exposed to weather shall be sealed air tight with grey duct sealant.
 - d. Dampers: Install volume control damper and damper regulator in all branch ducts.
2. Flexible Glass Fiber Ductwork: The use of flexible duct is limited to the last 5 feet of each branch duct (i.e. one 5 foot section of flexible duct may be used to connect the grille to the sheet metal branch duct). No joints are permitted in this 5' length. Hangers shall be 4" wide metal straps spaced to prevent sagging, 42" spacing maximum. Insert 6" wide fiberglass pad between duct and hanging strap. Joints shall be installed with stainless steel or nylon draw bands, Duro Dyne Dyn-O-Tie. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).

3.4 AIR TERMINALS AND DUCT FITTINGS INSTALLATION:

- A. General: Unless otherwise noted, all air terminals and duct fittings shall be installed in accordance with current SMACNA Standards. Terminals and fittings shall be installed in a manner to prevent vibration and rattling. Metal surfaces exposed to view behind grilles and registers shall be painted flat black.

3.5 DUCTWORK INSULATION INSTALLATION:

- A. General: Insulate all sheet metal supply, return and outside air intake ductwork except as noted below. Insulation shall be continuous through walls and floors except at fire dampers.
- B. Where Insulation Is Not Required: Do not insulate factory-insulated ducts or casings, acoustic lined ducts, fibrous glass ducts, underground ductwork, supply or return ductwork exposed to view in the space that it serves, or exhaust ductwork.

- C. Concealed Ductwork: Wrap concealed ductwork including outside air ductwork with fiberglass blanket lapped 2" minimum. Secure with staples 4" on centers maximum on straight runs and 3" maximum at elbows and fittings. Insulation on bottom of ducts wider than 36" shall also be secured with mechanical fasteners at 24" on center.
- D. Acoustic Lining: Unless otherwise indicated, all supply and return ductwork in equipment rooms, all ductwork exposed to weather and other ducts as indicated on drawings, shall have acoustic lining. Do not acoustic line outside air intakes. Where acoustic lining is installed, increase each sheet metal dimension to accommodate lining and maintain clear inside duct dimensions shown on drawings. Apply lining with bonding adhesive in accordance with manufacturer's recommendations and also secure with mechanical fasteners in accordance with SMACNA Standards. Seal exposed edges of lining with bonding adhesive.

3.6 EQUIPMENT INSTALLATION:

- A. General: It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block or otherwise hinder the equipment. All equipment shall be securely anchored in place. All equipment shall be installed level.
- B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.
- C. Equipment Platforms: Shall be as shown on drawings and as follows: Flashing and platform cover shall be 22 gage (min.) sheet metal. All joints and seams shall be soldered with 2" (min.) overlaps. Provide 3/4" gap around perimeter between roofing and platform cover to facilitate re-roofing. Extend drip lip down 3" (min.). Provide 30# felt under platform cover.

3.7 TESTS AND ADJUSTMENTS:

- A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Architect. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested.

3.8 SYSTEM ENERGY BALANCE:

- A. Scope: Provide the services of an independent test and balance agency to test, adjust and balance, retest and record performance of the system to obtain design quantities as specified. The agency must prove that they have no affiliation with any equipment manufacturer, design engineer, installing contractor, or any other party which might lead to a conflict of interest, in order to provide an unbiased, third party system balance and report.
- B. Qualifications: Prior to commencing work, the agency shall be reviewed by the Engineer and shall be certified by the Associated Air Balance Council, National Environmental Balancing Bureau or Testing, Adjusting and Balancing Bureau. The agency shall provide documentation of having successfully completed at least five projects of similar size and scope.
- C. Instruments: All instruments shall be accurately calibrated; calibration histories shall be available for examination. Application of instrumentation shall be in accordance with AABC, NEBB or TABB standards.
- D. Submittals: Include in shop drawings copies of forms to be used for testing and balancing showing all data which is to be recorded. Seven copies of completed balance report shall be submitted to and reviewed by the Mechanical Engineer prior to the final mechanical construction review.

- E. Procedure - General: Procedure shall be in accordance with Associated Air Balance Council's "National Standards for Field Measurements and Instrumentation - Total System Balance", Volume Two, No. 12173, or equivalent NEBB or TABB standards. System shall be in full, continuous operation during test. Balanced quantities shall be plus 10%, minus 0% of design quantities. All nameplate data, manufacturer, model and serial numbers shall be recorded for each item tested.
- F. Extended Warranty: The test and balance agency shall include an extended warranty of 90 days after completion of test and balance work, during which time the Engineer, at his discretion, may request a recheck or resetting of any item or items in test report. The agency shall provide technicians to assist the Engineer in making any tests he may require during this period of time.
- G. Air Balance Procedure (For Each Air Handling System):
 - 1. All air filters shall be clean when air balance is performed.
 - 2. Provide a sketch of the equipment showing exactly where all pressure readings were taken.
 - 3. Adjust blower RPM to design requirements.
 - 4. Record motor full load amperes.
 - 5. Make pitot tube traverse of main supply and return ducts and obtain design CFM at fans.
 - 6. Record system static pressures, inlet and discharge.
 - 7. Record filter quantity, size(s) and pressure drop across filter(s) at each filter bank.
 - 8. Adjust system for design CFM recirculated air.
 - 9. Adjust system for design CFM outside air.
 - 10. Record entering air temperatures. (DB heating, DB and WB cooling.)
 - 11. Record leaving air temperatures. (DB heating, DB and WB cooling.)
 - 12. Adjust all main supply and return air ducts to design CFM.
 - 13. Adjust all zones to design CFM, supply and return.
 - 14. Adjust all diffusers, grilles and registers to plus 10%, minus 0% of design requirements.
 - 15. Adjust CFM at all exhaust fans, make-up units, etc. (high and low speed, where applicable). Record applicable data from items 1 through 11 above.
 - 16. Each grille, diffuser and register shall be identified as to location.
 - 17. Verify proper diffusion pattern for all ceiling grilles and that all sidewall grilles are set for 5 degrees upward deflection unless otherwise noted. Make a notation of any that are not set properly.
 - 18. Size, type and manufacturer of diffusers, grilles, registers and all tested items shall be identified and listed. Manufacturer's ratings shall be used to make required calculations on all items.
 - 19. Readings and tests of diffusers, grilles, and registers shall include required FPM velocity and test resultant velocity, required CFM and test resultant CFM after adjustments.
 - 20. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified. Testing agency shall check all controls for proper calibrations and list all controls requiring adjustment by control installers.
 - 21. All diffusers, grilles and registers shall be adjusted for required air patterns and to minimize drafts.
 - 22. As a part of the work of this contract, THE AIR CONDITIONING CONTRACTOR shall make any changes in pulleys, belts and dampers or the addition of dampers required for correct balance as recommended by air balance agency, at no additional cost to Owner.
 - 23. Set, test and adjust packaged heating/cooling unit economizer operation in cooperation with controls contractor. Record minimum and maximum outside and exhaust airflows.
 - 24. Verify that the Controls Contractor has commissioned and documented their work before the TAB work begins.

END OF SECTION 23 0001

SECTION 23 0923 - DIRECT DIGITAL CONTROL AND ENERGY MANAGEMENT SYSTEM

PART 1 - GENERAL

1.1 GENERAL MECHANICAL PROVISIONS:

- A. The General Mechanical Provisions of Section 23 0000 shall form a part of this Section with the same force and effect as though repeated here.

1.2 SCOPE:

- A. General: The direct digital control and energy management system (DDC/EMS) includes control panels, control devices, valves, actuators, all line and low voltage control and interlock wiring (including wiring to controllers, switches, timers, relays, etc.) and conduit and related equipment, as required for proper operation of all equipment. Provide all equipment, programming, labor, materials and services necessary for a complete, lawful and operating DDC/EMS as shown or noted on the drawings and as specified herein. All control wiring, line and low voltage shall be installed in conduit. Power wiring, power to DDC/EMS control panels and disconnect switches are included in the Electrical Specifications, except that power wiring for control devices such as controllers, valves, etc., is included in the control system. Electrical work shall be in accordance with Electrical Specifications. Set, test and adjust the system for proper operation.
The system shall be direct digital control/electric. **The control system shall be direct digital. Johnson Metasys, without substitution, to match existing District Standard.** Except as otherwise noted, the control system shall consist of all Ethernet Network Controllers. The system shall be Metasys with N2 protocol and shall be compatible with existing district-wide system. The system shall communicate over the District's Ethernet LAN/WAN, and shall include the latest upgrading (software and firmware) during the warranty period. The data wiring shall have an Ethernet connection at the DDC/EMS panel and at the onsite workstation.
If the District's current Graphical User Interface is server based, the GUI must be integrated into the District's current GUI server. The design of the total installed system shall be based on such systems, which are the District standards. Coordinate with Section 23 0001, Heating, Ventilating and Air Conditioning and with Division 26.
 - 1. Provide access to hardware and software or onsite technical support required to assist the TAB effort. The hardware and software or the onsite technical support shall be provided at no cost to the TAB Firm.
- B. Contractor Qualifications: All controls shall be furnished and installed by a Contractor who is licensed, certified or contracted by the controls manufacturer for design, installation, start-up and service of their product. The Contractor must have factory supplied training and support. The Contractor must have sufficient personnel to respond to a trouble call at the site within four hours. The Contractor's local manager shall have a minimum of five years' experience in the design, installation, start-up and service of similar systems. The Contractor shall submit a list of at least five projects which are similar in size, scope and contract value to this project. This list shall include the Owner's contact person, phone number and controls contract value.
- C. Submittals: Within 60 days of contract award, submit eight (8) copies of shop drawings showing the following aspects of the DDC/EMS system (CAD file with DXF format if required of floor and site plans can be secured from the Architect).
 - 1. All termination points, terminal cabinets, and cabling.
 - 2. Schedule of input and output points.

3. Locations of all visible DDC/EMS system components (i.e. interior and exterior sensors, terminal strips, panels, trench and pull boxes, etc.), identifying specifically any exposed conduit.
 4. Complete written sequence of operation.
 5. Descriptive literature for all material and equipment items shall include manufacturer's name and catalog numbers, dimensions, capacities, and all other characteristics and accessories as listed in the specifications or on the drawings.
 6. Submit copies of forms to be used for testing and verification showing all data which is to be recorded. Three copies of complete report shall be submitted for review.
- D. Utility Interfacing: Coordinate interface, via equipment modem and District Ethernet connections furnished by Supplier to Owner's dedicated telephone line or Ethernet network. The DDC/EMS Contractor shall interface with the PG&E electric meter to allow DDC/EMS monitoring and logging of electricity usage, and pay any costs to the utility for such as to comply with PG&E installation requirements.
- E. Installation and Operation Manuals: Furnish Installation and Operating Manuals for all components. These manuals shall contain full documentation which shall include, without being limited to, the following:
1. General description and specifications.
 2. Installation and initial checkout procedures.
 3. Principles and theory of operation.
 4. Complete trouble-shooting procedures and diagrams.
 5. Complete alignment and calibration procedures for all components.
 6. Program source file on CD or 3-1/2" disk (ASCII text file) and hard copy.
 7. Detailed schematics and assembly drawings.
 8. Complete recommended spare parts lists including unit prices.

1.03 SYSTEM ARCHITECTURE

- A. DDC/EMS Equipment: The main controller shall contain the network communications and information management programs providing integrated global control, trend logging, local and remote alarming and fully menu driven user interface. It may be equipped with at least 64 local controllers on each network. The local controller is an intelligent, stand-alone microprocessor based controller which can have a variety of configurations based on their application.
- B. Campus-Wide Data Transfer System: The DDC/EMS shop drawings shall indicate where all equipment items are to be located for input and output to complete the system. The conduit/cabling system shall inter-tie these points as required to complete one system to meet the design criteria herein. System high speed communication (LAN) shall be hardwired using a Belden shielded cable as recommended by DDC manufacturer and shall communicate at 10M baud with peer to peer communication. System communication between master controller and local controllers (field bus) shall be at 19.2K baud minimum with a two wire shielded RS-485 cable. See Drawings for exterior lighting circuits to be controlled by contactors at panels.
- C. User Interface Communication: The user may communicate with the DDC/EMS system with a workstation located at the District Office over the WAN, with a remote workstation via a telephone modem, with an On-Campus Operator Workstation, and with a Lap-Top computer (Service Tool). The system shall be configured to allow the Service Tool to access data and program any controller on the system from any room sensor service port. Alternatively, a conveniently located service port shall be provided in each building that allows access to data and programming of any controller on the system, if the room sensor service port is limited to only the controller to which the sensor is connected.
- D. Standard Network Support: All Master Controllers, Workstation(s) and File Server shall be capable of residing directly on the owner's Ethernet TCP/IP LAN/WAN. Furthermore, the Master Controllers, Workstation(s) and File Server shall be capable of using standard, commercially available, off-the-shelf

Ethernet infrastructure components such as routers, switches and hubs. With this design the owner may utilize the investment of an existing or new enterprise network or structured cabling system. This also allows the option of the maintenance of the LAN/WAN to be performed by the owner's Information Systems Department as all devices utilize standard TCP/IP components.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. The Electronic Microprocessor Based Direct Digital Control and Energy Management System (DDC/EMS) shall monitor the data environment and perform control functions in relation to a programmed strategy and the status of the data environment. The system shall use solid state computer based digital and analog technology. The system shall be standard with the manufacturer to insure ongoing parts availability and trained technical support. The DDC/EMS shall be of the user programmable type requiring no special computer education for operation. All necessary instruction manuals and user orientation training shall be supplied by the manufacturer or agent thereof. The DDC/EMS shall be UL listed as a Direct Digital Control and Energy Management System. The programmable control requirements of the DDC/EMS shall include, but not be limited to:

OPTIMUM START/STOP (BASED ON HISTORICAL DATA)
TIME OF DAY ROUTINES
SCHEDULED OCCUPANCY ROUTINES INCLUDING HOLIDAYS
CUSTOM TAILORED REPORTING
ACCUMULATING RUN TIME
CRITICAL CONDITION ALARMING
FLUID FLOW SWITCH AND CONTROL ALARMING
PID CONTROL ON ANALOG OUTPUTS
HOT WATER RESET
DAY/NIGHT SETBACK
ECONOMIZER/PURGE
CUSTOM TAILORED REPORTING
ACCUMULATING RUN TIME
SEPARATE MODES AS REQUIRED BY CONTROL SEQUENCE

- B. Environment: The DDC/EMS shall operate in an environment of 40 120 degrees F and 10 95% relative humidity. Sensors and control elements shall operate under the temperature, pressure, humidity, and vibration conditions normally encountered in the installed location. The DDC/EMS shall maintain accuracy as follows:
1. +/- 0.5 F for the space temperatures in the 0 F 130 F range.
 2. +/- 0.5 F for duct temperatures in the 40 F 130 F range.
 3. +/- 1.0 F for outside air temperatures in the 30 230 F range.
 4. +/- 1.0 F for water temperature in the 30 230 F range.
 5. KWH and KW monitoring within 1.0%.
- C. Battery Backup: The system shall be tolerant of power failure and hold memory for a minimum of 12 hours. On power restoration, the system shall automatically and without operator intervention of execution of manual restart procedures:
1. Come On Line.
 2. Update all monitored functions.
 3. Resume operation based on current time and status.
 4. Implement special building start up strategies as required.
 5. Log time of power outages and start ups.

- D. Program Storage: The system shall also be capable of interfacing with a mass storage (tape or disc) device, for use in uploading and downloading programs to the DDC/EMS.
- E. Protocol: Protocol shall be Johnson N2.

2.2 SYSTEMS DESCRIPTION:

- A. Modular Design/Expandability: The DDC/EMS shall be of a modular design providing distributed processing capability, and allowing future expansion of both input/output points and processing/control functions. System size shall be expandable from 4 input points and 4 output points to unlimited. Expansion shall be in modules. The modular DDC/EMS shall be configured on the main/local concept. The main controller shall have the capability of adding local controllers and the local controllers shall be capable of adding I/O modules.
- B. Main (Master) Description: The master shall function as the overall system coordinator, accept control programs, perform automated energy management functions, control peripheral devices and perform all necessary mathematical calculations. The master shall be a microcomputer of modular design. The word size shall be 16 bits or larger, with a memory cycle time less than 1 microsecond. All chips shall be second sourced. The master shall have the following:
 - 1. Protected Access: Key lock protected access to output override switches and internal circuitry.
 - 2. Memory: The master shall have at least 2 MB of user available memory, in addition to memory required for systems operation and diagnostics or MCP software. Minimum requirements for system operation are as follows: A minimum of 4MB of RAM shall be provided for masters with expansion up to 8MB. The 8MB versions shall include a floating-point math co-processor.
 - 3. Real Time Clock: The master shall have a battery backed uninterruptable "Real Time Clock". The accuracy shall be within ten seconds per day. The RTC shall provide the following information: Time of Day, Day, Month, Year, and Day of Week. The system shall be programmed to automatically correct the clock for day light savings time and leap years.
 - 4. Power: The master shall operate from 120 VAC +/- 20%, 60 Hz. Line voltages below the operating range of the system shall be considered outages. The master shall have over voltage surge protection, and require no additional AC power signal conditioning.
 - 5. Parallel Processing: The master shall be capable of parallel processing, executing separate control programs simultaneously. Any control program may affect control of another program if desired. Each program shall have full access to all I/O facilities of the processors.
 - 6. Communications Processor: Each master shall provide communication to both the Workstation(s) (LAN) and the field buses (RS-485). In addition, each master must have at least 3 other communications ports that support a telephone modem, portable service tool, serial printer and connection to third party controllers such as a chiller control panel or Variable Frequency Drives. On a LAN/WAN system the master(s) shall be provided with a 10Mbps plug-in Ethernet TCP/IP network interface card (NIC).
 - 7. Uninterruptable Functions: Control functions shall not be interrupted due to program entry or other user communications.
- C. Local Controller Units: The local units function as a stand-alone controller and as an Input/Output interface of the DDC/EMS and the Data Environment.
 - 1. Monitoring: Local units shall be used to connect the data environment to the system and contain all necessary Input/Output functions to read field sensors and operate controlled equipment based on internal instructions or instructions from the Master. The units shall be fully supervised to detect failures. The units shall report the status of all points in its data environment at the rate of at least once every second. Local units shall connect directly to the Master with a twisted pair shielded RS-485 interface. All local units can run independently in the event of a central unit failure.

2. Unit Failure: Upon failure of the unit (including transmission failure), the unit shall automatically fail off or to a predetermined state for three-way valves. A message shall be transmitted by the unit indicating a local unit failure.
3. Power: The unit shall operate from 120 VAC, +/-20%, 60 Hz, 220 VAC, +/-20%, 50 Hz or 24 VAC +/- 20%, 50/60 Hz power. For voltages below the operating threshold the unit shall totally shutdown and de energize its outputs.
4. LAN and/or Field Bus: Each unit shall communicate with any unit through the RS-485 interface LAN and/or field bus.
5. Auxiliary Port: Each unit shall be equipped with an auxiliary port to allow local interrogation of input and output values, and keyboard override of outputs through laptop.

2.3 INPUT/OUTPUT CAPABILITY:

- A. Inputs: The DDC/EMS shall accept information in the form of a temperature, voltage, digital signal (on off) or pulse counter.
 1. Analog Inputs: The Analog Input (AI) function shall monitor each analog input, perform A/D conversion, and hold the digital value in a buffer for interrogation. The A/D conversion shall have a minimum resolution of 10 bits. Input ranges shall be within the range of 0 10 VDC.
 2. Digital Inputs: The Digital Input (DI) function shall accept dry contact closures and voltage level or resistance level (5VDC reference voltage) transitions. A voltage level below 1 volt or a resistance below 500 ohms shall be read as ON (closed), a voltage level above 3 volts or a resistance above 1400 ohms shall be read as OFF (open).
 3. Pulse Accumulator Inputs: The pulse accumulator function shall have the same characteristics as the DI, except that, in addition, a buffer shall be included to totalize pulses between interrogations. Each input shall accept pulses at a minimum of 2 per second.
 4. Temperature Inputs: Temperature inputs originating from a thermistor shall be monitored and buffered as an AI, except that, automatic conversion to degrees F shall occur without any additional signal conditioning.
 5. Input Wiring: All analog inputs shall be two wire devices, with shielded wire for accurate operation.
- B. Outputs:
 1. Master and local controllers - Form C relay outputs rated at 5 amp, 24 VAC/DC or 2 amp, 30 VAC for on/off or Pulse Width Modulation for maintained operation of field devices. Output pulse width shall be selectable between 0.1 and 3200 seconds with a minimum resolution of 0.1 seconds. Isolation and protection against voltage surges shall be provided. Central plant controllers shall be equipped with an ON/OFF/AUTO switch to manually obtain either output state. Manual overrides shall be reported to the master at each update. An LED shall be provided to indicate the state of each digital output.

2.4 SOFTWARE:

- A. User Software: Provide software for On-Campus workstation, Laptop Computer (Service Tool) and District office workstation (required upgrades and programming only if software is already existing on District office workstation).
- B. Software Features:
 1. Mathematical Requirements: The DDC/EMS shall have a math package capable of addition, subtraction, multiplication, division, square root, greater than and less than functions, minimum and maximum selection functions, and up to five levels of parenthesis for computation of variables. Control commands may be executed based on these calculated variables which are available to the program on a global basis. Math expressions may be used in action and exit commands of control program. The mathematical software shall be capable of mixed mode

- arithmetic, utilizing Boolean logic statements in combination with basic arithmetic to provide conditional mathematical computations.
2. Passwords: The DDC/EMS shall have multiple levels of user programmable passwords in addition to a master password, for programming security. Separate passwords may be user programmed. Level of password will define user's access level and ability to change system.
 3. Trend Logging: The DDC/EMS shall trend log variables. Any system variable (inputs, outputs, numerals, can be trend logged.
 4. Messages: The DDC/EMS shall provide alarming, preventative maintenance and status reporting messages.
 5. Look Up Tables: The DDC/EMS shall have preprogrammed "LOOK UP" tables for the conversion of voltage inputs into dew point temperature and water vapor pressure values for the computation of relative humidity and enthalpy.
 6. Documentation Format: The programming language of the DDC/EMS shall be plain English based such that a printout of the control program shall serve as the primary documentation for the system.
 7. Micro Processor Integrity Checking: Each DDC/EMS microprocessor shall continuously monitor and check itself and produce error messages in the event of a malfunction.
 8. Data Plotting: The DDC/EMS shall provide plots of values of system variables on a graph. Graphs may consist of combinations of up to 3 system variables at a time from the history logs.
- C. Color Graphics Requirements Provide color graphics which allow user to access and change (based on user access level) all schedules and setpoints (including damper or control valve positions) directly through the user graphics. Real time data shall continuously be updated. Navigation between the screens (forward and backwards) shall be accomplished with the use of a mouse. The minimum graphic screens shall include the following:
1. Site lay-out locations of all equipment being controlled, control component locations, and spaces served. Provide multiple screens-minimum of 1 screen per building plus site and others as needed for clarity. By "clicking" mouse on the desired equipment area a flow diagram will be displayed for the related equipment (as described below - Item 2). By "clicking" the mouse on a conditioned space, a graphic display of the zone conditions (as described below - Item 3) will be displayed.
 2. Flow diagrams shall be provided for each HVAC system, such as air-handling system, chilled water system, hot water system, condenser water system, package unit system, brine system with all inputs and outputs dynamically displayed.
 3. Each temperature control zone shall have a screen providing set points, temperatures, and related HVAC system status data.
 4. Scheduling screens allowing On/Off times to be set for all of the following:
 - a. Pre-determined individual days
 - b. Pre-determined blocks of days (From/To)
 - c. Schedules for "Routine" school sessions
 - d. Schedules for "Special" school sessions
- D. Software Manual: The software manual shall describe programming and testing, starting with a system overview and proceeding to a detailed description of each software feature. The manual shall instruct the user on programming or reprogramming any portion of the system. This shall include all control programs, variables, set points, time periods, messages, passwords and other information necessary to load, alter, test and execute the system. The manual shall include commands, editing and writing control programs, printouts and logs, mathematical calculations, and instructions on modifying any control point, verifying error status, changing passwords, and initiating or disabling control programs.
- E. Software Licenses: The owner shall be named the license holder of all software associated with any and all incremental work on the project(s). Owner shall receive ownership of all job-specific software configuration documentation, data files, and application-level software developed for this project. This shall include all custom, job-specific software code and documentation for all configuration and

programming that is generated, and any related LAN/WAN/Intranet and Internet connected routers and devices. Any and all required IDs and passwords for access to any component or software program shall be provided to the Owner.

2.05 USER INTERFACE:

- A. Character Code: Communication with the DDC/EMS shall be ASCII format, or manufacturer's management communication program.
- B. External Communication Interface: In addition to the LAN/WAN communication capabilities specified in paragraph 1.3, C, each master unit shall communicate through an EIA RS232C serial port. Communication may be accomplished with any RS232C compatible terminal. Baud rate shall be selectable from 300 to 19.2 baud. The master shall also provide a spare RS232C serial port for communication to an alarm printer. The software shall provide the ability to direct alarm messages and text reports to either the District workstation and On-site workstation via the LAN/WAN, the spare port or the primary communication port based on time of day, type of alarm, etc.
- C. Phone Modem: Remote communication with the DDC/EMS shall be accomplished using any Bell System compatible 300-9600 baud modem connected to the RS232C communication port. The DDC/EMS controlled modem shall perform automatic dialing of user specified phone numbers, automatic answering, pulse or touch tone dialing, with an autodial 300-9600 baud modem.
NOTE: Conduit from main phone back board and LAN rack to be installed by electrical contractor. Phone line and LAN connection to be arranged for by the District and installed by the phone company or District networking group. Final connections by DDC/EMS Contractor.
- D. Direct Computer Communication: The DDC/EMS shall have a computer compatible communication mode for communication with other intelligent devices, which performs data integrity checking, with automatic retransmission of data when errors are detected.
- E. On-Campus Operator Workstation: Hardware shall be furnished by District. Install DDC/EMS software on workstation, and furnish Software license for workstation to District. Coordinate hardware requirements with District.
- F. Laptop Computer (Service Tool): Hardware shall be furnished by District. Install DDC/EMS software on laptop, and furnish Software license for workstation to District. Coordinate hardware requirements with District.

2.6 SYSTEM COMPONENTS:

- A. Control Components:
 - 1. Wall Switches: Plates for all wall switches and timers shall match those specified in Division 26.
 - 2. Labels: All labels, signs, etc. shall be engraved, laminated plastic, white on black background, 1/8" high lettering, minimum.
 - 3. Temperature Sensors:
 - a. Sensor Type: All temperature sensors shall be made of a highly stable, precision thermistor material accurate to within +/- 0.36 Degrees F. Identify each temperature sensor with a "Lamicaid" label keyed to the control system as-built drawings.
 - b. Room Sensor: Room temperature sensor shall have Executive Decorator housing with programmable visible temperature indication. Housing shall include an occupancy override, temperature setpoint adjustment and a service tool jack.
 - c. Vandal Resistant Room Sensor: Where noted, shall be a blank stainless steel wall plate with the sensing element bonded to the back side. The plate back shall be insulated to reduce wall temperature influence.

- d. Duct Sensor: Duct temperature sensor shall be a probe type element with 9 inch insertion length. Element shall be installed where air mixture provides a true temperature indication. Where adequate mixing is not practical, the duct temperature sensor shall have an averaging type thermistor element, installed across the entire cross section of the duct.
- e. Outdoor Air Sensor: Outdoor air temperature sensor shall be a probe type element mounted in a ventilated, treated white PVC sun shield to minimize radiant energy effects. The sensor and sun shield shall be mounted on a weatherproof outlet box for outdoor installation.
- f. Low Differential Air Pressure Applications (0" to 5" W.C.): The differential pressure transmitter shall be of industrial quality and transmit a linear, 4 to 20 mA output in response to variation of differential pressure or air pressure sensing points. Non-interactive zero and span adjustments, adjustable from the outside cover. (0.00 - 1.00" to 5.00") W.C. input differential pressure ranges. 4-20 mA output. Maintain accuracy up to 20 to 1 ratio turndown. Reference Accuracy: +0.2% of full span.
- 4. Carbon Dioxide Sensor: Wall mounted CO2 sensor, specially designed for demand controlled ventilation. Non-dispersive IR (NDIR) sensor. Five-year recommended calibration interval. Push-button calibration. Features as specified below. Kele KCD Series.
 - a. Range: 0-2000 ppm CO2
 - b. Accuracy +/- 3% of reading or ±40 ppm
 - c. Response time: < 1 min.
 - d. Output signal: 0-10 VDC or 4-20 mA (500 ohm max) depending on model
 - e. Power supply: Nominal 24 VAC/DC
 - f. Warm-up time: 3 min.
 - g. Operating temp: 32° to 122°F (0° to 50°C)
 - h. Operating humidity: 0% to 95% RH (noncondensing)
- 5. Temperature Control Panels: Each panel and each control device or readout on the front of the panel shall be identified with a laminated plastic label with 1/4" high engraved lettering, white on black background. Pilot lights shall be the push to test type.
- 6. Smoke Detectors: Furnished and installed by Division 26. Power and fire alarm wiring by Division 28. Control wiring by Division 23. Coordinate with Division 26.
- 7. Status Sensor: Current sensing status sensor (with sensitivity adjustment for belt loss detection).
- 8. Control Valves:
 - a. General: Equal percentage or linear flow characteristics. Unless otherwise noted, select for 2-4 psi pressure drop across the valve at the specified flow. Belimo. 2" and smaller shall be screwed connection, globe or ball valve. 2-1/2" and larger shall be flanged connection globe valve.
 - b. Ball Valve: Stainless steel ball and stem, teflon seat and O-rings. 400 psi WOG. Packing shall be reinforced teflon seal washer and stuffing box ring. Stem packing gland screw shall be adjustable for wear. Factory flow characterization disk.
 - c. Globe Valve: Contoured plugs for linear control. 316 stainless steel stem, replaceable seat and adjustable operating range. Packing shall be molded BUNA-N. Valves controlling terminal units or above ceilings shall be of the packless type with bellow seal, or spring loaded teflon requiring no packing maintenance. 2" and Smaller: Bronze body, 250 psi WOG. 35 psi maximum working pressure differential. 2-1/2" and Larger: Cast iron body, 125 psi WOG. 25 psi maximum working pressure differential.
- 9. Electric Actuators:
 - a. General: Fully modulating, UL listed. Visual position indicator, manual override and clear weather shield where exposed to weather. 24 volt. Belimo.
 - b. Valve Actuators: Provide with factory mounting brackets and linkage to the control valve. Capable of shutting off against a 50 psi differential.

- c. Damper Actuators: Positive position feedback and spring return. OSA dampers shall be spring return closed. Actuators shall be direct mounted onto the damper control shaft without linkage. Damper actuators shall be sized to provide a minimum of 5 in-lbs torque per square foot of damper face area.
- 10. LG Controller. LG controller with on-site LCD and internet IP accessibility.
- 11. LG Room Sensor/Controller: LG "in-room" wired remote controller.

- B. Lighting Contactors: Lighting contactor with metal enclosure will be furnished, installed, and wired to the lighting panel by the electrical contractor. See electrical contract documents for location. The DDC/EMS Contractor shall provide low voltage relay(s) required at the contactor panel and wire to the contactors to complete the DDC/EMS side of the lighting control. DDC/EMS Contractor shall provide required photo cells. Relays shall be suitable for up to 277 volts.

- C. Lightning Arrestor and Surge Suppressors: Shall be provided as approved and/or manufactured by the DDC/EMS equipment manufacturer.

- D. Conduit: Conduit to be a minimum 1" diameter, and to have at least 25% spare capacity, except drops to room sensors may be run in ½" conduit. Conduit shall be run in electrical or mechanical trenches wherever possible. Site conduit (building to building) will be installed (and terminated inside the building) by Division 26.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION:

- A. General: All electrical work shall be in accordance with the California Electrical Code and the Electrical Specification Sections. All electric/electronic systems shall be hardwired in conduit. Wiring shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed wiring shall run parallel to room surfaces; location shall be approved by the Architect. No structural member shall be weakened by cutting, notching, boring or otherwise. Provide a 120 volt circuit for each device requiring external power. Dedicated circuits shall be provided where required. Any devices or wiring exposed to the weather shall be protected in weatherproof enclosures such as NEMA 3R and weatherproof conduit.

- B. Labeling of System: DDC/EMS Contractor shall provide complete labeling of all terminals at all panels or equipment terminal strips and wiring. Equal to Brady marking on wires and number on terminals in sequence corresponding to control diagram.

- C. Programming:
 - 1. The Direct Digital Control and Energy Management System (DDC/EMS) operational program shall be provided by the DDC/EMS Contractor. The DDC/EMS Contractor shall be responsible for programming the system and shall coordinate the scheduling (on/off times) with the Owner. Prior to start-up, the DDC/EMS Contractor shall provide any testing program he feels necessary to fully test the operation of the various components.
 - 2. The DDC/EMS Contractor shall load the operational program into the DDC/EMS controller from his office via the system's modem or at the job site via a direct connect cable. Prior to starting up the system, the DDC/EMS Contractor shall:
 - a. Confirm that the control system has been connected to the District's LAN/WAN, a dedicated telephone line, and that the LAN/Wan and the phone line and system modem is working.
 - b. Confirm the functionality of the DDC/EMS controllers and all input points by reading the input values, and comparing them with a measured temperature, pressure, voltage, current, or resistance as appropriate. Calibrate all transducers as required.

- c. Confirm the functionality of all digital output points by manual operational of the relay contacts. Use proper discretion in starting and stopping equipment.
 - d. Confirm the functionality of all analog output points by manually imposing an adjustable voltage on the appropriate circuit to check proper operation of the controlled device. Calibrate all transducers as required.
 - e. The DDC/EMS Contractor shall notify the General Contractor (one week in advance of) when the system will be ready for loading and testing the operational program. The DDC/EMS Contractor's start-up technician shall be present while the program is being loaded and shall communicate with the programmer prior and after program loading to confirm proper operation.
- D. Training: Prior to final acceptance, the DDC/EMS Contractor shall provide operational training to the Owner's personnel. The training sessions shall include a complete demonstration of the system. Dates and times of the training sessions shall be coordinated through the Owner not less than one week prior to session. A total of 40 hours of instruction shall be provided - 24 hours initially, and 16 hours to be spread throughout the first year of operation. The DDC/EMS Contractor shall maintain a log of training sessions including dates, times and names/titles of those attending. The DDC/EMS Contractor shall submit a copy of this log on request.
- E. Testing and Acceptance: The DDC/EMS Contractor shall furnish a complete and operating system. The DDC/EMS Contractor shall also verify, in the presence of the Owner, the system accuracy and proper function of each controlled device and sensor. The following items shall be successfully demonstrated prior to acceptance by the Owner:
 - 1. All system outputs including controllers, relays, and other control devices shall be addressed and start/stop functions demonstrated.
 - 2. All inputs shall be displayed and all event-initiated functions shall be demonstrated.
 - 3. Demonstrate program integrity and power restore sequence during and after a power failure and restoration.
 - 4. Deliver all Record Drawings, wiring diagrams, equipment specifications, installation and Operation Manuals and other documentation as required to describe the system.
 - 5. Complete operator training in the use, programming, and operation of the system.
 - 6. Daikin I-Touch System Commissioning: Shall be by the manufacturer representative's factory certified technician.
- F. Start-up of the System:
 - 1. The start-up period starts when the following conditions are met:
 - a. The DDC/EMS system and all involved HVAC equipment have been installed, connected to the DDC/EMS system and are ready to operate.
 - b. A start-up meeting has been conducted with representative of the General Contractor, Architect/Engineer, maintenance staff, and the DDC/EMS Contractor.
 - c. Consensus is reached, by the representatives at the above referenced meeting that it is appropriate for the start-up process to start.
 - 2. The alarm pagers called by the control system during the start-up period shall be the pagers carried by the Mechanical Contractor and/or DDC/EMS Contractor as appropriate. The Mechanical Contractor and DDC/EMS Contractor shall respond to all pages from the control system and work cooperatively to insure that the building environmental standards are maintained.
 - 3. The start-up process shall be completed and the warranty period shall start when the following conditions are met.
 - a. All training to be provided as part of the project has been completed.
 - b. No "alarm" or "condition reports" are being generated by the DDC/EMS system for seven (7) calendar days (168 hours) due to incomplete or inaccurate installation or programming.
 - c. All adjustments and "fine tuning" of the system have been completed.

- d. The phone numbers for the pagers and alarm printer are programmed.
- G. Verification: A written testing and start-up report must be submitted for approval before acceptance. In addition to the DDC/EMS Contractor's testing and start-up report, the Owner may independently verify the test results. The report on test results shall include setpoints and operating ranges of all components.

3.2 SEQUENCE OF OPERATION: REFER TO DETAILS F, G AND H ON DRAWINGS SHEET M6 FOR ADDITIONAL SENSORS AND POINTS.

- A. Split System Heat Pump (IDU/ODU): (Heating set point 72°F, Cooling set point 75°F) The unit shall run per the system operation schedule through the DDC/EMS. Room temperature sensor shall be wall mounted. If the bypass button on the room temperature sensor is activated, the heating/cooling unit shall start for two hours (adj.). The unit set point shall be adjustable $\pm 2^{\circ}\text{F}$ (adj.) from a switch located on the temperature sensor. Unit fan shall run continuously on start by the DDC/EMS. DDC/EMS shall control the heating/cooling unit to maintain set points. On call for cooling, the DDC/EMS shall start the unit cooling at 2°F (adj.) above cooling set point and run to 2°F (adj.) below set point for cooling and then stop the unit cooling. On call for heating, the DDC/EMS shall start the unit heating at 2°F (adj.) below heating set point and run to 2°F (adj.) above set point for heating and then stop the unit heating. IDU/ODU-1 thru 8 shall have an outside air damper which shall open when unit is running. The DDC/EMS shall monitor the unit status with a current sensor and the supply air temperature. For IDU-1 and 2, a signal from the area detection fire alarm system (Div. 28) shall shut off the unit on alarm. Control contactor shall install wiring from fire alarm shutoff relay to the unit.
- B. Exhaust Fans: Shall start/stop by DDC/EMS unless scheduled otherwise on drawings. Current sensor shall report fan status to DDC/EMS.
- C. Domestic Hot Water Circulating Pump (CP-1): Shall start/stop by DDC/EMS. Current sensor shall report pump status to DDC/EMS.
- D. Outside Lighting: Outside lighting points currently controlled by DDC/EMS shall remain. Provide additional points, if required by the Electrical Drawings. Coordinate with Division 26.

END OF SECTION 23 0923

SECTION 26 3100 - PHOTOVOLTAIC SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included:
 - 1. PV Module and Array
 - 2. Communications

1.2 RELATED SECTIONS

- A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 26 60 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

- A. Provide electronic (PDF) set for all components to be installed for a complete and operable photovoltaic system.
- B. In addition provide:
 - 1. Overview of major system components and principals of operation.
 - 2. Complete parts lists, including electrical components, mechanical hardware and other equipment required for installing the systems. (Must include description, make, model/part number and source for the equipment provided.)
 - 3. If different from design documents, provide diagram indicating overall layout of entire system, including PV array, and location of GII and combiner boxes with respect to the array.
 - 4. If different from design documents, provide electrical schematics and diagrams showing major components and devices, including conductor types and sizes, connections of individual modules and array source circuits, terminations at junction boxes, connection to surge suppression devices and the GII, and the GII interface with the utility grid.
 - 5. Mechanical drawings showing details of module/array mechanical support structure and instructions for assembling and installing arrays on rooftops.
 - 6. Complete assembly and installation instructions for mounting array, junction boxes and enclosures, routing conduit, wiring arrays, and terminating conductors at array, combiner boxes and GII.
 - 7. Procedures for operating, disconnecting, servicing and maintaining complete system and individual components.
 - 8. Warranty information on individual components as required in this bid document.
 - 9. Equipment manufacturer's specifications and operations manuals, including those for PV modules, GII, overcurrent devices, disconnects and optional equipment

10. Qualifications for installer(s), including minimum 5 grid-interactive PV projects of minimum 15 kilowatts at STC within 200 miles of the project site.

1.5 QUALITY ASSURANCE

- A. Quality assurance as required by Section 26 60 00, Electrical Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 1. IEEE Standards Coordinating Committee 21, IEEE 1547 Standard for Interconnecting Distributed Resources with Electrical Power Systems.
 2. Underwriters Laboratories, Standard for Safety: Flat-Plate Photovoltaic Modules and Panels, Standard UL 1703.
 3. Underwriters Laboratories, Standard for Safety: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources, Standard UL 1741.
 4. System designed and installed by a qualified installer with a minimum of 5 years of experience in installation of commercial photovoltaic systems.

1.6 WARRANTY

- A. Warranty of materials and workmanship as required by Section 26 60 00, Electrical Basic Requirements and Division 01, General Requirements.
- B. In addition, provide:
 1. Provide minimum 20 year warranty on power output of PV modules.
 2. Provide with minimum 10 year replacement warranty from the manufacturer covering parts and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Modules
 1. Monocrystalline or Polycrystalline Modules (60-cell):
 - a. Hanwha QCELLS (Basis of Design)
 - b. SunPower
 - c. Canadian Solar
 - d. Trina Solar
 - e. LG
 - f. Or approved equivalent.
- B. Inverters
 1. Inverters
 - a. Sol-Ark (Basis of Design)
 - b. SolarEdge
 - c. Enphase Energy
 - d. APsystems

e. Or approved equivalent.

- C. Combiner/Rapid Shutdown Boxes
 - 1. Sol-Ark (Basis of Design)
 - 2. SolarEdge
 - 3. SolarBOS
 - 4. Yaskawa Solectria RSDCOM
 - 5. Enphase Combiner Box
 - 6. Or approved equivalent.
- D. Energy Storage System (ESS)
 - 1. EG4 Electronics (Basis of Design)
 - 2. SolarEdge Energy Bank
 - 3. Enphase Energy
 - 4. SunPower
 - 5. Generac
 - 6. Or approved equivalent.
- E. Power Optimizers
 - 1. Sol-Ark 0900-80V (Basis of Design)
 - 2. SolarEdge P750
 - 3. Tigo
 - 4. Or approved equivalent.

2.2 PV MODULE AND ARRAY

- A. PV Modules: Monocrystalline or Polycrystalline.
- B. Non-Thin Film Modules Include: Tempered glass, EVA laminate, weatherproof film. Black, anodized aluminum frames and trim strips. Rated for 1-inch diameter hailstones at 52 mph.
- C. Performance requirements:
 - 1. Module Maximum Power (STC): 415 Wp.
 - 2. Minimum Module Efficiency: 22%.
 - 3. Maximum System Voltage: 600 Vdc.
 - 4. Minimum Array Size (STC): 10.79 kW.
- D. Physical/mechanical characteristics:
 - 1. Verify all dimensions and weights with actual components being provided.
 - 2. Dimensions 74-inches by 41.1-inches by 1.26-inches.
 - 3. Weight: 48.5 pounds.
 - 4. Nominal module Operating temperature: 103.6 degrees F to 114.4 degrees F.
 - 5. Permitted module temperature on continuous duty: -40 degrees F to 185 degrees F.

2.3 GRID-INTERACTIVE INVERTER (GII) AND UTILITY INTERCONNECTION

- A. Design with GII built specifically for grid-interactive connection photovoltaic arrays to utility,

and capable of automatic, continuous, and stable operation over the range of voltages, currents, and power levels for the size and type of arrays used.

- B. Provide each GII to be compliant with IEEE 1547 (Standard for Interconnecting Distributed Resources with Electric Power Systems) and meet UL1741 (Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources) or equivalent product listing. GII to comply with the latest applicable ANSI and FCC standards and addenda dated prior to the award of the purchase order for this procurement.
- C. Provide GII with communications connection for remote monitoring of inverter operation through the internet. Provide and configure software for receiving and tabulating this information through a graphic user interface accessible over the internet. Provide communications card in each GII to allow daisy-chained RS-485 connection between GII's, and interface card for internet communications. Software to provide DC voltage, current, power and energy production, AC voltage, current, power and energy production, operational status of the GII, and graphical record of past production for minimum of 365 previous days on 15 minute increments. Prior to construction, determine location and accessibility to LAN connection point.
- D. Provide GII with minimum 10 year replacement warranty from the manufacturer covering parts and labor.
- E. Base Bid Inverter Sol-Ark 15k-2P-N:
 - 1. GII Performance Criteria:
 - a. Maximum Array Input Power: 19.2 kW.
 - b. Maximum Input Voltage: 500VDC
 - c. Maximum AC Output Current: 62.5A at 240V, 1-phase

2.4 COMMUNICATIONS

- A. Provide internet portal account through inverter manufacturer to allow real time monitoring of total system and individual inverter power and energy production, with logs going back to at least 365 days.
- B. Portal interface:
 - 1. In bar graph, show power (watts) and energy (kilowatt-hours) production on hourly basis for one day, daily basis for one month, and daily basis for one year. Provide means to examine past power and energy production for at least the previous 365 days.
 - 2. Program interface to allow end user to examine power and energy production for the total site, as well as for each individual GII.
 - 3. Supplemental Display Information: Show PV system size in KW, maximum output production in KW, quantity and manufacturer/model of GII and quantity and manufacturer of PV modules, installation date.
 - 4. Lifetime Energy Production: Show lifetime total equivalents (e.g. number of typical residences that could be powered for one day, number of cups of coffee that could be brewed with same energy, gallons of gasoline offset, etc.).
 - 5. Greenhouse Gas Offsets: Show offset quantities for clean energy produced

- (example: weight of carbon dioxide, nitrogen oxides, sulfur oxides).
6. Environmental Information: Show current ambient temperature, cell temperature, irradiance, wind speed and direction.
 7. Integration of Other Meters: Show power and energy consumption from sub-metering on main electrical service; see Drawings for locations. Provide and connect to Veris H8163 Series and matching split-core CT.
- C. Basis of Design:
1. Integral internet-based data logger with RJ-45 connection.
 2. Tie data logger to internet portal via TCP/IP connecting via building local area network. Fronius Interface Card or approved equivalent.
 3. Provide telecommunications cabling and connectivity under Division 27, Communications as required to fulfill Basis of Design.
 4. Provide tele/data outlet in Main Electrical Room where directed by Owner to allow Owner to add flat screen monitor and/or computer for remote monitoring of PV power and energy production through kiosk, remote internet portal site.
 5. Display Package: Provide internet gateway compatible with GII communications, including: Full weather station for display of environmental information specified in this Article, lobby kiosk display software and connectivity as required by Owner, system installer support portal for commissioning system, electrical demand measurement and connection from main electrical sub-meter to internet gateway. Fat Spaniel Insight Views Package, or approved equivalent.

PART 3 - EXECUTION

3.1 SYSTEM DESCRIPTION

- A. These specifications cover the design and procurement of equipment, hardware and documentation required for the installation of grid-connected PV systems.
- B. Provide complete system installation, in addition to documentation on the design, configuration, permit acquisition, installation, operation and maintenance of the complete system and individual components.
- C. System designed for installation in California; all equipment provided must meet state requirements for photovoltaic equipment. Supplied equipment must be rated and warranted to withstand and operate under normal weather conditions at the site.
- D. Each PV system will be connected to the utility electric grid through a grid-interactive power conditioner (inverter). The design and functional specification of the PV modules, power conditioners, utility interconnections, PV system electrical design, and PV array mechanical design are described in the following articles.
- E. Utility Coordination: Coordinate with local Utility Company prior to start of work for location of their net metering equipment, including CT enclosure provided under this Contract per the Drawings, and any additional utility required disconnects which will also be provided under this Contract.

- F. Basis of Design: Provide PV system designed to meet or exceed the performance requirements of the equipment, listed in this specification, while staying under the physical size and weight requirements listed. Costs to allow approved alternative manufacturers and models to meet the performance requirements as specified are part of the scope of this Contract.

3.2 PV SYSTEM ELECTRICAL DESIGN

- A. Provide electrical design and installation instructions for the PV systems conforming to the California Electrical Code (CEC). Article 690 of the CEC applies specifically to photovoltaic system safety, protection, control and interface with other sources. Other articles of CEC also apply. Comply with IEEE 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems.
- B. Electrical components, including overcurrent protection, disconnects, surge suppression devices, conduit, wiring and terminals must have UL or equivalent listing and have appropriate voltage, current and temperature ratings for the application. Special attention should be given to appropriate ratings for components used in DC circuits.
- C. Wiring must be listed for 600VDC and 600VAC, and a temperature rating of 90C in wet locations. The use of exposed conductors or cabling (excluding grounds) is not acceptable, except MC cable connectors installed under PV modules. Exposed conduit to be painted to match surrounding area. Confirm color with Architect.
- D. Ampacity calculations must take into account appropriate deratings as required. Conductors in the system are subject to a 125 percent CEC derate, and DC source circuit conductors and overcurrent devices must include an additional 125 percent derate for solar radiation enhancements. Appropriate temperature deratings for conductors used in module junction boxes must be considered for peak module operating temperatures, as well as deratings for instances where more than three current-carrying conductors are enclosed in a conduit.
- E. Voltage drop in array DC source circuits should be limited to no more than 2 percent, including losses in conductors, and through all fuses, blocking diodes and termination points.
- F. Overcurrent devices must have trip ratings no greater than the derated ampacity of the conductors that it protects.
- G. Series connected strings of modules (source circuits) must include a series fuse as required by UL and CEC to prevent excessive reverse current flow through modules in source circuits. Parallel connections of modules in individual source circuits are not permitted.
Parallel-connected cells within individual modules are allowable as long as the module listing allows for the series fuse required for this configuration.
- H. Series connected strings of modules (source circuits) must also include a blocking diode or power optimizer to minimize overall array losses due to partial shading of source circuits. These diodes should have low voltage drop to meet the requirements above, and have a voltage and current ratings (at temperature) at least twice the open circuit voltage and short-circuit ratings of the source circuits.

- I. Terminations must use listed box terminal or compression type connections. Twist on wire splices, crimped, soldered or taped connections are not permitted for the required field installed wiring. Proper torque specifications should be provided for the required field connections.
- J. Module frames, metal enclosures, panel boards and the grid-interactive inverter (GII) should be provided with connections for bonding to a common grounding conductor and terminating at the ground electrode system at the utility service entrance point. In addition, provide for grounding the neutral of the GII output. The DC negative circuit may be common to the AC neutral in the GII design and under no circumstances should multiple connections to ground be specified for current carrying conductors in the system.
- K. Provide a weathertight, vented, locking, pad mountable enclosure, suitable for housing the GII, AC/DC disconnect devices, and source circuit combiner boxes (as required). Enclosure rating: NEMA 4, 3R or better and have superior strength and corrosion resistance properties based on the project location.

3.3 PV ARRAY MECHANICAL DESIGN

- A. Provide hardware as required for assembling the photovoltaic modules and panels, and structurally attaching them to the base support structure.
- B. Coordinate PV array and equipment mounting with PV system mounting structures shown on Drawings. Where array and supporting equipment deviate from Basis of Design, include cost of engineering services to update Drawings and Structural Calculations for submitted design. Array design that requires modification of building structure in addition to structure supporting PV array and equipment is not acceptable under this Contract.
- C. Provide panel layout design with firefighter access and egress paths per local Codes.
- D. Include a 36-inch wide pathway maintained along three sides of the solar roof. For arrays larger than 150-feet, measured in length or width, to have a 36-inch intermediate pathway for service, maintenance and egress. Disconnects, junction boxes, combiner boxes or gutters not to be located in any required pathway or cutout.
- E. Array mounting hardware supplied by the bidder to be compatible with the site considerations and environment. Minimize risk from exposed fasteners, sharp edges, and potential damage to the modules or support structure. Emphasize corrosion resistance and durability of the mechanical hardware. Avoid use of ferrous metals, contact of dissimilar metals or wood or plastic components.
- F. As these are high profile, publicly visible installations, the aesthetics of the overall installation is extremely important to the Owner. To create a uniform appearance of the array, spacing between individual modules and panels should be kept to a minimum. As much as possible, conceal mechanical hardware, conduit, junction boxes and other equipment beneath and/or behind the array.

- G. Be consistent with the ordering and labeling of source circuits in the array combiner boxes. Ease of access for array troubleshooting and maintenance is desired by allowing access to the back of the array for module junction box servicing, and removal/replacement of individual source circuits and modules if necessary.

3.4 INSTALLATION

A. Grid-Interactive Inverter:

1. Provide fusing for incoming strings.
2. Clean interiors and ensure airways for convective cooling are clear and debris-free.
3. Verify that inverter display measures for AC voltage match measurement from a true-RMS AC digital voltmeter.
4. Check that maximum power point tracking circuit is operational. Monitor array voltage from open circuit condition until it reaches a point where system power peaks and then starts to drop again. Provide chart of field measurements input and output voltage and current through the day as part of O&M manual.
5. Provide factory required clearances and air space for cooling and ventilation.

B. Photovoltaic System Wiring:

1. Field connections: Use crimp-on connectors that maintain connection even when screw loosens.
2. Size wiring from inverter to PV modules based on less than 2 percent voltage drop in any string.
3. Conceal flexible conduit and MC cable to underneath the PV modules. Outside of the PV modules, use rooftop conduit per Division 26, Electrical.
4. PV module wiring to be secured to run parallel and perpendicular to module frame lines, as well as be secured to module and module support structure. Do not allow PV module wiring to rest unsupported against the roof surface.
5. Provide strain reliefs and cable clamps on cable and cords for PV modules.
6. Retorque terminations prior to completion of construction.

C. Grounding:

1. Verify that one connection to DC circuits and one connection to AC circuits is being used for system grounding referenced to the same point. Bond to buildings main grounding system.
2. Provide bonding for non-current carrying metal parts to ensure they are grounded properly.
3. Grounding electrode to be installed in accordance with CEC Article 250.122 (AC) but not smaller than #6 AWG copper or #4 AWG Aluminum.
4. Provide grounding electrodes at the location of ground and pole mounted arrays as close as possible. Bond to buildings main grounding system.

D. Signage:

1. Post an "Interactive Point of Connection" sign per CEC Article 690.
2. Place a sign at building service entrance indicating type and location of on-site interactive electric power production sources and disconnects per CEC Article 705.
3. At each inverter, post a sign indicating:

- a. Label for Inverter.
 - b. Operating current and voltage.
 - c. Maximum system voltage.
 - d. Short circuit current.
- E. Install PV panels, inverter, wiring, protection device as per written installation instructions from the manufacturer.
- F. Coordinate mounting of panels with structural engineer and roof system installer prior to submitting design documents.

3.5 TESTING

- A. Test each PV panel per manufacturer's written instructions prior to connection to inverter. String level testing is allowed. Document test results and submit in O&M manuals.
- B. Test inverters per manufacturer's written instructions. Document test results and submit results with O&M manuals.

3.6 DISPLAY COMMISSIONING AND TRAINING

- A. Coordinate with Owner for TCP/IP address for PV communications gateway prior to start of programming.
- B. Provide manufacturer supported programming and commissioning services as required for functionality of system as described above. Provide Owner minimum two 2-hour training sessions on separate days with factory support, for use of both internet portal and review installation of communications system. Provide audio/video record of both sessions. Hold either session no less than 30 days from date of substantial completion of the project.
- C. Prior to installation of Energy Storage System, contractor is to provide commissioning and decommissioning plans in accordance with California Fire Code sections 1207.2. See Appendix A for a template of ESS commissioning and decommissioning plans.

END OF SECTION

Appendix A – Battery Energy Storage System Commissioning / Decommissioning Plan

General Project Information

- **Project Name:** New Classroom Wing at Sunset Elementary School
- **DSA Application#:** A#02-122658, File# 10-28
- **Owner/Client:** Coalinga-Huron Unified School District
- **Commissioning Objectives:**
 - (1) Ensure compliance with specifications and standards,
 - (2) Verify system performance and functionality,
 - (3) Identify and rectify any issues before full operation, and
 - (4) Provide documentation and training for operation & maintenance.
- **System Summary:**

Project Location	985 Sunset Avenue, Coalinga, CA 93210
Min. Design Temperature	- 2°C
Max. Design Temperature	65°C
PV Module	QCELLS Q.PEAK DUO ML-G10+
PV Module Wattage @ STC & Count	(38) 415W
PV DC System Size	15.77 kW DC
PV Inverter Type & Count	(1) Sol-Ark 15k-29-N
BESS Type & Count	(2) EG4 Electronics All-Weather Battery (15 kWh)

- **Personnel:**

Team Member / Contact Information	Project Responsibility
Owner:	
Project Manager:	
Training Coordinator:	
Site Supervisor:	
Site Technicians:	
Safety Officer:	
Test Engineers:	
IT Specialist:	
Environmental Engineer:	
Safety Engineer:	

1. Phased Commissioning Activities

- **Phase 1: Pre-Commissioning**
 - **Personnel:** Project manager, lead engineer, site supervisor.
 - **Activities:**
 - **Design Review:** Verify that design meets specifications and regulatory requirements.
 - **Documentation Check:** Ensure all necessary documentation (manuals, schematics, etc.) are available.
 - **Site Preparation:** Confirm site readiness (e.g., electrical connections, environmental conditions).
 - **Commissioning Team:** Assemble commissioning team and corresponding contact information. Assign roles and responsibilities (e.g., project manager, engineers, technicians).
- **Phase 2: Equipment Installation Verification**
 - **Personnel:** Site technicians, safety officer.
 - **Activities:**
 - **Installation Check:** Confirm installation of all ESS components and controls. Check installation quality, safety equipment, and connections.
- **Phase 3: Functional Testing**
 - **Personnel:** Test engineers, IT specialists.
 - **Activities:**
 - **Equipment Tests:** Conduct battery module tests (capacity, performance), inverter and charge/discharge tests, and integration tests with grid or microgrid. Verify communication between components.
 - **Safety Tests:** Verify operation of safety systems (e.g., fire suppression, emergency shutdown).
- **Phase 4: Integrated System Testing**
 - **Personnel:** Safety engineer, environmental engineer.
 - **Activities:**
 - Perform integrated testing of fire and safety systems.
 - Validate thermal management systems.
- **Phase 5: Training and Documentation**
 - **Personnel:** Training coordinator, lead engineer.

- **Activities:**
 - Prepare and provide O&M documentation.
 - Deliver training sessions for operation and maintenance staff.

2. ESS Components and Testing

- **Components to be Tested:**
 - Battery modules, inverters, control systems, safety devices (e.g., fire suppression systems, emergency disconnects).
- **Tests to be Performed:**
 - Capacity and performance tests for battery modules.
 - Inverter functionality tests (charge/discharge cycles).
 - Communication tests between components.
 - Safety device activation tests.

3. Testing Conditions

- Testing will be conducted under conditions that simulate normal operational scenarios, including:
 - Full charge/discharge cycles.
 - Ambient temperature ranges typical of operational conditions.
 - Expected load conditions based on usage forecasts.

4. Owner's Project Requirements

- Compile documentation that outlines:
 - Owner's performance expectations.
 - Safety requirements.
 - Compliance with local regulations.
 - Basis of design, including capacity, efficiency, and lifecycle requirements.

5. Installation Compliance

- Conduct inspections and testing to ensure that:
 - All equipment is installed according to approved plans.
 - Specifications for materials and installation methods are met.

- Non-conformities are documented and addressed.

6. Integrated Testing for Fire and Safety Systems

- Perform tests that include:
 - Activation and response of fire alarms.
 - Functionality of fire suppression systems.
 - Emergency shut-off systems testing.

7. Thermal Management and Ventilation Systems Testing

- Conduct performance tests for:
 - Cooling systems (e.g., air conditioning, liquid cooling).
 - Ventilation rates and exhaust systems to ensure adequate airflow.
 - Monitoring of temperature and humidity within battery enclosures.

8. O&M Documentation Preparation and Delivery

- Compile and deliver:
 - Operation manuals.
 - Maintenance schedules.
 - Safety procedures and emergency response protocols.

9. Facility Operating and Maintenance Staff Training

- Develop a training program that includes:
 - System operation and monitoring.
 - Safety protocols.
 - Maintenance procedures and troubleshooting.

10. System Performance / Maintenance Requirements

- Document:
 - Key performance indicators (KPIs) for ongoing monitoring.
 - Scheduled maintenance tasks to ensure compliance with design intent.
 - Performance assessment of metrics and reporting protocols.

- Risk Management:
 - Identify potential risks during commissioning.
 - Develop mitigation strategies.

11. Qualified Personnel Identification

- Create a list of qualified personnel for:
 - Service and maintenance.
 - Emergency response procedures.
- Ensure documentation of training and certifications for all personnel.

12. Decommissioning Plan

- **Plan Overview:**
 - Outline procedures for safe shutdown of the ESS, including:
 - Notification to code officials and emergency services.
 - Detailed steps for disconnecting and isolating systems.
 - Safety measures for handling damaged systems.
 - **Contingencies:**
 - Procedures for intact operational systems.
 - Special protocols for systems damaged by fire or other incidents.

Conclusion

This commissioning plan is designed to ensure a systematic approach to the commissioning of the energy storage battery system. Tailor the specifics to align with the project's unique requirements and regulatory considerations. Regular updates and reviews should be incorporated as necessary throughout the commissioning process.

Appendix A – Battery Energy Storage System Commissioning / Decommissioning Plan

General Project Information

- **Project Name:** New Classroom Wing at Sunset Elementary School
- **DSA Application#:** A#02-122658, File# 10-28
- **Owner/Client:** Coalinga-Huron Unified School District
- **Commissioning Objectives:**
 - (1) Ensure compliance with specifications and standards,
 - (2) Verify system performance and functionality,
 - (3) Identify and rectify any issues before full operation, and
 - (4) Provide documentation and training for operation & maintenance.
- **System Summary:**

Project Location	985 Sunset Avenue, Coalinga, CA 93210
Min. Design Temperature	- 2°C
Max. Design Temperature	65°C
PV Module	QCELLS Q.PEAK DUO ML-G10+
PV Module Wattage @ STC & Count	(38) 415W
PV DC System Size	15.77 kW DC
PV Inverter Type & Count	(1) Sol-Ark 15k-29-N
BESS Type & Count	(2) EG4 Electronics All-Weather Battery (15 kWh)

- **Personnel:**

Team Member / Contact Information	Project Responsibility
Owner:	
Project Manager:	
Training Coordinator:	
Site Supervisor:	
Site Technicians:	
Safety Officer:	
Test Engineers:	
IT Specialist:	
Environmental Engineer:	
Safety Engineer:	

1. Phased Commissioning Activities

- **Phase 1: Pre-Commissioning**

- **Personnel:** Project manager, lead engineer, site supervisor.
- **Activities:**
 - **Design Review:** Verify that design meets specifications and regulatory requirements.
 - **Documentation Check:** Ensure all necessary documentation (manuals, schematics, etc.) are available.
 - **Site Preparation:** Confirm site readiness (e.g., electrical connections, environmental conditions).
 - **Commissioning Team:** Assemble commissioning team and corresponding contact information. Assign roles and responsibilities (e.g., project manager, engineers, technicians).

- **Phase 2: Equipment Installation Verification**

- **Personnel:** Site technicians, safety officer.
- **Activities:**
 - **Installation Check:** Confirm installation of all ESS components and controls. Check installation quality, safety equipment, and connections.

- **Phase 3: Functional Testing**

- **Personnel:** Test engineers, IT specialists.
- **Activities:**
 - **Equipment Tests:** Conduct battery module tests (capacity, performance), inverter and charge/discharge tests, and integration tests with grid or microgrid. Verify communication between components.
 - **Safety Tests:** Verify operation of safety systems (e.g., fire suppression, emergency shutdown).

- **Phase 4: Integrated System Testing**

- **Personnel:** Safety engineer, environmental engineer.
- **Activities:**
 - Perform integrated testing of fire and safety systems.
 - Validate thermal management systems.

- **Phase 5: Training and Documentation**

- **Personnel:** Training coordinator, lead engineer.
- **Activities:**
 - Prepare and provide O&M documentation.
 - Deliver training sessions for operation and maintenance staff.

2. ESS Components and Testing

- **Components to be Tested:**

- Battery modules, inverters, control systems, safety devices (e.g., fire suppression systems, emergency disconnects).

- **Tests to be Performed:**

- Capacity and performance tests for battery modules.
- Inverter functionality tests (charge/discharge cycles).
- Communication tests between components.
- Safety device activation tests.

3. Testing Conditions

- Testing will be conducted under conditions that simulate normal operational scenarios, including:
 - Full charge/discharge cycles.
 - Ambient temperature ranges typical of operational conditions.
 - Expected load conditions based on usage forecasts.

4. Owner's Project Requirements

- Compile documentation that outlines:
 - Owner's performance expectations.
 - Safety requirements.
 - Compliance with local regulations.
 - Basis of design, including capacity, efficiency, and lifecycle requirements.

5. Installation Compliance

- Conduct inspections and testing to ensure that:
 - All equipment is installed according to approved plans.
 - Specifications for materials and installation methods are met.
 - Non-conformities are documented and addressed.

6. Integrated Testing for Fire and Safety Systems

- Perform tests that include:
 - Activation and response of fire alarms.
 - Functionality of fire suppression systems.
 - Emergency shut-off systems testing.

7. Thermal Management and Ventilation Systems Testing

- Conduct performance tests for:
 - Cooling systems (e.g., air conditioning, liquid cooling).
 - Ventilation rates and exhaust systems to ensure adequate airflow.
 - Monitoring of temperature and humidity within battery enclosures.

8. O&M Documentation Preparation and Delivery

- Compile and deliver:
 - Operation manuals.
 - Maintenance schedules.
 - Safety procedures and emergency response protocols.

9. Facility Operating and Maintenance Staff Training

- Develop a training program that includes:
 - System operation and monitoring.
 - Safety protocols.
 - Maintenance procedures and troubleshooting.

10. System Performance / Maintenance Requirements

- Document:
 - Key performance indicators (KPIs) for ongoing monitoring.
 - Scheduled maintenance tasks to ensure compliance with design intent.
 - Performance assessment of metrics and reporting protocols.
- Risk Management:
 - Identify potential risks during commissioning.
 - Develop mitigation strategies.

11. Qualified Personnel Identification

- Create a list of qualified personnel for:
 - Service and maintenance.
 - Emergency response procedures.
- Ensure documentation of training and certifications for all personnel.

12. Decommissioning Plan

- **Plan Overview:**
 - Outline procedures for safe shutdown of the ESS, including:
 - Notification to code officials and emergency services.
 - Detailed steps for disconnecting and isolating systems.
 - Safety measures for handling damaged systems.
 - **Contingencies:**
 - Procedures for intact operational systems.
 - Special protocols for systems damaged by fire or other incidents.

Conclusion

This commissioning plan is designed to ensure a systematic approach to the commissioning of the energy storage battery system. Tailor the specifics to align with the project's unique requirements and regulatory considerations. Regular updates and reviews should be incorporated as necessary throughout the commissioning process.

SECTION 266000
GENERAL CONDITIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary conditions, Divisions 0 and 1, specifications apply to work of this section.

1.2 ALL WORK MUST CONFORM TO THE REQUIREMENTS WHICH FALL WITHIN THE SCOPE OF THE REGULATIONS IN THE CODES OR UNDER THE JURISDICTION OF ANY OF THE GOVERNING BODIES LISTED.

- A. The California Code of Regulations, Titles 19 thru 24.
- B. The California Electrical Code as applicable under current state and local regulations (latest edition and supplements).
- C. State Board of Health.
- D. CAL-OSHA Regulations.
- E. Nothing in these Specifications or shown on the plans shall relieve the Contractor from full compliance with applicable portions of any of the above regulations pertaining to work which is installed under this Contract.

1.3 PERMITS AND FEES

- A. Pay for and obtain all permits, inspection fees, etc., as required for the completion of all work included in this Contract. Any inspection Certificates required shall be obtained and delivered to the Owner.

1.4 EXAMINATION OF DRAWINGS AND SITE

- A. Before submitting the bid, the Contractor shall carefully examine the Architectural, Structural, Mechanical and Plumbing Drawings for this work, along with the Specifications for same in addition to the drawings and specifications governing the work of this trade. The Contractor shall also visit the site of the proposed construction and familiarize himself with all the site conditions. No subsequent allowances will be made to the Contractor because of negligence in complying with the above or alleged inability to understand the requirements.

1.5 CONDUCT OF THE WORK

- A. The Contractor shall maintain on the job a competent foreman or a superintendent at all times to superintend the work.

1.6 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall be responsible for the safety and good condition of all materials and equipment until final acceptance by the Owner. The Contractor shall erect and maintain suitable barriers, protective devices, lights, and warning signs where required for the protection of the public and employees about the buildings. The Contractor shall be fully responsible for any loss or injury to persons or property resulting from neglect or the carelessness and neglect by the Contractor's employees.

1.7 SUBMITTALS

- A. Shop drawings of power, signal, service, and distribution equipment and lighting fixture catalog cuts shall be submitted for approval in electronic format (PDF).
- B. All shop drawings shall be submitted at one time in a neat and orderly fashion in electronic format (PDF) with a title sheet including Project, Engineer and Contractor, table of contents. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings.
- C. Equipment or material furnished or incorporated in construction without prior approval of the Architect may be rejected and if rejected shall be removed from the structure and replaced with approved equipment or material at the Contractor's expense.

1.8 RECORD DRAWINGS

- A. See General Conditions.

1.9 CATALOG DATA AND OPERATING INSTRUCTIONS

- A. Upon completion of the work in this Contract, the Architect shall be furnished with a complete set of catalog data which describes each piece of equipment installed under this Contract. The catalog shall be bound in a set and shall be clearly labeled as to each item of equipment used.

PART 2 – PRODUCTS

2.1 LIST OF MATERIALS

- A. Within thirty (30) calendar days after the award of the Contract, the Contractor shall submit PDF copies of a complete list of materials to be installed under this Contract, giving, in the case of each item of material to be used, the name of the article. All substitutes must be approved by the Architect as stipulated in Section 01620.

PART 3 - EXECUTION

3.1 THE WORK AS LAID OUT IS TO SOME EXTENT DIAGRAMMATIC, AND THE LOCATION THEREON INDICATED MAY BE APPROXIMATE ONLY. THE CONTRACTOR, THEREFORE, SHALL INSTALL ALL THE EQUIPMENT, APPARATUS, CONDUIT RUNS AND THE LIKE AS FOLLOWS:

- A. Adhere to the location indicated as far as possible.
- B. Maintain ample head room in all rooms and passageways, clearance around all apparatus and equipment and under pipelines for unrestricted passage and for easy servicing of all apparatus, equipment, devices and the like.
- C. Verify the exact locations of all fixtures and other apparatus or devices as indicated on the drawings. In the event these drawings do not sufficiently indicate the locations for all such fixtures, apparatus or devices, the Contractor shall obtain the exact locations from the Architect.

3.2 CUTTING AND PATCHING

- A. This Contractor shall do all cutting and patching of the work for the installation of the equipment and materials as approved by the Architect and/or Engineer. All patching shall accurately match the adjoining work.

3.3 BORING

- A. Provide mechanical boring equipment to bore under existing asphalt, concrete, or other surfaces or objects as noted on the drawings. All borings shall be a minimum of 24" under the substrate material unless otherwise authorized by the Architect.
- B. Holes shall be bored not to exceed 1" larger diameter than the largest component remaining in the excavation.
- C. Water or air pressure jetting are not permitted, unless they comply with the following requirements:
 - 1) All surfaces of the hole can be visually inspected with 6' maximum length.
 - 2) All objects shall be supported continuously to prevent sagging.
 - 3) The hole shall be filled with compacted damp sand and inspected by the Project Inspector or Materials Testing Lab technician.

3.4 FOUNDATIONS AND SUPPORTS

- A. This Contractor shall provide all foundations, supports and hangers, etc., as required to install the equipment as specified or shown on the drawings. All equipment shall be supported, braced and cross-braced in such manner as to prevent sway and/or lateral movement.

3.5 EXCAVATION AND BACKFILLING

- A. Excavating required for the installation of the work shall be done by this Contractor. Underground lines outside the buildings shall be installed with a minimum cover of 24" except depth of utility services shall comply with respective utility company requirements.
- B. The conduit shall be laid on material described below to afford bearing for the full length of the conduit. Any part of the trench excavated below grade shall be corrected with thoroughly compacted material approved by the Architect.
- C. When the bottom uncovered at subgrade is soft and, in the opinion of the Architect, cannot support the conduit, a further depth shall be excavated and refilled to conduit foundation grade as required by the Architect.
- D. Backfill:
 - 1) 6" Below, Around, and to 6" Above Conduit: Material shall be sand. Place carefully around and on top of conduit, taking care not to disturb conduit. Consolidate with vibrator.

- 2) 6" Above Conduit to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture, and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- E. No excavation below the level of, or adjacent to, foundations of footings shall be made except in a manner approved by the Architect.
- F. A red or yellow tracer tape stating "CAUTION ELECTRIC LINE BURIED BELOW" shall be installed 12" above conduit, full length of trench.
- G. Electrical conduit shall not be run in excavations provided for plumbing or heating pipes, unless separated by a minimum of 12 inches.
- H. Verify location of all underground lines with Owner and utility companies before starting excavation. If any utility company facilities are identified and located within the perimeter of the building, the Contractor shall stop work, promptly notify the Architect, and secure instructions.
- I. Ten (10) days before doing any excavation or trenching, contact "Underground Service Alert," 1-800-642-2444, advise them of work schedule and comply with their recommendations.

3.6 CLEANING UP

- A. The Contractor shall keep the premises free from accumulations of waste material or rubbish. At the completion of the work, he shall remove all rubbish, tools, scaffolding and surplus materials from and about the buildings, leaving the premises in a clean condition.
- B. All exterior surfaces of exposed equipment and material shall be thoroughly cleaned of all dirt, cement, plaster and other debris, including the exterior surfaces of all conduit, conduit fittings, conduit hangers, insulation and the like.
- C. All surfaces to be painted shall be carefully wiped or otherwise cleaned; cracks and corners scraped out clean, grease and oil spots removed so that surfaces may receive paint without further preparation.
- D. All fixtures and plated materials shall be thoroughly cleaned and polished.

3.7 DAMAGE BY BREAKS

- A. The Contractor shall be responsible for all damage to any part of the premises caused by breaks in conduit or fixtures furnished and/or installed by him under this specification for a period of one (1) year from date of acceptance of the project by the Owner.

3.8 SITE CONDITIONS

- A. Where existing utilities are shown on the plans, extreme care shall be exercised in excavating near these utilities to avoid any damage thereto, and the Contractor shall be held responsible for any such damage caused by this operation.

- B. The general location and arrangement of conduit, equipment apparatus, etc., as shown in the drawings or herein specified and all installations shall be made in accordance therewith. Information on the drawings relative to existing services is approximate only. Minor deviations required to conform to actual locations shall be made without additional cost to Owner.
- C. Should existing utilities, not shown on the plans, be found during excavations, or identified, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from the operations after discovery of such utilities not shown on the plans. These utilities shall be removed or relocated as directed by the Architect. An equitable adjustment in the Contract will be made for the additional work involved.
- D. The Contractor shall use special precautions where excavations are made in the areas near electrical ducts since they may be high voltage ducts. All such ducts shall be exposed by careful hand excavation so as not to damage the ducts or cause injury to personnel and shall be suitably marked with warning signs, barricades, etc. as required.

3.9 STANDARD PRACTICE

- A. All work not shown in complete details shall be installed in conformance with the best standard practice for the trade.

3.10 INTENT

- A. It is the intention to provide systems that are complete in every respect without further cost to the Owner. Anything not shown in drawings, or indicated in the specifications, but required for complete operating systems shall be included as part of this Contract. This shall include all connections to existing services.

3.11 SPECIAL NOTE

- A. Attention of Contractor is hereby called to all work covered by notes on the drawings. Work covered by notes must be furnished and installed whether it is specifically mentioned in these specifications or not.

3.12 GUARANTEE

- A. Except as otherwise specified, all materials, apparatus equipment furnished and installed under the Electrical Section of this specification shall be new and free from all defects. Should any trouble develop within a period of one (1) year from date of acceptance of the work, due to inferior or faulty material and/or workmanship, the trouble shall be corrected, and material and equipment replaced by the Contractor without expense to the Owner.

3.13 SERVICES

- A. The location of any existing utility services shown on the drawings is approximate and shall be checked by this Contractor for exact location. Refer to "EXCAVATION AND BACKFILLING" for additional requirements.

3.14 ACCESS OPENINGS

- A. It shall be the responsibility of the Contractor to provide sufficient and convenient access openings, panels, etc., in the building construction where required for the maintenance of, installation and/or removal of all equipment, or other items of the various systems and equipment.

3.15 PURCHASE ORDERS AND ACCEPTANCE

- A. The Contractor shall file with the Architect two (2) certified copies of all purchase orders, for materials, equipment, appliances, and rentals thereof within two (2) weeks from date of Notice to Proceed with the Contract if requested by the Architect.
- B. The Contractor shall file with the Architect two (2) certified copies of acceptance of purchase orders for materials, equipment, and appliances by the manufacturer, distributor, or wholesale house within six (6) weeks from the date of Notice to Proceed with the Contract if requested by the Architect.
- C. Failure to provide same within the stipulated time shall be deemed sufficient cause for the Architect to withhold certificates of payment for work completed or materials and equipment provided by the Contractor or subcontractors toward the completion of their Contracts.

END OF SECTION

SECTION 267000
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

- A. UL 845 - Motor Control Centers; Current Edition, Including All Revisions.
- B. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary conditions, Divisions 0 and 1 and Section 26 6000 specifications apply to work of this section.

1.3 SCOPE OF WORK

- A. This portion of the work includes the furnishing of all labor and materials necessary for the complete wiring system to outlets and all equipment shown on the drawings or covered by this Section of the Specifications and other Division 26 and Division 28 sections of the Specifications. In general, the work includes the following:
 - 1) Complete system of branch circuit wiring, conduit and distribution equipment for lights, receptacles, and power.
 - 2) Furnish and install lighting panelboards, lamps, lighting fixtures, wall switches, convenience outlets, etc. as shown on drawings.
 - 3) All hangers, anchors, sleeves, chases, and supports for fixtures, all electrical equipment and materials.
 - 4) Furnish, install, and connect wire, conduit, and switches, etc. required for other equipment covered by other sections of these Specifications.
 - 5) All excavating and backfill as required for electrical work.
 - 6) The patching and repair of all work modified or damaged by the installation of work under this Contract.
 - 7) Outlet boxes and conduit system for telecommunications (voice and data).
 - 8) Demolition work.
 - 9) Terminal cabinets and backboards.
 - 10) The Contractor shall furnish and install all work necessary to make complete systems, whether or not such details are mentioned in these Specifications or shown on the drawings, but which are necessary in order to make complete working systems, excepting only those portions that are specifically mentioned therein or plainly marked on the accompanying drawings as being installed by other Contractors.

- 11) Electrical Contractor must coordinate his work with the work of other trades so as to provide raceways, conductors and outlets in the correct location for the equipment served, including all built-in appliances, mechanical, and signal equipment and connect same. Electrical Contractor must provide power of the correct voltage and phase to each item of equipment.
- 12) Before construction starts, the Electrical Contractor shall arrange a coordination meeting with the General Contractor and all other subcontractors supplying equipment that requires electrical connections. All electrical requirements shall be verified, and any problems shall be immediately reported to the Architect. Equipment items to verify shall include, but not be limited to: Voltage, amps, phase, location, orientation, space requirements, type of connection, starter and disconnect location and provision, control system operation and requirements, etc.
- 13) The above list is given for the convenience of the Contractor and is not considered all-inclusive.
- 14) Complete system of conduits, substructures and equipment for power, telephone, and cable television services. The Electrical Contractor shall inform the respective utility companies that the project has been started and confirm that all forms, which are required for the Application for Service, have been completed and submitted to the Utility Company. The Electrical Contractor shall obtain a copy of the approved engineering drawings prior to construction.

1.4 TEMPORARY CONSTRUCTION POWER

- A. Provide a temporary construction power system that is adequate for this project. Coordinate requirements and details with the General Contractor. All 120V, 15A and 20A receptacles shall have ground fault circuit interrupter protection.

1.5 WORK NOT INCLUDED

- A. A. The furnishing and installation of motors.
- B. Access panels.

1.6 COORDINATION OF HEATING, AIR CONDITIONING, PLUMBING HEATING, AIR CONDITIONING, PLUMBING AND OTHER MECHANICAL WORK

- A. The Mechanical Contractor shall furnish equipment such as motors, starters, thermostats, wiring diagrams, etc. However, the Electrical Contractor shall be responsible for furnishing and installing of all fused disconnect switches, conduits, wire, fittings, etc. for power connections.
- B. Install all electrical equipment where it is not already installed as a part of a unit furnished by the Equipment Contractor. (See drawings of respective contractors).
- C. The Electrical Contractor shall furnish fused disconnect switches for pumps, motors and air conditioning and handling units, if they are not furnished by others. Fuses shall be dual element, rating per equipment manufacturer's recommendations. Disconnects shall comply with requirements for "Motor Disconnects" as specified earlier in this section.
- D. All disconnect switches (whether provided with unit or by Contractor) shall have a circuit identification engraved nameplate as specified under "Motor Disconnects".

- E. Thermal overload protection shall be furnished for all motors where such protection is not included as a part of another contract.
- F. All motor outlets, disconnect switch locations and control outlets shown on the plans are approximate only. Verify exact location of same with Equipment Contractor.
- G. All line and low voltage controls, including conduits, outlets, wiring and connections shall be furnished and installed by the Mechanical Contractor. (Division 23).
- H. Furnish and install a weather-resistant duplex receptacle with ground fault circuit interrupter protection within 25 ft. of all rooftop H.V.A.C. units. Provide a diecast weatherproof "while-in-use" lockable cover, Red Dot #CKSUV or equal.
- I. Coordinate with General Contractors, Mechanical Contractors and equipment suppliers before bid is submitted and again before rough-in is started to verify that all systems are complete and all components are provided including starters, disconnects, relays, solenoids, control conduit and wire, etc.

PART 2 - MATERIALS

- 2.1 ALL MATERIALS, APPLIANCES, AND EQUIPMENT EXCEPT THAT FURNISHED BY THE OWNER SHALL BE NEW, BEAR U.L. LABEL AND OF THE MAKE, BRAND OR QUALITY SPECIFIED OR AS ACCEPTED BY THE ARCHITECT AS HEREIN PROVIDED. THIS SHALL ALSO APPLY TO ALL PARTS OF THE WORK WHETHER OR NOT THIS PARTICULAR PARAGRAPH IS REFERRED TO BY NUMBER.
- 2.2 ALL APPARATUS, CONDUIT SYSTEMS, ETC., SHALL BE INSTALLED AND INTERCONNECTED SO AS TO FORM COMPLETE SYSTEMS AS HEREIN SPECIFIED AND/OR SHOWN ON ALL THE ACCOMPANYING DRAWINGS. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL WORK NECESSARY TO MAKE COMPLETE WORKING SYSTEMS, EXCEPTING ONLY THOSE PORTIONS THAT ARE SPECIFICALLY MENTIONED HEREIN OR PLAINLY MARKED ON ACCOMPANYING DRAWINGS AS BEING FURNISHED BY OTHER CONTRACTORS.
- 2.3 PANELBOARDS
 - A. The panelboards shall be constructed in accordance with the standard set up by the Underwriters' Laboratories, Inc., and as manufactured by Square "D", General Electric, Eaton, Siemens or approved equal, and each shall contain the number and type of circuit breakers as indicated on the drawings. All circuit breakers, rated 100 amps and larger, shall be sub-feed type and equipped with adjustable instantaneous trip settings.
 - B. The panelboards shall be equipped with a hinged lockable door, piano hinged trim, and typewritten circuit directory. All finish in offices, corridors, or areas subject to public view shall be prime coat for finish coat by painter. In storage rooms, equipment rooms, etc., finish shall be standard factory gray Hammertone. Provide a flush lock on all panelboards.
 - C. Provide an engraved Bakelite nameplate, fastened with screws or rivets to the face of each panelboard, which will identify it.
 - D. Any panel with an isolated ground bus shall have a nameplate stating, "IG CIRCUITS". Nameplate to be same size and color and adjacent to panel designation nameplate.
 - E. Seven copies of detailed construction drawings for the panelboards and terminal cabinets shall be submitted to the Architect for Approval before their construction is started.

2.4 MAGNETIC STARTERS

- A. Motor Starters shall be across-the-line magnetic type rated in accordance with NEMA Standards, sizes, and horsepower ratings, mounted in general purpose enclosures, or NEMA 3R as required. All starters shall be full voltage, non-reversing, unless otherwise noted. Thermal overload relays on starters shall be non-compensated bimetallic type with selector for either auto or manual reset. Overload heater units shall be provided in each leg of starter unit. Each starter shall have 2 auxiliary interlock contacts.
- B. Each starter shall have 120-volt control transformer and HOA selector switch mounted on cover.

2.5 TERMINAL CABINETS

- A. Terminal cabinets shall be flush, or surface mounted as indicated with hinged doors and lock. The exterior finish to be same as for panelboards. Provide $\frac{3}{4}$ " plywood backing inside of cabinet. Provide proper number of terminals in cabinets as required.
- B. Provide a Bakelite nameplate fastened with screws or rivets to the face of each terminal cabinet, which will identify it.
- C. Provide circuit directory and holder on inside of door with one line for each conductor entering and each conductor leaving cabinet.

2.6 RACEWAYS AND FITTINGS

- A. Shall be manufactured by Allied Tube and Conduit Corporation, AFC Cable Systems, Inc., Carlon, Cantex, PW Pipe or approved equal.
- B. Galvanized rigid steel conduits (RSC) may be used in all above ground locations.
- C. For underground runs in direct contact with earth, conduit shall be wrapped with PVC tape or shall have factory applied PVC coating.
- D. Galvanized intermediate metallic conduit (IMC) may be used in indoor locations not in direct contact with earth.
- E. Galvanized electrical metallic tubing (EMT) may be used in indoor dry locations in which it is:
 - 1) Not subject to physical damage.
 - 2) Not in direct contact with earth.
 - 3) Not in concrete slabs.
 - 4) Not in hazardous areas.
 - 5) On roof or walk cover when specifically shown on drawings.
 - 6) In masonry walls, not in the same cells as rebars.
- F. Non-metallic rigid conduit shall be PVC Schedule 40 and may be used:
 - 1) Underground.

- 2) Below concrete slab on grade.
 - 3) In concrete slab on floors above grade.
 - 4) In masonry walls, not in same cells as rebars.
- G. Flexible steel conduit may be used in dry locations for final connections to:
- 1) Motors, transformers, and other mechanical equipment, not to exceed 18 inches.
 - 2) Lighting fixtures, not to exceed 72 inches.
 - 3) Facilitate wiring in tight locations, when approved by Engineer.
- H. Flexible aluminum conduit may be used in walls or in attics to facilitate wiring in tight locations, when approved by the Engineer.
- I. Liquidtight flexible steel conduit shall be used in outdoor or wet locations for final connection to motors or other mechanical equipment, not to exceed 18 inches.
- J. Fittings:
- 1) For rigid and intermediate steel conduits, fittings shall be:
 - a) Galvanized rigid steel threaded type.
 - b) Provide insulated grounding bushings at switchboard enclosures and panel enclosures for feeders.
 - 2) For electrical metallic tubing (EMT), fittings shall be:
 - a) Zinc plated steel set screw type in dry locations.
 - b) Zinc plated steel compression type for conduits larger than 1", in wet locations and in masonry walls.
 - c) All connectors shall have an insulated throat.
 - 3) For non-metallic conduits, fittings shall be PVC Schedule 40 type. Use PVC schedule 40 adapters at all boxes and panelboards.
 - 4) Brush or dauber apply PVC cement.
 - 5) For flexible metallic conduits, fittings shall be zinc plated steel/malleable iron squeeze type.
 - 6) For liquidtight flexible metallic conduits, fittings shall be zinc plated steel/malleable iron compression type.
 - 7) Use of the following is prohibited:
 - a) Crimp-on, tap-on or indenter type fittings.
 - b) Spray (aerosol) PVC cement.

2.7 PULL BOXES

- A. Pull Boxes shall meet all code requirements as to size for conduits terminating therein and to thickness of material used in fabrication.

- B. Fabricated sheet steel pull boxes shall be installed only in dry, protected locations and shall be furnished with knockouts and removable screw cover. The box shall be finished with one coat of zinc chromate and a coat of primer sealer and where exposed to public view shall be painted to match the surrounding surface.
- C. Weatherproof sheet steel pull boxes shall be fabricated of code gauge galvanized sheet steel with two coats of rust resistant finish and shall be furnished with gasket and made completely weathertight.
- D. Approved manufacturers for metal boxes are Cooper B-Line, Milbank, Hoffman or approved equal.
- E. Weatherproof concrete pull boxes, junction boxes and telephone boxes shall be manufactured by Christy Concrete Products, Utility Vault or approved equal. All pull boxes shall be H/20 rated and be equipped with H/20 rated galvanized steel checker plate cover with the inscription "Electric, Lighting, Fire Alarm or Signal".

2.8 OUTLET BOXES

- A. All outlet boxes shall be standard one or two piece galvanized knockout outlet boxes. Raco, Appleton, Thomas and Betts or approved equal.
- B. All outlet box covers, rings or other fittings shall be standard galvanized. Raco, Appleton, Thomas and Betts or approved equal.
- C. No outlet box shall be smaller than four inches (4") square and 1 ½" in depth, except in concrete block construction where Thomas and Betts concrete masonry boxes are approved.
- D. Floor outlets on grade shall be fully adjustable type floor boxes, suitable for use in concrete floors. Wiremold #RFB6E-OG with a Wiremold #8CTC2NKTR Evolution cover assembly. Where floor box is installed in a bare concrete floor, provide a Bare Concrete and Terrazzo ring, Wiremold #RFB6E-CTR with a Wiremold #8CT2NKTR Evolution cover assembly.
- E. Cover shall be die-cast aluminum with nickel finish, unless otherwise noted on drawings. For 120V power, provide an industrial specification grade 20A 125V duplex receptacle with internal duplex receptacle bracket #RFB6DP, quantity as shown on drawings. For data/telephone, provide a decorator style receptacle bracket #RFB6GFI for mounting frame to accept the modular telephone/data jacks, unless otherwise noted on drawings. Any unused device compartments shall be covered with internal blank bracket #RFB6B.
- F. All special outlets shall be as hereinafter specified or as shown on drawings.
- G. Thru boxes are not permitted.
- H. Any unused boxes shall be equipped with a blank cover plate.

2.9 RECEPTACLES

- A. Furnish and install an industrial specification grade 20A, 125-volt, 3 wire grounding type tamper-resistant duplex receptacle with one piece brass mounting strap at all receptacle outlets as indicated on drawings. Leviton #5362-SGW or equal as manufactured by Hubbell, Pass and Seymour, Eaton, or other approved manufacturers.
- B. Device color shall be white.

- C. Tamper-resistant isolated ground duplex receptacles shall be 20A, 125V NEMA 5-20R, orange in color. Leviton #T5362-IG or approved equal.
- D. Tamper-resistant G.F.C.I. duplex receptacles shall be provided for 15 and 20-amp 125-volt circuits where required by the C.E.C. #210.8 and #590.6. At indoor locations, provide Leviton #G5362-0TW or equal. At exterior locations, provide weather and tamper-resistant type G.F.C.I. duplex receptacles, Leviton #G5362-WTW or equal. At damp locations, provide a diecast weatherproof lockable cover, RACO # 5028-0 or equal. At wet locations, provide a diecast weatherproof "while-in-use" lockable cover, Red Dot #CKSUV or equal.

2.10 LOCAL SWITCHES

- A. Furnish and install industrial specification grade, quiet type toggle switches, 20 AMP rated 120/277V AC only, controlling wall and ceiling outlets as indicated on the drawings. Leviton #1221-2W or equal as manufactured by Hubbell, Pass and Seymour, Cooper or other approved manufacturers.
- B. Where two or more switches are in proximity they shall be ganged in the same box, and they will be set under one plate. Switches controlling lights and/or outlets on emergency power shall be kept entirely independent of all other switches not on emergency power by mounting in a separate box.
- C. Special receptacles or switches shall be as noted on the drawings.
- D. Where key switches are noted on the drawings, provide Leviton #1221-2KL.
- E. Device color shall be white.
- F. When a switch is used as a disconnecting means, it shall be mounted in a readily accessible location.

2.11 WALL PLATES

- A. All wall plates for electrical outlets and devices shall be smooth stainless steel, non-magnetic type 302S.
- B. All telephone outlet plates shall be blanked plates, same as device plates.

2.12 CONDUCTORS (WIRE)

- A. All wire installed in this contract shall be of a standard manufacturer as approved by the National Board of Fire Underwriters and be of the size as indicated on the drawings. All wire shall bear the Underwriters' label and shall be brought to the job in unbroken packages and approved by the Job Inspector before it is installed.
- B. All power conductors #10 AWG and smaller shall be type THWN copper, unless otherwise noted. All conductors #8 AWG and larger shall be type THWN-2 copper, unless otherwise noted.
- C. All underground conductors in a 480V or 480/277-volt power system shall be type XHHW-2 copper, unless otherwise noted.
- D. Number 12 AWG wire shall be the smallest gauge wire used, except for signal circuits, which shall be as shown on plans or as specified under other sections of these specifications.

- E. All wire #8 AWG gauge or larger shall be stranded.
- F. The neutral conductor of all lighting feeders shall be of the same size as the phase conductors.
- G. Splices on all wire less than #8 gauge shall be with insulated spring connectors Ideal "Wing Nuts", 3M "Scotchlok", or equal.
- H. Splices in wires #8 gauge and larger shall be made with crimp on solderless connector, 3M Scotch, Burndy or equal. Connectors to switches or bus bar shall be made with one-piece lugs for all wires, sized for conductors as shown on the plans.
- I. Each branch circuit shall be marked with the circuit number at the panel and at the first outlet nearest the panel. E-Z Code Markers (Thomas and Betts) or equal shall be used to label the circuits.

2.13 LIGHTING FIXTURES

- A. This Contractor shall submit for approval seven (7) portfolios with full description and manufacturer data sheets of all fixtures (including ballasts and lamps), that he proposes to use.
- B. This Contractor shall furnish and install all lighting fixtures and lamps as indicated on the Electrical Drawings and in accordance with these specifications.
- C. This Contractor shall be held responsible for the complete equipment of all fixture outlets with fixtures of the proper design as shown.
- D. All fixtures shall be securely anchored to prevent any possible chance of their falling.
- E. Continuous runs of fixtures shall be installed straight and true.
- F. Recessed fixtures shall be complete with plaster frames, supporting brackets and hanger wires.
- G. Stem lengths shall be adjusted to meet conditions where required. Furnish aligners to ensure vertical alignment (ball aligner).
- H. Electrical Contractor shall coordinate outlets with Acoustic Tile Contractor and other trades and locate outlets in the center or at intersections of acoustical tile in all acoustical tile ceilings.
- I. Recessed fixtures in t-bar ceilings shall be attached to t-bar ceiling with integral
- J. t-bar clips, two at each end of fixture.
- K. When the light fixture is equipped with an integral emergency battery pack, the light fixture shall be connected so that it is controlled via the room light switch and is automatically energized when power has fails.

2.14 MOTOR DISCONNECTS

- A. Disconnects shall be fused safety switches with dual element fuses. Heavy Duty rated with quick-make, quick-break operating mechanism. Fuse rating shall comply with motor manufacturer's recommendations. Switch shall be UL listed. Disconnects shall have an external operating handle, lockable in the open or closed position.
- B. Disconnect switches shall be located so as not to obscure any part of the HVAC unit's nameplate data.
- C. Each disconnect switch shall have an engraved Bakelite nameplate identifying the panel and circuit number that feeds the motor. Nameplates shall comply with specifications for "Identification of Switches and Apparatus".

PART 3 - EXECUTION AND INSTALLATION

3.1 CONDUIT SYSTEMS

- A. A concealed conduit system shall be installed for all interior wiring including controls. Conduit shall be run continuously between outlets, etc., and with the minimum number of bends.
- B. PVC 40 shall be used for underground runs.
- C. Where underground conduit cannot be run below building footings and the Contractor shall provide PVC-80 sleeves through the footings (Contractor shall obtain approval for all sleeve sizes and locations with the Structural Engineer before installation).
- D. All conduit shall be delivered to the site of construction in their original bundles. Each length of conduit shall bear the label of the National Board of Fire Underwriters. All conduit subjected to rough usage while on the job before installation and not acceptable to the Architect shall be removed from the premises upon notice.
- E. Conduit installed in masonry walls shall be rigid steel galvanized conduit, PVC or EMT, not in same cell as re-bars.
- F. The joints in all conduits installed under concrete slabs on the ground, or underground, or exposed to the weather, shall be made liquid and gas tight. All underground conduit outside of the buildings shall be buried to a depth of not less than 24" below finish grade. Utility services shall comply with utility company requirements. Two or more conduit runs installed in a common trench shall be separated horizontally by at least four inches (4"). Electrical conduit runs installed in a common trench with other utility lines shall be separated horizontally from such lines by at least twelve inches (12"). Provide a detectable warning tape, 12" above the top of the conduit and the full length of trench.
- G. Changes in direction shall be made with conduit elbows or long radius bends made on the job. Where two or more conduits are grouped in exposed locations, the sweeps shall be struck from the same center forming concentric arcs.

- H. All joints in conduit shall be made with standard coupling. In making joints, conduits must be truly and accurately cut and threaded (where applicable) with straight thread, smoothly reamed and squarely butted. All conduit shall be kept corded and dry during construction, using plastic caps or conduit pennies held in place with conduit bushings. Should dirt or moisture collect in any conduit, the Contractor shall swab them out to the satisfaction of the Architect.
- I. Conduits ending at the motors shall be carried as close as possible to the terminal blocks making allowance for the movement of the motors when they are equipped with slide rails. The connection between the conduit terminals on the motor and the conduit shall be made with liquid-tight flexible conduit using the proper fittings.
- J. All conduits where they enter panel enclosures, pull boxes, or outlet boxes shall be secured in place by galvanized locknut inside of box.
- K. Where conduits are run exposed, they shall be installed straight and true with reference to the adjacent construction.
- L. Any conduit installed under the building shall be under the slab. The top of any conduit below floor slab shall be a minimum of 4" below the bottom of the concrete slab.
- M. All boxes for bracket outlets shall be equipped with a 3/8" "No-Bolt" fixture stud. These boxes shall be so set that when in place the fixture shall be at right angles to the ceiling or walls.
- N. All empty conduit shall be equipped with a nylon pull rope continuous from outlet-to-outlet or end-to-end.
- O. Flexible conduit will be permitted for connecting lighting fixtures to junction boxes.
- P. Flexible connections in outdoor and damp locations shall be flexible liquid-tight metal conduit or non-corrosive seamless metallic tubing with watertight connections.
- Q. Install roof jacks for this construction in accordance with other sections of this Specification.
- R. The maximum allowed length of flex conduit at equipment connections is 18".
- S. Expansion joints for conduit shall be provided where required to compensate for thermal expansion and contraction.
- T. At all sub-panels and terminal cabinets, stub two 1"C and two 3/4"C into the accessible attic space. If the attic space is not accessible, stub conduits to a location as directed by Architect or Engineer. Provide additional conduit stubs when indicated on the drawings.
- U. Support conduits on roof with prefabricated pipe supports (B-Line "Dura-Blok Series" or equal), spaced 8 ft. O.C. maximum. Minimum clearance from roof to framing channel shall be 4". Framing channel length shall be as required plus 50% spare length. Installation shall comply with manufacturer's recommendations.

- V. Any conduit entering underground pull boxes shall be sealed to prohibit water from entering the conduit. Conduits with conductors shall be sealed with a sealing compound after all conductors have been installed. All spare (empty) conduits shall be identified with either the "origination" or "destination" (example: to pull box 150' to the south, from Main Switchboard, etc.). The contractor shall use a scrap piece of $\frac{3}{4}$ " PVC conduit, approximately 5" in length and tie the nylon pull string thru it. Write the description on the conduit using an indelible/permanent marker.

3.2 OUTLETS

- A. In general, the locations of electrical outlets shall be as shown on the drawings; however, the Contractor shall make any changes necessary to suit conditions on the job or rearrangement of built-in fixtures and equipment as directed by the Architect or his representative.
- B. The Contractor shall study the general building plans with relation to spaces surrounding each outlet in order that his work may fit the work of others and that when fixtures or other equipment are installed, they will be symmetrically located according to room layout. Refer all conflicts and discrepancies promptly to the Architect.

3.3 OUTLET BOXES

- A. Outlets for concealed wiring shall be flush with the finished wall or ceiling surfaces. Pull boxes, junction boxes and all others to which no fixture or device is to be attached, shall be fitted with blank cover plates, and painted to match surroundings. In order to reduce noise transmission between rooms, outlet boxes shall not be installed back-to-back. Where outlets are side by side and faced into opposite rooms, the boxes shall be at least 6" apart, except in fire rated walls space boxes at least 24" apart. If the boxes are connected together, the connection shall be flexible and shall have openings packed with fiberglass.
- B. The Electrical Contractor shall inform himself of wall thickness throughout the building and shall provide outlet boxes of suitable depth that can be flush mounted and yet will be deep enough to contain the particular apparatus involved. The location of exposed pull or junction boxes will be subject to the Architect's approval.
- C. Outlets from which lights are suspended shall have approved $\frac{3}{8}$ " fixture studs fastened through from back of box. All outlet boxes and particularly those supporting fixtures shall be securely anchored in place in an approved manner. Support outlet boxes and fixtures in acoustic ceiling areas from building structures, not from acoustic ceilings. All lighting fixture outlets shall be coordinated with mechanical, architectural, or other equipment to eliminate conflicts and provide a workable, neat installation.
- D. Where more than one switch occurs at the same location, use multiple gang outlet boxes covered by a single plate; provide box partitions as required by the C.E.C. Switches controlling lights and/or outlets on emergency power shall be kept entirely independent of all other switches not on emergency power by mounting in a separate box.
- E. Outlet box extensions shall be UL listed and shall be attached to box with threaded metal screws. "Flash guards" are not permitted to be used as box extensions.

3.4 LOCATIONS OF OUTLETS

- A. The Architect reserves the right to make reasonable changes in the indicated locations before work is roughed in without additional charge to the Owner.

- B. Where wainscot occurs at the 4'-6" level, the switch shall be mounted lower in the wainscot as near the 4'-0" level as possible, but in no case, shall the switch be partially in the wainscot and partially in the wall. It shall be the Electrical Contractor's responsibility to verify all door swings. Switches, unless specifically noted, shall be on the strike side of the door. If switch is indicated on hinged side of door, verify location with Architect.

3.5 CONDUCTOR IDENTIFICATION AND INSTALLATION

- A. The drawings indicate the arrangement of outlets on each branch circuit and the circuit tags show the number of the circuit, and the board to which it will be connected.
- B. Circuits indicated with the same numbers shall be connected to the same breaker on the panelboard.
- C. All feeders and branch circuits shall be tagged in all pull boxes and in the gutters of all panels to which they connect.
- D. All wiring shall be done in identified neutrals.
- E. No wire shall be installed until all work of other contractors that might cause injury to the said wire has been completed. Care shall be used to pull wires to ensure that no damage occurs to the insulation. A wire lubricant shall be used for pulling in wires.
- F. In making the connection of all branch circuits to the terminals of switches, base plugs, etc., the wires shall be looped around the binding screws or be fitted with connecting lugs. At the ceiling outlets, this Contractor shall leave not less than 6" of free ends on each wire for connections to the fixtures.
- G. No splices shall be permitted except in outlet boxes, and in panelboard gutters.
- H. Switches and receptacles shall be securely fastened to the outlet box. Where the outlet box covers are back of the finished walls the switch or receptacle shall be built out from the same with washers so that it is rigidly held in place to the box. The floating of any switch or receptacle will not be permitted.
- I. All signal and communications conductors shall be identified in terminal cabinets as to type of system e.g.: clock, bell, fire alarm, etc. and location of other end of conductor by room number or name as directed by Owner. Identification shall be by numbers at terminal strips and a numbered directory in cardholder inside terminal cabinet.
- J. Fire alarm system cabling and wiring shall be color-coded as follows:
 - Initiating Devices: - Addressable cable, red jacket.
 - Signaling Devices: - Black & Red wires for horns, strobes, or horn strobes.
 - Speaker cable, blue jacket for speakers.
- K. All power wiring size #6 AWG and smaller, shall be factory color-coded. For larger than #6, mark conductors on each end and at all junction and/or pull boxes with a 1" band of colored pressure-sensitive plastic tape. For isolated ground wires, mark with a 1" band of green tape, followed by a 1" band of yellow tape, followed by a 1" band of green tape. Colors for each phase and the neutral shall be consistent throughout the system. Color code shall be as follows:

WIRE	120/208V
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Equip. Ground	Green

- L. The white or gray conductor shall be the neutral at each outlet. All switches shall be installed in "hot" leg. On all lighting circuits the switch leg shall be purple from switch to fixture. All travelers from switch to switch on 3 and 4-way switches shall be pink. This color code shall be followed by Contractor for all fixture whips except for factory-manufactured whips. When factory manufactured whips are used, color code shall apply to all wiring except the factory whip.
- M. Conductors having white, gray or green covering shall not be used to indicate anything other than neutral or grounding. This limitation applies to all power, lighting, and control circuits.
- N. Installation of conductors shall be made in a neat and workmanlike manner to meet Code requirements and shall be run continuous without weld, splice or joint between boxes. Do not install wires in conduit unless the entire system of conduit and outlet boxes is permanently in place. All conductors shall be pulled using a UL approved wire lubricant.
- O. Make all terminations at motors using 3M Series 5300 Motor Lead/Cable Splicing Kits. Make connections per 3M written installation procedures.
- P. On all bolted electrical connections, the Contractor shall use Belleville washers.
- Q. All wiring to be neatly bundled and tied with nylon cord or plastic straps.
- R. When approved by the Electrical Engineer, splices in underground pull boxes shall be made with crimp on compression connectors and insulated with heat shrink sleeves or with splice kits listed by the manufacturer for wet locations. Wire nuts are not permitted. Cables and/or conductors for fire alarm and signals systems shall not be spliced.

3.6 GROUNDING

- A. The conduit system supports, cabinets, switchboards, etc., and neutral conductors must be permanently and effectively grounded, in accordance with Title 24 of the California Code of Regulations. The neutral shall only be grounded at the main service location unless specifically noted otherwise on the drawings or required by the California Electrical Code.
- B. This Contractor shall exercise every precaution to obtain good contacts at all panel boxes, pull boxes, etc.: where it is not possible to obtain good contacts, the conduits shall be bonded around the boxes with a #6 AWG gauge conductor with ground clamps.
- C. All equipment cases, motor frames, etc. shall be completely grounded to satisfy applicable code requirements.
- D. At each building, the interior hot and cold-water piping and the interior aboveground gas piping shall be bonded to the building service equipment per C.E.C. #250.104.

- E. Do not use underground gas piping as a grounding electrode.
- F. Pull a green equipment ground conductor in all power conduits, both metallic and non-metallic.
- G. Pull a separate isolated ground wire to isolated ground receptacles, insulated green with yellow stripe, in addition to the equipment ground conductor.
- H. Isolated ground conductor shall begin at the isolated ground bus in the panel in the building served and shall not be connected to any neutral conductor or any item not isolated from the system ground. All isolated ground circuits shall have a separate neutral conductor (not used for more than one circuit). The isolated ground conductor cannot extend upstream from the building served.
- I. Each disconnect switch shall have a ground connector (lay in wire type) which shall be used for grounding the disconnect enclosure. The ground wire shall continue and be connected to the enclosure of the equipment served.
- J. Where there is more than one building supplied from a common service, provide a grounding electrode at each building per C.E.C. #250.32.
- K. At each telephone backboard and/or data backboard, provide a power distribution block (one pole with two primary openings and six secondary openings) and mount at + 18" A.F.F. unless otherwise noted. Run $\frac{3}{4}$ " C - 1 #6 AWG to the ground bar of the nearest panel or the ground bus of the main switchboard. Power distribution block shall be Square D #LBA 163206 or equal.

3.7 MOUNTING HEIGHTS OF EQUIPMENT

- A. Unless otherwise specified elsewhere or shown on the plans, the following mounting shall apply:
 - 1) Panelboards: 6'-0" top of box
 - 2) Disconnect Switches: 4'-0" to center line
 - 3) Contactors: 4'-0" to center line

3.8 IDENTIFICATION OF SWITCHES AND APPARATUS

- A. All switchboard circuits, externally operated switches and apparatus used for the operation of or control of circuits, appliances, or equipment shall be properly identified with an engraved Bakelite nameplates, 1" x 3", black letters on white background. All such nameplates shall be of the self-adhesive type and attached onto the apparatus by screws or rivets. Card holders in any form are not acceptable.

3.9 EARTHQUAKE PROOFING OF LIGHT FIXTURES

- A. Fixtures weighing more than 50 pounds shall be supported independently of the outlet box.

- B. Pendant type fixtures shall be designed so that they may swing horizontally in any direction a minimum of 45 degrees from the vertical. Pendant shall have ball aligner at top, and swivel connection at fixture. If there is an obstruction within the 45 swing of the fixture the Contractor shall provide a State approved restraint to keep fixture from swinging into the obstruction.
- C. All fixtures mounted in or on suspended ceilings shall be fastened to the ceiling-framing members in accordance with C.E.C. #410.36(B). Recessed fixtures in t-bar ceilings shall be provided with integral t-bar clips, one near each corner to attach it to the t-bar ceiling frame.
- D. Recessed fixtures in T-bar ceilings shall be attached to the building structure above with #12 Ga. slack safety wire at two diagonal corners of each fixture (two wires per fixture).

3.10 FIRE RATED AREAS

- A. Where light fixtures, conduit, cabinets, or boxes penetrate fire rated ceilings, walls or floors provide a fire rated enclosure or fire stop. Rating of enclosure or fire stop shall match or exceed rating of area penetrated. Verify location of fire rated areas with architectural drawings and with General Contractor.
- B. Where outlet boxes are recessed on opposite sides of a fire rated wall, boxes shall be separated by a horizontal distance of at least 24 inches. Where the wall opening for a steel electrical outlet box exceeds 16 sq. inches in area, or an aggregate of more than 100 sq. inches for any 100 sq. feet of wall or partition area, fire stopping is required.
- C. C. Penetrations in walls, floors or ceilings requiring protected openings shall be fire-stopped.
- D. Fire-stopped shall be of an approved material, securely installed and be in conformance with the 2022 C.B.C., Section 714.4.1 and 714.4.2.
- E. All required fire-stopping and joint sealants as a result of the work in Divisions 26, 27 and 28 is the responsibility of each individual trade. Refer to Sections 07 8400 and 07 9210, respectively.

3.11 MISCELLANEOUS EQUIPMENT

- A. Contractor shall be responsible for electrical hook up and connections to all electrical equipment whether furnished by this Contractor or others, including wiring, conduit, disconnects, circuit breakers etc., even if not shown on drawings. Verify all locations and requirements with equipment supplier before rough-in.
- B. When there are fire sprinklers, the Electrical Contractor shall connect bell, flow and tamper switches and other electrical devices as required by Sprinkler Contractor and local and state fire marshal. Verify requirements with General Contractor before bid.

3.12 INTERRUPTION OF SERVICE

- A. Interruption of service in existing buildings shall not be made at a time which will inconvenience the Owner. Before making any final connections to the existing buildings or doing any other work that will interrupt the service, the Contractor shall consult with the Owner and schedule the work at Owner's convenience even if it is necessary to make such connections after regular working hours.

- B. This Contractor shall do all rerouting and reconnecting of existing electrical facilities made necessary by this construction. Care shall be taken not to disrupt existing facilities. If any facilities are disrupted, this Contractor shall replace or repair them at his expense and to the satisfaction of the Architect.

3.13 CHANGES

- A. Electrical Contractor shall consider the number of outlets for electric equipment shown on plans as final, but the Architect reserves the right to shift same, within reason, to a location and position which will meet more completely final requirements.

3.14 GUARANTEE AND TESTS

- A. All electrical equipment testing, and related costs shall be included in the Contractor's bid.
- B. Contractor shall obtain approval from the Architect of proposed independent testing agencies before any testing is started.
- C. Equipment of all kinds installed by this Contractor shall be tested to determine whether it fulfills the requirements of these specifications. The Contractor shall furnish all labor necessary to adjust the operation of the apparatus and make the connections for the tests. After the tests have been completed, the Contractor shall restore all connections, apparatus, etc., to their original condition.
- D. Should any piece of apparatus or any material or work fail in any of these tests, it shall be immediately removed and be replaced with new material by this Contractor at his expense and the portion of the work replaced be again tested by the Contractor.
- E. All circuit breakers, 100 amps or more, shall be tested by an independent testing agency in accordance with NETA specifications and a report submitted to the Architect. Any circuit breaker that does not pass the test shall be replaced.
- F. The entire installation shall be free from short circuits and improper grounds. Panels and circuits shall be tested for grounds and shorts. Each individual circuit shall be tested at the panel with the equipment connected for proper operation. Ground tests shall meet the requirements of the California Electrical Code. Upon completion of the work, a final inspection by the Architect and other interested authorities shall be conducted. This Contractor shall guarantee to repair or replace at his expense any material or equipment that develops defects or is determined not to be in conformance with the plans and specifications, during a period of one year after work is accepted by the Owner.
- G. The grounding electrode system at the main electrical service equipment shall be tested by an independent testing agency in accordance with the three-point fall of potential method as specified in IEEE Standard 81-1983. Maximum ground resistance shall be 25 OHMS. A copy of the test report shall be submitted to the Architect and Engineer of record.
- H. All feeder cables #2 and larger shall be tested for insulation resistance. Test report must include number of cable per phase & type of cable insulation.
- I. Three copies of the test report shall be submitted to the Electrical Engineer prior to the final job walk.
- J. The independent testing agency performing the above-mentioned tests shall be NETA or NICET certified or approved by the electrical engineer.

3.15 DEMOLITION

- A. Remove and/or relocate electrical facilities as required to clear areas for new construction.

3.16 UTILITY COMPANY SERVICE CHARGES

- A. All service charges shall be paid by the Owner. Monthly energy charges shall be paid by the Electrical Contractor.

END OF SECTION

SECTION 270200 Communications General Requirements (Structured Cabling Systems and Pathways and Spaces systems for all Voice and Data systems)

01 Summary

- A. The Scope of Work covered by this document is to furnish and install the Structured Cabling Systems and Pathways and Spaces systems. This work will provide the structured cabling system (SCS) for all Voice and Data systems.
- B. Telecommunications system shall include the following systems:
 - 1. Structured Cabling System (SCS) For Telecommunications Systems
 - 2. Pathways for Telecommunications Systems
 - 3. Grounding and Bonding System (GBS) For Telecommunications Systems
 - 4. Fire stopping for Telecommunications Systems

02 Additional Requirements

- A. **Coordination of work:** Contractor shall be responsible for coordination of work among project specification divisions and contractor/subcontractors involved in this project. This coordination of Work Includes following instructions provided the Construction Manager or General Contractor if project is managed by such.
- B. **General compliance requirements:** Provide a complete and operable system in compliance with project drawings, specifications, referenced standards, applicable building codes, and Authority Having Jurisdiction (AHJ) requirements. Scope of this contract includes materials, equipment, labor, configuration, programming, testing, startup and commissioning services, and documentation costs for complete and operable system that meets all requirements indicated on drawings or contained in specifications. Comply with all contract documents, specifications, drawings, manufacturer's instructions, and Owner and AHJ requirements. In case of conflict among applicable documents or standards, the contractor shall notify owner's representative in writing of apparent conflict, and then comply with most stringent requirements unless otherwise directed in writing from owner's representative. Work includes all items required for complete system whether or not identified in specification or drawings.
- C. Information about general construction and architectural features and finishes shall be derived from structural and architectural drawings and specifications only.
- D. Work related to telecommunications systems shall be installed by an SCS manufacturers authorized or certified trained installer. The owner reserves the right to review and approve any personnel assigned to this project in a supervisory or managerial role.

- E. SCS contractor shall have had at least 3 years of comparable experience with telecommunications projects. Comparable projects shall equal or exceed the size and complexity of work on drawings.
- F. **Complete and usable work:** Refer to and comply with requirements in section 27 02 67 outlined below.

03 Related Documents and Drawings

- A. **General:** The project drawings and general conditions of Contract shall apply to this section.
- B. **Coordination:** Coordinate with work specified in other sections and divisions of specifications.
- C. **Reference:** Codes and standards as referenced in Section 27 02 20 may define additional specifications or requirements not specifically called out within this division. However, the contractor shall adhere to most stringent requirements as defined herein, or as defined by reference within section 27 02 20.
- D. Architectural and Engineering specifications may have additional conditions or requirements that affect the work defined by this division of specifications. Contractor shall be responsible for the coordination of all conditions and other trade requirements that may impact schedule, scope of work, work progress, or other factors that may affect the overall ability for contractor to execute the requirements of this division of specifications.

04 Codes and Standards

- A. General: All work, including but not limited to: cabling, pathways, support structures, wiring, equipment, installation and workmanship shall comply with the latest editions of the requirements of the Authority Having Jurisdiction (AHJ), California Electrical Code, all applicable local rules and regulations, equipment manufacturer's instructions, and the National Electrical Contractor's Association (NECA) Standard of Installation. In case of discrepancy or disagreement between the documents noted above, the Contractor shall satisfy the most stringent requirements.
- B. Other sections of this document contain References to Codes and Standards that are applicable to the section.

05 Codes

- A. California Electric Code (CEC)
- B. National Fire Protection Association (NFPA)
 - NFPA 72, National Fire Alarm Code
 - NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment
 - NFPA 76, Recommended Practice for the Fire Protection of Telecommunications Facilities
 - NFPA 101, Life Safety Code

06 Reference Standards

- A. Telecommunications Industry Association (TIA)
 - TIA-526-7, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7
 - T-526-14-A, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – SFSTP-14
 - TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises
 - TIA-568-C.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 - TIA-568-C.2, Commercial Building Telecommunications Cabling Standard—Part 2: Balanced Twisted Pair Cabling Components
 - TIA-568-C.3, Optical Fiber Cabling Components Standard
 - TIA-569-B, Commercial Building Standards for Telecommunications Pathways and Spaces
 - TIA-606, Administration Standard for Commercial Telecommunications Infrastructures
 - ANSI J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
- B. Other Reference Materials
 - BICSI Telecommunications Distribution Methods Manual (TDMM)
 - BICSI Wireless Design Reference Manual (WDRM)
 - Institute of Electrical and Electronic Engineers (IEEE)
 - National Electrical Manufacturers Association (NEMA)
 - Underwriters Laboratories (UL) Cable Certification and Follow Up Program

07 Definitions

Access Floor - A floor system that has removable floor panels.

Building Backbone Cabling – Cabling used to connect Floor Distributors (FD) or other local collection points to the Building Distributor (BD). Building backbone cabling typically carries aggregate traffic and, as such, impacts multiple network devices and users. Building backbone cabling may include either fiber optic or copper cabling or both.

Building Distributor (BD) – Termination points from which all building backbone cabling emanates and interconnection point for the network backbone. Commonly referred to as BDF and Intermediate Cross-connect (IC). There is one BD for each building, and it feeds all FD's in the same building. The BD should be located so that all FD's served are within 300 cable meters (984 cable feet).

Campus Backbone Cabling – Cabling used to connect Building Distributors (BD) or other key network segments to the Campus Distributor (CD). With rare exceptions, campus backbone cabling carries aggregate traffic and typically impacts entire buildings worth of network devices and users and, as such, link redundancy with diverse routing is highly recommended. Campus backbone cabling almost exclusively consists of fiber optic cabling. Copper cabling may be used in short-distance (< 90m) applications. In such cases, lightning protection will usually be required by code.

Campus Distributor (CD) – Termination point from which all campus backbone cabling emanates and highest-level interconnection point for the network backbone. Commonly referred to as NOC and Main Cross-connect (MC). On smaller campuses, there is one CD for the campus. On larger campuses there might be several CD's with each CD serving several buildings. Besides linking to each of the BD's it serves, the CD is also the network interconnection point for data center links and links to service providers.

Category 3 (Cat 3) – A category of transmission performance, defined in EIA standards, that specifies electrical properties up to 10 MHz. Cat 3 is the minimum performance grade permissible and is used typically for analog voice distribution.

Category 5e (Cat 5e) / Class D – A category/class of transmission performance that specifies electrical properties up to 155.5 MHz. Capable of supporting copper-based, four-pair Gigabit Ethernet (IEEE 802.3ab 1000BASE-T) applications. Category 5e is defined in TIA/EIA 568B.2 standard. Class D is defined in the ISO 11801 standard.

Category 6 (Cat 6) / Class E – A category/class of transmission performance that specifies electrical properties up to 250 MHz. Refer to the TIA/EIA 568B family of standards for more information on Category 6 and ISO/IEC 11801 for more information on Class E requirements. Also refer to CENELEC EN50173.

Category 6A (Cat 6) / Class EA – A category/class of transmission performance that specifies electrical properties up to 500 MHz and capable of supporting data applications operating at 10Gbps. Refer to the TIA/EIA 568B family of standards for more information on Category 6 and ISO/IEC 11801 for more information on Class EA requirements.

Certification – The testing and documentation of the transmission performance (e.g., Category 5e / Class D) of a permanent link or channel, based on sweep frequency (where applicable) testing of numerous parameters with results compared to a range of acceptable values. This project requires 100% certification (with documentation) of all permanent link cabling at the time of installation. Channel certification is optional and is the responsibility of the group using the channel.

Channel – The entire physical pathway between active equipment ports, inclusive of all patch cords, patch panels, jacks and cabling segments.

Conduit - A raceway of circular cross-section.

Entrance Facility (EF) – Termination points of service provider cables that have entered the building and location of service demarcation point (MPOE) and interconnection point to the network. Commonly referred to as Telco Room and Entrance Facility (EF). The EF is linked to the CD, where present, or to the BD.

Floor Distributor (FD) – Termination points for horizontal cabling and interconnection point for network access. Commonly referred to as IDF and Horizontal Cross-connect (HC) - FD quantities and locations are determined by building size and geometry so that all points served are within 90 cable meters (295 cable feet) of an FD. The FD feeds all Telecommunications Outlets (TO's) in its service zone. All FD's in a building are linked to the building's Building Distributor (BD) via backbone cabling.

Horizontal Cabling – Cabling used to connect individual work area outlets to local Floor Distributors (FD) or other collection points. Unlike backbone cabling, horizontal cabling does not typically carry aggregate traffic and, as such, impacts only single network devices or users. In buildings, horizontal cabling almost exclusively consists of copper cabling. Fiber optic cabling may be used where situations dictate but, unlike horizontal copper cabling, horizontal fiber optic cabling is not installed in advance as default building facilities. At this writing, horizontal copper cabling in many networks is capable of supporting Gigabit (1Gb/s) Ethernet applications as well as other applications of similar bandwidth.

Permanent Link – A stationary cabling segment, consisting of the permanently installed cable and the permanently affixed jack at both ends (typically at the outlet faceplate and closet patch panel, or on a patch panel on both ends). The concept assumes that, while patch cords might be disconnected or moved over time, the permanent cable and jacks will not be disturbed, and the electrical characteristics of the permanent link will remain unaltered.

Plenum -A space within the building designed for the movement of environmental air, i.e., a space above a suspended ceiling or below an access floor.

Raceway - Any channel designed for holding wires or cables, i.e. conduit, electrical metal tubing, busways, wireways, ventilated flexible cableway.

08 Project Drawings

- A. **Building composite floor plans:** Provide building floor plans showing outlet locations and jack configuration, types of jacks, run distance for each jack cable, and cable routing/locations. Identify TO's that, according to location and available pathway systems, require cable length greater than allowed by standards. Recommend alternatives for Owners Representative's consideration.
- B. **Telecommunications space plans/elevations:** Include enlarged floor plans of TRs indicating layout of equipment and devices, including receptacles and grounding provisions. Submit detailed plan views and elevations of telecommunications spaces showing racks, termination blocks, and cable paths.

- C. **Logical Drawings:** Provide logical riser or schematic drawings for all systems. Include schematic symbol key.

09 Substitutions

- A. **Substitution requests:** Substitution requests will be considered only if submitted to Owner's Representative not less than 7 working days prior to project bid date. Acceptance or rejection of proposed substitution is at Owner's Representatives sole discretion. No exceptions. Requests for substitutions shall be considered *not approved* unless approval is issued in writing by Owner's Representative.
- B. **Rejection:** For equipment, cabling, wiring, materials, and all other products indicated or specified as *no substitutions* or *no alternates*, Owner does not expect nor desire requests for substitutions and alternate products other than those specified. Owner reserves right for Owner's Representative to reject proposed substitution requests and submissions of alternates without review or justification.

10 Warranty

11 Contractors Warranty

- A. **General requirements:** Comply with additional requirements in the contract general requirements and extended warranties required in other specification sections. Refer to all other 27xxx sections for specific additional warranty requirements that exceed or are in addition to those of this section.
- B. **Contractor warranty:** Provide all services, materials, and equipment necessary for successful operation of entire telecommunications system and SCS system for a period of one year after system acceptance. Scope of warranty includes all equipment, devices, wiring, accessories, software, hardware, installation, programming, and configuration required to maintain a complete and operable system. Provide manufacturer's published recommended preventative maintenance procedures during warranty period. This shall apply to all items except those specifically excluded, or items wherein a longer period of service and warranty is specified or indicated. All warranties shall be in effect for one year, minimum, from the date Certificate of Final Acceptance is issued. Use of systems provided under this section for temporary services and facilities shall not constitute final acceptance of work nor beneficial use by Owner and shall not institute warranty period. The warranty shall cover repair or replacement of defective materials, equipment, workmanship, and installation that may be incurred during this period. Warranty work is to be done promptly and to Owner's satisfaction. In addition, the warranty shall cover correction of damage caused in making necessary repairs and replacements under warranty. Additional warranty responsibilities are:
1. Obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's designated name. Replace material and equipment that require excessive service during guarantee period as determined by Owner.

2. Provide 2-business day service beginning on date of Substantial Completion and lasting until termination of warranty period. Service shall be at no cost to Owner. Service can be provided by installing contractor or by a separate service organization. Choice of service organization shall be subject to Owner's approval. Submit name and a phone number that will be answered on a 24-hour basis each day of week, for duration of service.
 3. Submit copies of equipment and material warranties to Owner before final acceptance.
 4. At end of warranty period, transfer manufacturers' equipment and material warranties still in force to Owner.
 5. If warranty work problems cannot be corrected immediately to Owner's satisfaction, advise Owner in writing, describing efforts to correct situation, and provide analysis of cause for problem. If necessary to resolve problems, provide at no cost services of manufacturer's engineering and technical staff at site in a timely manner to analyze warranty issues, and develop recommendations for correction, for review and approval by Owner.
- C. **Pathways Material and Installation warranty:** Provide all services, materials, and equipment necessary to warrant the installation and performance of all pathway materials for a period of one year after beneficial use. The scope of the warranty includes all equipment, devices, installation and other work required to maintain a complete and operable system. Provide manufacturers published recommended preventative maintenance procedures during warranty period.
- D. **Grounding and Bonding Material and Installation warranty:** Provide all services, materials and equipment necessary for successful operation of GBS for a period of one year after beneficial use. The scope of the warranty includes all equipment, devices, installation and other work required to maintain a complete and operable system. Provide manufacturers published recommended preventative maintenance procedures during warranty period.
- E. **Firestopping Material and Installation warranty:** Provide all services, materials, and equipment necessary to warrant the performance of all Firestopping material for a period of one year after beneficial use, or longer if required by the local AHJ. The scope of warranty includes all equipment, devices, installation, and other work required to maintain a complete and operable system. Provide manufacturers published recommended preventative maintenance procedures during warranty period.

12 SCS Manufacturers Extended Warranty

- A. SCS Systems will be covered by a two-part certification program provided by a single manufacturer and that manufacturer's certified vendor. Manufacturer shall administer a follow-up program through the Vendor to provide support and service to the purchaser. The first part is an assurance program, which provides that the certified system will support the applications for which it is designed, during the 20-year warranty of the certified system.

- B. The second portion of the certification is a 20-year warranty provided by the manufacturer and the vendor on all products within the system (cords, telecommunications outlet/connectors, cables, cross-connects, patch panels, etc.).
- C. In the event that the certified system ceases to support the certified application(s), whether at the time of cutover, during normal use or when upgrading, the manufacturer and vendor shall commit to promptly implement corrective action.
- D. The cabling system must conform to the current issue of industry standard ANSI/TIA/EIA-568. All performance requirements of this document must be followed. As well, workmanship and installation methods used shall be equal to or better than that found in the BICSI (Building Industry Consulting Service International) ITSIM manual.

13 Completeness of Work

- A. **Complete and usable work:** The contractor is responsible for providing complete and usable work according to contract documents. All materials and equipment shall be provided with all accessories and additional work required for field conditions, as well as additional work and accessories required for complete, usable, and fully functional construction and systems, even if not explicitly specified or indicated. Telecommunications system in this Contract shall be provided as complete and operable systems in full compliance with requirements on drawings and specification requirements. Drawings are diagrammatic and specifications are performance-based, and Contractor shall provide all work required to comply with drawings and specifications, even if not explicitly indicated or specified. The contractor shall be responsible for coordinating the installation of electrical systems with all field conditions and the work of other trades. Minimum clearances and work required for compliance with, *California Electrical Code (CEC)*, and manufacturer's instructions shall be provided. Comply with additional requirements indicated for access and clearances. Contractor shall verify all field conditions and dimensions that affect selection and provision of materials and equipment, and shall provide any disassembly, reassembly, relocation, demolition, cutting, and patching required to provide work specified or indicated, including relocation and reinstallation of existing wiring and equipment. Contractor shall protect from damage resulting from Contractor's operations existing facility, equipment, and wiring. Extra charges for completion and contract time extension will not be allowed because of field conditions or additional work required for complete and usable construction and systems. Comply with additional requirements indicated for access and clearances.
- B. **Drawings and specifications form complementary requirements;** provide work specified and not shown, and work shown and not specified as though explicitly required by both. Except where explicitly modified by a specific notation to contrary, it shall be understood that indication or description of any item, in drawings or specifications or both, carries with it instruction to furnish and install item, provided complete.

- C. **Terms:** As used in this specification, *provide* means *furnish* and *install*. *Furnish* means “to purchase and deliver to project site complete with every necessary appurtenance and support,” and *install* means “to unload at delivery point at site and perform every operation necessary to establish secure mounting and correct operation at proper location in project.”
- D. **Supplementary items:** Provide supplementary or miscellaneous items, appurtenances, devices and materials necessary for a sound, secure and complete installation. Examine project drawings and other Sections of specifications for requirements that affect work of this section. Completely coordinate the work of this section with the work of other Sections and provide a complete and fully functional installation. Refer to all other drawings and other specifications sections that indicate types of construction in which work shall be installed and work of other sections with which work of this section must be coordinated.

14 Project Conditions

- A. **Field verification:** Carefully verify location, use and status of all material, equipment, and utilities that are specified, indicated, or deemed necessary for removal. Verify that all materials, equipment, and utilities to be removed are completely inactive and will not be required or in use after completion of project. Replace with equivalent any material, equipment and utilities that were removed by Contractor that are required to be left in place.
- B. **Existing utilities:** As applicable, do not interrupt utilities serving facilities occupied by Owner or others unless permitted under following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify owner in writing at least 14 days in advance of proposed utility interruptions. Do not proceed with utility interruptions without Owner’s written permission.
 - 2. Equipment installation:
 - a. Determine suitable path for moving unit substation into place; consider Project conditions.
 - b. Verify clearance requirements and locate equipment to meet installation tolerances.
 - c. Revise locations and elevations from those indicated to those required to suit Project.

15 Delivery Storage and Handling

- A. **General:** Contractor shall be responsible for the deliveries, storing and handling of all materials related to the SCS systems, including materials supplied by others that are part of the SCS installation contract. Material shall be stored and protected according to the manufacturer’s instructions. The contractor shall be responsible for the security of all material during installation. For all material provided by contractor, or delivered to contractor on site, contractor assumes full responsibility and liability for any material shortages, damage, or loss due to storage and handling methods.

16 Examination

- A. **General:** Prior to submitting a proposal, Contractor shall examine site, review Project drawings and specifications, and determine exact extent of work required. Contractors shall include in their proposals all materials, labor, and equipment required to complete the required work indicated. Work that is necessary to obtain complete and usable Project as specified herein shall be included in Contractor's proposal, even if not indicated or specified.
- B. **Bidders' questions:** Should bidders have questions as to intent of drawings and specifications, quality of materials to be used, and work to be performed, questions shall be submitted in writing to Owner's Representative in manner dictated by Owner's Representative. All answers and clarifications to drawings and specifications will be issued in writing.
- C. Extra payment will not be allowed for claims due to unfamiliarity with work to be performed by other trades, existing conditions at job site, local or state laws and codes, and alterations due to field conditions.

17 Additional Costs

- A. **General:** Project acceptance inspections, final completion inspections, substantial completion inspections, and acceptance testing/demonstrations shall be conducted after verification of system operation and completeness by Contractor.
- B. **Inspections and testing:** For Project acceptance inspections, final completion inspections, substantial completion inspections, and/or testing/demonstrations that require more than one site visit by Owner's Representative or Architect/Engineer to verify Project compliance for same material or equipment, Owner reserves right to obtain compensation from Contractor to defray cost of additional site visits that result from Project construction or testing deficiencies/incompleteness, incorrect information, or non-compliance with Project provisions. Owner's Representative will notify Contractor of hourly rates and travel expenses for additional site visits and will issue an invoice to Contractor for additional site visits. Payment of additional site visit costs by Contractor is required within 30 days of invoicing. The owner reserves the right to deduct additional costs defined herein that are indicated on past due invoices from Project amount due Contractor.
- C. **Exclusions:** Contractor shall not be eligible for extensions of Project schedule or additional charges resulting from additional site visits that result from Project construction or testing deficiencies/incompleteness, incorrect information, or non-compliance with Project provisions.

END of SECTION

SECTION 270400 Communications Execution

01 General Requirements

- A. General: Sequence, coordinate, and integrate various elements of telecommunications system, materials, and equipment. Comply with following requirements as a minimum.
- A. Coordinate systems, equipment, and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for wiring, cabling, and equipment installations.
- D. Coordinate installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- E. Sequence, coordinate, and integrate installations of materials and equipment for efficient flow of Work. Give particular attention to large equipment requiring positioning prior to closing in building.
- F. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide maximum headroom and access for service and maintenance as possible.
- G. Coordinate connection of materials, equipment, and systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide the required connection for each service.
- H. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by Contract Documents, recognizing that portions of Work are shown only in diagrammatic form. In case of conflict among individual system requirements, request direction in writing from Owner's Representative.
- I. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components, where installed in both exposed and un-exposed spaces.
- J. Install cabling, wiring, and equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- K. Provide access panel or doors where units are concealed behind finished surfaces.
- L. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

- M. Comply with all requirements and work indicated on drawings.
- N. Avoid interference with structure and with work or other trades, preserving adequate headroom and clearing doors and passageways to satisfaction of Owner and according to code requirements.
- O. Install equipment and cabling/wiring to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof-mounted equipment shall be installed and supported on structural steel or roof curbs as appropriate.
- P. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall and ceiling mounting of equipment as required.
- Q. Provide steel supports and hardware for proper installation of hangers, anchors, guides, and other support hardware.
- R. Obtain and analyze catalog data, weights, and other pertinent data required for proper coordination of equipment support provisions and installation.
- S. Structural steel and hardware shall conform to ASTM standard specifications. Use of steel and hardware shall conform to requirements of AISC Code of Practice: Section Five.
- T. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly that would void warranty.

02 Equipment Installation

- A. General: Install equipment according to manufacturer's written instructions. Install equipment level and plumb. Install wiring and cabling between equipment and all related devices.
- B. Mounting: If neither the Owner's Instructions nor the individual section call out the required hardware mounting, use the following.
 - 1. For equipment at walls, bolt units to wall or mount on structural steel channel strut bolted to wall.
 - 2. For equipment not on walls, provide freestanding racks fabricated of structural steel members and slotted structural steel channel strut.
 - 3. Use feet consisting of 0.25-inch-thick steel plates, 6 square inch, bolted to floor.
 - 4. Use feet for welded attachment of vertical posts not over 3 feet on center.
 - 5. Connect posts with horizontal U channel steel strut and bolt control equipment to channels.
- C. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean devices internally using methods and materials as recommended by the manufacturer.

- D. Connections: Tighten wiring connectors, terminals, bus joints, and mountings, to include lugs, screws, and bolts according to equipment manufacturer's published torque tightening values for equipment connectors. In absence of published connection or terminal torque values, comply with torque values specified in UL 486A and UL 486B.

03 Demolition, removal, and Protection of work

- A. Demolition and removal: Cut, remove, and legally dispose of selected equipment, components, and materials as indicated, including but not limited to removal of material, equipment, devices, and other items indicated to be removed and items made obsolete by new Work. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
- B. Protection of work: Protect structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed. During cutting and patching operations, protect adjacent installations. Patch finished surfaces and building components using new materials specified for original installation and experienced Installers.

04 Penetrations and Sleeves

- A. General: Coordinate work with other sections. SCS Installation Contractor shall be responsible for the provision of cabling sleeves and conduits unless specifically provided by the Electrical Contractor. SCS Installation Contractor shall coordinate with Electrical Contractor to determine exact requirements.
- B. When required, set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured or otherwise constructed without sleeves and wall penetration is required. Do not penetrate structural members. Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on-grade), partitions, and floors. Sleeves shall meet requirements of pertinent specifications. Lay out penetration and sleeve openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.
- C. Sleeve fill: Sleeves that penetrate outside walls, basement slabs, footings, and beams shall be waterproof.
 - 1. Fill slots, sleeves and other openings on floors or walls if not used.
 - 2. Fill spaces in openings after installation of conduit or cable.
 - 3. Fill for floor penetrations shall prevent passage of water, smoke, fire, and fumes.
 - 4. The fill shall be fire resistant in fire floors and walls, and shall prevent passage of air, smoke and fumes. See section 27 05 32 - Firestopping for Telecommunications Systems.
 - 5. Sleeves through floors shall be watertight and shall extend 2 inches above floor surface.

6. Where raceways passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling, and wall finishes.

D. Conduit sleeves:

1. Annular space between conduit and sleeve shall be at least 1/4 inch.
2. Sleeves shall not be provided for slabs-on-grade unless specified or indicated otherwise.
3. For sleeves through rated fire walls and smoke partitions, comply with requirements for firestopping. See section 27 05 32 - Firestopping for Telecommunications Systems.

E. Supports: Do not support piping risers or conduit on sleeves.

F. Future use: Identify unused sleeves and slots for future installation.

05 Cleaning

- A. Contractor is responsible for clean up of debris on a daily basis. Cost of clean up is the responsibility of the Contractor.
- A. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition. Perform cleaning and washing required to provide acceptable appearance and operation of equipment to satisfaction of Owner's Representative.
- B. After completion of Project, clean exterior surface of all equipment, including concrete residue, dirt, and paint residue. Final cleaning shall be performed prior to Project acceptance by Owner's Representative.

06 Special Responsibilities and Information

- A. Coordination of information: Cooperate and coordinate with work of other sections in executing work of this section. Perform work such that progress of entire project, including work of other sections, shall not be interfered with, or delayed. Provide information as requested on items furnished under this section, which shall be installed under other sections. Obtain detailed installation information from manufacturers of equipment provided under this section.
- B. Information gathering: Obtain final rough-in dimensions or other information as needed for complete installation of items furnished under other sections or by Owner. Keep fully informed as to the shape, size and position of openings required for material or equipment to be provided under this and other sections. Give full information so that openings required by work of this section may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provide sufficient information in proper time, provide cutting and patching or have same done, at no expense to Owner.
- C. Housekeeping pads: Provide information as requested as to sizes, number and locations of concrete housekeeping pads necessary for floor mounted equipment.

- D. Maintenance of equipment and systems: Maintain equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.
- E. Use of premises: Use of premises shall be restricted as directed by Owner's Representative and as required below:
 - 1. **Cleaning and rubbish removal:** Remove and dispose of dirt and debris, and keep premises clean. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition, and do cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Owner's Representative.
 - 2. **Rubbish Removal:** Provide for the removal from the site of all spoils, debris, boxes, packaging, crates, and trash generated from the work.
 - 3. **Storage:** Store materials maintaining an orderly, clean appearance. If stored on site in open or unprotected areas, all equipment and material shall be kept off ground by means of pallets or racks, and covered with tarpaulins.
- F. Protection of fireproofing:
 - 1. Clips, hangers, clamps, supports and other attachments to surfaces to be fireproofed shall be installed, if possible, prior to start of spray fire proofing work.
 - 2. Conduits and other items that would interfere with proper application of fireproofing shall be installed after completion of spray fire proofing work.
 - 3. Patching and repairing of fireproofing due to cutting or damaging to fireproofing during course of work specified under this section shall be performed by installer of fireproofing and paid for by section responsible for damage and shall not constitute grounds for an extra to Owner.
- G. Temporary utilities: Refer to contract general requirements regarding requirements.
- H. Movement of materials: Unload materials and equipment delivered to site. Pay costs for rigging, hoisting, lowering and moving equipment on and around site, in building or on roof.

07 Division of Work

- A. General: Division of work responsibility matrix at the end of this section is for Contractor's reference to clarify roles of various manufacturers, installers, subcontractors, and trades involved in telecommunications system Project.
- B. Contractor holding contract with Owner is responsible for coordinating work of all subcontractors to provide a complete and usable Project complying with contract provisions of Project documents.

- C. Failure to coordinate work by subcontractors and suppliers will not be considered justification for additional compensation or extension of schedule.

END of SECTION

SECTION 270500 Common Work Results for Communications

Grounding and Bonding for Communications Systems

1. GENERAL

1.1. Work Includes

Provide all labor, materials, and equipment for the complete installation of work called for in the Contract Documents.

1.2. Scope of Work

- A. This section includes the minimum requirements for the equipment and cable installations in communications equipment rooms (Telecommunications Closets).
- B. Included in this section are the minimum composition requirements and installation methods for the following:
 - 1. Grounding Electrode System
 - 2. Busbars
 - 3. Bonding accessories

1.3. Quality Assurance

- A. All cable and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner or Owner Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where “approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

1.4. Submittals

- A. Provide product data for the following:
 - 1. Manufacturers cut sheets, specifications, and installation instructions for all products.

2. PRODUCTS

2.1. Grounding Electrode System

- A. Grounding Electrode System
 - 1. When required the Grounding Electrode System shall meet the following
 - a. Active grounding system constantly replenishing moisture into the soil
 - b. Provide low resistance to ground
 - c. Provide season to season stability
 - d. Be maintenance-free for 30 years

- e. Contain no hazardous materials or chemicals.
- 2. Approved Manufacturers:
 - a. Cooper BLine, Burndy, or approved equal.

2.2. Wall-mount Busbars

A. Telecommunications Main Grounding Busbar (TMGB)

- 1. Telecommunications Main Grounding Busbar (TMGB) shall be constructed of .25" (6.4 mm) thick solid copper bar.
- 2. The busbar shall be 4" (100 mm) high and 20" (510 mm) long and shall have 30 attachment points (two rows of 15 each) for two-hole grounding lugs.
- 3. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 27 lugs with 5/8" (15.8 mm) hole centers and 3 lugs with 1" (25.4 mm) hole centers.
- 4. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" (100 mm) standoff from the wall.
- 5. The busbar shall be UL Listed as grounding and bonding equipment.
- 6. Approved manufactures:
 - a. Chatsworth (CPI), Erico Caddy, Cooper BLine, or approved equal

B. Telecommunications Grounding Busbar (TGB)

- 1. Telecommunications Grounding Busbar (TGB) shall be constructed of .25" (6.4 mm) thick solid copper bar.
- 2. The busbar shall be 2" (50 mm) high and 12" (300 mm) long and shall have 9 attachment points (one row) for two-hole grounding lugs.
- 3. The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 6 lugs with 5/8" (15.8 mm) hole centers and 3 lugs with 1" (25.4 mm) hole centers.
- 4. The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4" (100 mm) standoff from the wall.
- 5. The busbar shall be UL Listed as grounding and bonding equipment.
- 6. Approved manufactures:
 - a. Chatsworth (CPI), Erico Caddy, Cooper BLine, or approved equal

2.3. Bonding Accessories

A. Below Grade:

- 1. Exothermic-welded type connectors.

B. Above Grade:

- 1. Bonding Jumpers: compression type connectors, using zinc-plated fasteners and external tooth lock washers.
- 2. Ground Busbar: Two-hole compression type lugs using tin-plated copper or copper alloy bolts and nuts.
- 3. Rack and Cabinet Ground Bars: one-hole compression-type lugs using zinc plated or copper alloy fasteners.

4. Cable Shields: Make ground connections to multi-pair communications cables with metallic shields using shield bonding connectors with screw stud connection.
- C. Grounding conductor splices shall be joined with mechanical crimped sleeve designed to have two crimps per side with proper indents markings. Crimp sleeves shall be copper alloy.
- D. Grounding conductor shall be terminated with a mechanical crimped type lug designed to have two crimps, spade section of have two bolts and made of copper alloy.
- E. Two Mounting Hole Ground Terminal Block
 1. Ground terminal block shall be made of electroplated tin aluminum extrusion.
 2. Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
 3. The conductors shall be held in place by two stainless steel set screws.
 4. Ground terminal block shall have two 1/4" (6.4 mm) holes spaced on 5/8" (15.8 mm) centers to allow secure two-bolt attachment to the rack or cabinet.
 5. Ground terminal block shall be UL Listed as a wire connector.
- F. Compression Lugs
 1. Compression lugs shall be manufactured from electroplated tinned copper.
 2. Compression lugs shall have two holes spaced on 5/8" or 1" centers, as stated below, to allow secure two bolt connections to busbars.
 3. Compression lugs shall be sized to fit a specific size conductor, sizes #6 to 4/0, as stated below.
 4. Compression lugs shall be UL Listed as wire connectors.
- G. C-Type, Compression Taps
 1. Compression taps shall be manufactured from copper alloy.
 2. Compression taps shall be C-shaped connectors that wrap around two conductors forming an irreversible splice around the conductors; installation requires a hydraulic crimping tool.
 3. Compression taps shall be sized to fit specific size conductors, sizes #2 AWG to 4/0, as stated below.
 4. Compression taps shall be UL Listed.
- H. Pipe Clamp with Grounding Connector
 1. Pipe clamp shall be made from electroplated tinned bronze. Installation hardware will be stainless steel.
 2. Pipe clamp shall be sized to fit up to two conductors ranging in size from #6 to 250 MCM; conductors must be the same size.
 3. Pipe clamp installation hardware shall be sized to attach to pipes, sizes 1" to 6" (.75" to 6.63" in diameter), as stated below.
 4. Pipe clamp shall be UL Listed as grounding and bonding equipment.
- I. Equipment Ground Jumper Kit

1. Kit includes one 24" L insulated ground jumper with a straight two hole compression lug on one end and an L-shaped two hole compression lug on the other end, two plated installation screws, an abrasive pad and a .5 once tube of antioxidant joint compound.
 2. Ground conductor is an insulated green/yellow stripe #6 AWG wire.
 3. Lugs are made from electroplated tinned copper and have two mounting holes spaces .5" to .625" apart that accept 1/4" screws.
 4. The jumper will be made with UL Listed components.
- J. Approved Manufacturers:
1. Cooper BLine, Burndy, or approved equal.

2.4. Bonding Conductors

A. Cable Tray Bonding Conductor

1. Green # 6 AWG insulated bonding jumper with appropriate lugs or manufactured braided copper grounding jumper equal to a # 6 AWG cable.

B. Equipment Fame Bonding Conductor

1. Bonding Conductor shall be run neatly and uniformly to the equipment, racks, and trays.

C. Bonding Conductor (BC)

1. Green insulated copper bonding conductor, size as required by CEC.
2. The BC shall be, as a minimum, the same as the TBB.
3. Bare conductors are acceptable where plenum or exposed areas limit the use of insulated conductors.

D. Telecommunications Bonding Backbone (TBB)

1. Green insulated copper conductor, minimum as specified in the table below, size 6 AWG. The TBB shall be sized at 2 kcmil per linear foot of conductor length. Insulation shall meet fire ratings of its pathway.
2. Table 1 – Conductor Sizing

Maximum TMGBB to TGBB Length (L) (feet)	Conductor cross-sectional area (minimum), AWG
$L \leq 13\text{ft}$	# 6
$4 < L \leq 14 - 20\text{ft}$	# 4
$6 < L \leq 21 - 26\text{ft}$	# 3
$8 < L \leq 27 - 33\text{ft}$	# 2
$10 < L \leq 34 - 41\text{ft}$	# 1

$13 < L \leq 42 - 52\text{ft}$	# 1/0
$16 < L \leq 53 - 66\text{ft}$	# 2/0
$20 < L \leq 67 - 84\text{ft}$	# 3/0
$26 < L \leq 85 - 105\text{ft}$	# 4/0
$32 < L \leq 106 - 125\text{ft}$	250mcm
$38 < L \leq 126 - 150\text{ft}$	300mcm
$46 < L \leq 151 - 175\text{ft}$	350mcm
$53 < L \leq 176 - 250\text{ft}$	500mcm
$76 < L \leq 251 - 300\text{ft}$	600mcm
Greater than 301ft	750mcm
For lengths in excess of those shown above, the conductor cross-sectional area should be calculated as 2kcmil/ft.	

E. Ground Rods

1. Copper clad steel, 3/4-inch diameter by 10 feet long, conforming to UL 467.

3. EXECUTION

3.1. Installation

A. Outdoor grounding and bonding connections.

1. All outdoor grounding and bonding (earthing) connections shall be accomplished using exothermic welding.

B. Wall-Mount Busbars

1. Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions.
2. Conductor connections to the TMGB or TGB shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
3. Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
4. The wall-mount busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

C. Rack-Mount Busbars and Ground Bars

1. When a rack or cabinet supports active equipment or any type of shielded cable or cable termination device requiring a ground connection, add a rack-mount horizontal or vertical busbar or ground bar to the rack or cabinet. The rack-mount busbar or ground bar provides multiple bonding points on the rack for rack and rack-mount equipment.
2. Attach rack-mount busbars and ground bars to racks or cabinets according to the manufacturer's installation instructions.
3. Bond the rack-mount busbar or ground bar to the room's TMGB or TGB with appropriately sized hardware and conductor.

D. Ground Terminal Block

1. Every rack and cabinet shall be bonded to the TMGB or TGB.
2. Minimum bonding connection to racks and cabinets shall be made with a rack-mount two-hole ground terminal block sized to fit the conductor and rack and installed according to manufacturer recommendations.
3. Remove paint between rack/cabinet and terminal block, clean surface and use antioxidant between the rack and the terminal block to help prevent corrosion at the bond.

E. Pipe Clamp

1. Bond metal pipes located inside the data center computer room with a minimum #6 AWG conductor to the TMGB or TGB using a pipe clamp sized to fit the pipe and the conductor and installed according to the manufacturer's recommendations.
2. Remove paint between the pipe and pipe clamp, clean surface and use antioxidant between the pipe and the clamp to help prevent corrosion at the bond.
3. Remove insulation from conductors where wires attach to the pipe clamp.

F. Equipment Ground Jumper Kit

1. Bond equipment to a vertical rack-mount busbar or groundbar using ground jumper according to the manufacturer's recommendations.
2. Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount busbar or groundbar to help prevent corrosion at the bond.

Pathways for Communications Systems

1. GENERAL

1.1. Scope of Work

- A. Install empty raceway system, including underfloor and overhead distribution system, fish wire, terminal cabinets, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, cable troughs, service poles, miscellaneous and positioning material to constitute complete system, as indicated for distribution of Telecommunications wiring which includes cables for Data, Voice, Video, Audio, Security, and future signal requirements.

- B. The location at which all new telecommunications wiring will terminate is called a Telecom Outlet (TO). There are several styles of outlets:
 - 1. New construction
 - 2. Existing construction typical
 - 3. Existing construction variations
 - 4. Telephone (Voice) only.
 - 5. Data only
- C. Furnish and install split channel raceway and outlet boxes as specified in the Drawings and as specified herein.
- D. Furnish and install conduit stubs in walls and floors for cable routes.

1.2. Quality Assurance:

- A. All cable and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner or Owner Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.
- B. Assure that the "as installed" system is correctly and completely documented including engineering drawings, manuals, and operational procedures in such a manner as to support maintenance and future expansion of the system.

1.3. Submittals

- A. Product Data: For features, ratings, and performance of each component specified.
- B. Submit manufacturer's instructions for storage, handling, protection, examination, preparation, operation, and installation of products. Include application conditions or limitations of use stipulated by any product testing agency. Submit for the following:
 - 1. Wall Boxes
 - 2. Raceway
 - 3. Conduit
 - 4. Conduit Bushings
- C. Shop Drawings:
 - 1. Component List: List manufacturer, part number, and quantity of each component.
 - 2. Include dimensioned plan and elevation views of equipment rooms, labeling each individual component. Show raceway assemblies, method of field assembly, workspace requirements, and access for cable connections.

2. PRODUCTS

2.1. Telecom Outlets (TO)

- A. Cat6 TO consists of one (1) 4-11/16" square by 2-1/8" deep flush mounted box. Each outlet box shall have an EMT conduit stubbed above the drop ceiling or extended into the hallway cable tray. Conduit size is as follows UON:
 - 1. For Outlets with 3 or less cables, use a 1" EMT conduit.
 - 2. For Outlets with 3-6 cables, use a 1.25" EMT conduit.
 - 3. For all other sizes, calculate the fill ratio at 40% for proper sized conduit.
- B. Cat6A TO consists of one (1) 5" square by 2-7/8" deep flush mounted box. Each outlet box shall have an EMT conduit stubbed above the drop ceiling or extended into the hallway cable tray. Conduit size is as follows UON:
 - 4. For Outlets with 3 or less cables, use a 1.25" EMT conduit.
 - 5. For Outlets with 3-6 cables, use a two 1.25" EMT conduit.
 - 6. For all other sizes, calculate the fill ratio at 40% for proper sized conduit.
- C. Existing the nearest mounted construction TO typically consists of surface-mounted raceway including base, cover, end fitting, entrance end fitting, and (2) 1" EMT conduits stubbed out top of entrance end fitting to above ceiling or out to nearest hallway distribution system. Size of the raceway is site dependent based on number of conductors to be installed.
- D. The intent of the installation of the TOs which consist of the raceway is as follows:
 - 1. Where ceilings are accessible, the raceway and entrance end fitting shall extend above the ceiling and the conduits installed above the ceiling in the room to the nearest hallway distribution system.
 - 2. Where ceilings are partially accessible, or if the Drawings and/or Specifications indicate installation of access panels, the raceway shall extend above the ceiling and the conduits installed above the ceiling in the room to the nearest hallway distribution system.
 - 3. Where ceilings are inaccessible or no ceilings exist, the raceway shall extend up as close to the ceiling as practical to allow installation of conduits as high as possible to the nearest hallway distribution system.

2.2. Horizontal Distribution Systems

- A. Conduit System (Renovations only, where conduit exists)
 - 1. Provide conduits secured to wall above corridor ceilings as shown on the Drawings or as specified herein for installation of telecommunications cables. Any exposed conduit
 - 2. Corridor conduits shall be 4" EMT, furnished in 10-foot lengths wherever possible, with no sharp edges, reamed as necessary, evenly supported at two locations per 10 foot section spacing. Conduits shall be sized and quantified to account for handling cables in all TO conduits at 40% fill back to the TR and/or ER rooms. Verify size prior to installation. Bushings and/or connectors on ends of EMT are required.

3. All conduits shall be installed stacked and attached to walls unless conditions exist which prohibit this type of installation. When this condition exists, mount conduits side-by-side supported with 3/8" rod attached to building structure utilizing unistrut channel to form a trapeze. Double nut the top and bottom at the unistrut. Utilize conduit clamp to secure conduits to unistrut.
4. Provide measured pull line in each conduit rated at 1200 lbs. minimum. Increments must be in 12" steps.
5. Grounding of conduits is not required per CEC #250-33, Exception No. 2. shall be painted except conduit above suspended ceilings or in mechanical, electrical or telecommunication rooms. Color to match that of surface installed upon or as directed by Owner's Representative. Coordinate with other trades prior to painting.
6. Provide restorable fire stops inside and around conduits as recommended by UL1479 or ASTM E814 for all conduits penetrating fire-rated construction. Fire rated construction to be verified with AHJ. See Section 27 05 32 for more firestopping information.

B. Corridor Cable Tray System

1. Complete wall mounted or suspended aluminum cable tray system and necessary accessories shall be provided as shown on plans. Install entire cable tray system in accordance with manufacturer's minimum installation practices and all local governing codes.
2. Coordinate installation of cable tray with other trades to allow a minimum of 12" above, 12" in front, and 12" below of clearance from piping, conduits, ductwork, etc. Allowance must be provided for access to the tray with reasonable room to work. Obstructions to the tray must be minimized and cannot block more than 6 feet of the tray at any point in the run.
3. Submittal drawings, in the form of 8 1/2"x 11" catalog cut sheets, shall be provided for the following items: cable tray, fittings, accessories and load data.
4. Cable tray shall not be loaded beyond 60% of manufacturer's recommended load capacity.
5. Install wall mounted cable tray on both sides of hallway as shown on drawings and where applicable.
6. Where a new cable tray distribution system encounters a wall, install sufficient 4" EMT sleeves through the wall so cabling does not exceed 20% fill.
7. Where cable tray is exposed below ceiling, install the appropriate solid bottom inserts to conceal cables.
8. Install cable tray dropouts where large quantities of cables exit the distribution system.
9. Cable tray must be sized to facilitate sufficient growth capacity for migration cable plant to coexist in same tray as existing cable plant, wherever possible.
10. Manufacturer of cable tray in corridors and telecom rooms shall be:

C. Telecommunication Room Cable Tray System

1. TR cable tray shall completely wrap all walls within the room. Cable tray shall extend over all equipment frames.
2. Cable tray shall be a minimum width of 2" high x 12" wide. Cable tray may be sized upwards if fill ratio requirements need to be met based on cable quantities.
3. Manufacturer of tubular ladder type cable tray in telecommunication rooms shall be Cooper BLine, Chatsworth (CPI), CommScope or approved equal.
4. Cable tray shall be 12 inch cable runway.
5. Rectangular steel tubing cross members welded at 12-inch intervals. Finish in black enamel. CommScope, Part Number CR-SLR-10L-12W or equivalent.
 - a. 12-inch Wall Angle Assembly Kit – CommScope Part Number CR6-12WRSK or equivalent.
 - b. 3-inch Channel Rack-To-Runway Mounting Plate - CommScope Part Number CRR2RRMK or equivalent.
 - c. End Closing Tube - CommScope Part Number CRPECK or equivalent.
 - d. Corner Clamp - CommScope Part Number CRTJSK or equivalent (2 required per End Closing Tube to complete assembly).
- D. All open pathway/trays shall be installed a minimum of six (6) inches away from any light fixture or other source of EMI (Electromagnetic Interference).
- E. All pathways shall be grounded per CEC Article 250.
- F. Provide external grounding strap at expansion joints, sleeves, and crossover and at other locations where pathway/tray continuity is interrupted.
- G. Support all pathways from building construction. Do not support pathways from ductwork, piping, or equipment hangers.
- H. Install cable tray level and straight unless noted on the construction drawings.

2.3. Station Conduits

Station conduit is defined as conduit that originates at the TO and rises within the walls or is exposed from a raceway and extends up into the drop ceiling or over to the hallway distribution system.

- A. Provide station conduits from TOs to above the drop ceiling or extend over to the hallway distribution systems consisting of 1" EMT minimum or appropriate size as shown on the Drawings or as specified herein for installation of telecommunications cables.
- B. Provide an insulating press fit bushing on all telecommunications conduits including interconnecting nipples and stub to distribution system. To prevent conflicts with other cables or conduits to cable tray, the conduit shall be stubbed not less than 6" above or below conduit/cable tray center line. Where space permits, every effort shall be made to bend station conduits down such that the flow of installed cables promotes the minimum length back to the TR and the least number of bends in the cables. Bushings must be rated to be used in an environmental air handling space (Plenum).

- C. Manufacturer of insulating bushing on all telecommunication conduits shall be:
 - 1. Arlington, Erico Caddy or equivalent
- D. Provide pull line in each empty conduit to hallway distribution system.
- E. Indelibly mark the station conduit at hallway distribution end with Room # that conduit serves.
- F. The use of 90 degree electrical pulling elbows is prohibited.
- G. Do not include more than two 90-degree bends between pulling points when installing station conduit runs. If the path of the station conduits requires more than 180 degrees of total bends, installation of an appropriately sized junction box is required. See section 2.4 for junction box requirements.
- H. Place an appropriately sized junction box in each individual station conduit run that exceeds 100 feet in length.
- I. The use of a third bend in a conduit is only acceptable if:
 - 1. The total conduit run is reduced by 15%.
 - 2. The conduit size is increased to the next trade size.
 - 3. One of the bends is located within 12" of the cable feed end.

2.4. Junction Box Requirements for Station Conduits

- A. If the station conduit route exceeds the 180 degree of total bends limitation, an appropriately sized junction box is required within a straight section of the conduit run.
- B. Each station conduit run requires a separate junction box. The sharing of a junction box by multiple conduits is prohibited.
- C. A junction box shall not be used in place of a bend. All junction boxes in station conduit paths shall be installed within a straight section of the conduit run.

2.5. Service Entrance Conduits

- A. Entrance conduits shall be continuous into the building and to the ER. Securely fasten all entrance conduits to the building to withstand any cable placing operation. Do not include more than two 90-degree bends between pulling points when installing entrance conduits.
- B. On exterior wall penetrations, seal both sides of the wall around outside of conduit with hydraulic cement to prevent water from entering the building. Seal the inside of the conduit on both sides with conduit plugs, water plugs, or duct sealer to prevent water, vapors, or gases from entering the building.

2.6. Pathway Requirements for Entrance Conduits

- A. If the entrance conduits exceed the 180 degree of total bends limitation, an appropriate sized junction box, manhole, or handhole is required.
- B. As-built drawings of entrance conduit path required to be submitted to Owner's Representative before covered with soil.

2.7. Riser Conduits

Riser conduits shall only be used when noted on the Construction Documents for special applications only. Riser conduits are not required as a general rule for the riser system. However, when required:

- A. A minimum of (2) 4" conduits shall be installed between the ER room and each TR room as shown on the Drawings.
- B. Conduits entering ER and TR rooms shall be reamed or bushed and terminated not more than 4" from entrance wall and within 12" of room corners.
- C. Conduits entering ER and TR rooms from below floor shall be terminated not more than 4" above finished floor.
- D. Conduits for riser cables shall be continuous and separate from all other conduit or enclosed raceway systems. Do not include more than two 90 degree bends between pulling points when installing riser conduits. Where junction boxes are required, locate in accessible areas, such as above suspended ceilings in hallways.
- E. Conduits shall not be less than 4" trade size and be equipped with a measured pull line at 12" increments rated at a minimum 1200-pound test.
- F. Provide restorable fire stops inside and around conduits as recommended by UL1479 or ASTM E814 for all conduits penetrating fire-rated construction. Fire-rated construction to be verified with AHJ. See Section 27 05 32 for more firestopping information.
- G. Provide an insulating press fit bushing on all telecommunications riser conduits. Bushings must be rated to be used in an environmental air handling space (Plenum).
 - 1. The manufacturer of insulating bushing on all telecommunication conduits shall be Arlington or equal.
- H. Riser conduits shall not be used for the distribution of horizontal cables.

2.8. Firestopping

- A. In all buildings, floor/ceiling assemblies, stairs, and elevator penetrations must be sealed with a 2-hour fire stop assembly at a minimum, unless otherwise noted.
- B. Contact Owner's Representative to identify walls which are fire-rated construction. Walls must be sealed with a 2-hour fire stop assembly at a minimum.
- C. Communication pathways requiring fire stopping shall utilize removable/re-usable fire stopping putties for ease of Moves, Adds, and Changes.
- D. All fire stopping penetrations shall conform to the recommended practices listed in UL1479 or ASTM.
- E. See Section 27 05 32 - Firestopping for Telecommunications Systems

3. EXECUTION

3.1. General Requirements

- A. The intention of the telecommunications conduits is to provide a route between ER and TR rooms, routes from the TRs throughout building floors to hallways, and routes from hallway distribution systems into rooms to individual TOs for telecommunications cabling.
- B. Installation of new pathways shall not interfere with existing pathways in such a way that installation of new cables within the existing pathway is made more difficult.

3.2. Examination

- A. Examine areas to receive cable management system. Notify the Owner's Representative of conditions that would adversely affect the installation or subsequent utilization of the system.
- B. Do not proceed with installation until unsatisfactory conditions are corrected.

3.3. Installation

- A. Install in accordance with recognized industry practices, to ensure that the equipment complies with the requirements of the CEC, and applicable portions of NFPA 70B and NECA "Standards of Installation" pertaining to general electrical installation practice.
- B. Coordinate installation with other trades.
- C. Field verification is required before installation.
- D. Install cable management system at locations indicated on the drawings and in accordance with manufacturer's instructions.

Hangers and Supports for Communications Systems

1. GENERAL

1.1. Work Includes

The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the system of non-continuous cable supports as described in this specification.

1.2. Scope of Work

This Section includes the minimum requirements for the support structures for the Communications Systems for the project as outlined in the Bid Document.

- A. Non-continuous cable supports (2.3A)
- B. Adjustable non-continuous cable support sling (2.3B)
- C. Multi-tiered non-continuous cable support assemblies (2.3C)
- D. Non-continuous cable support assemblies from tee bar (2.3D)
- E. Non-continuous cable support assemblies from drop wire/ceiling (2.3E)
- F. Non-continuous cable support assemblies from beam, flange (2.3F)
- G. Non-continuous cable support assemblies from C & Z Purlin (2.3G)

- H. Non-continuous cable support assemblies from wall, concrete, or joist (2.3H)
- I. Non-continuous cable support assemblies from threaded rod (2.3I)
- J. Raised floor non-continuous cable support assemblies (2.3J)
- K. Cantilever-Mounted Option for non-continuous cable supports (2.3K)
- L. Installation accessories for non-continuous cable supports (2.3L)

1.3. Submittals

- A. Submit product data on non-continuous cable support devices, including attachment methods. Product data to include, but not limited to materials, finishes, approvals, load ratings, and dimensional information.

1.4. Quality Assurance

- A. Non-continuous cable supports, and cable support assemblies shall be listed by Underwriters Laboratories for both Canadian and US standards (cULus).
- B. Non-continuous cable supports shall have the manufacturer's name and part number stamped on the part for identification.

1.5. Coordination

- A. Coordinate installation of hangers supports and cables with other trades.

2. PRODUCTS

2.1. Acceptable Manufacturers

- A. Subject to compliance with these specifications, non-continuous cable supports shall be manufactured in the United States of America.

2.2. Non-continuous Cable Support Systems

- A. Non-continuous cable supports
 - 1. Non-continuous cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables; cULus Listed.
 - 2. Non-continuous cable supports shall have flared edges to prevent damage while installing cables.
 - 3. Non-continuous cable supports sized 1 5/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces.
 - 4. Non-continuous cable supports shall have an electro-galvanized or G60 finish and shall be rated for indoor use in non-corrosive environments.
 - 5. Stainless Steel non-continuous cable supports are intended for indoor and outdoor use in non-corrosive environments or where only mildly corrosive conditions apply.
 - 6. Non-continuous cable supports shall be manufactured in the United States of America.
- B. Adjustable non-continuous cable support sling
 - 1. Constructed from steel and woven laminate; sling length can be adjusted to hold up to 425 4-pair UTP; rated for indoor use in non-corrosive environments. Rated to support Category 5e and higher cable, or optical fiber cable; cULus Listed.

2. Adjustable non-continuous cable support sling shall have a static load limit of 100 lbs.
 3. Adjustable non-continuous cable support sling shall be suitable for use in air handling spaces.
 4. If required, assemble to manufacturer recommended specialty fasteners including beam clips, flange clips, C and Z purlin clips.
 5. Material shall be manufactured in the United States of America.
- C. Multi-tiered non-continuous cable support assemblies
1. Multi-tiered non-continuous cable support assemblies shall be used where separate cabling compartments are required. Assemblies may be factory assembled or assembled from pre-packaged kits. Assemblies shall consist of a steel angled hanger bracket holding up to six non-continuous cable supports, rated for indoor use in non-corrosive environments; cULus Listed.
 2. If required, the multi-tier support bracket may be assembled to manufacturer recommended specialty fasteners including beam clamps, flange clips, C and Z purlin clips.
 3. The multi-tiered support bracket shall consist of:
- D. Non-continuous cable support assemblies from tee bar
1. Tee bar support bracket with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
 2. Material shall be manufactured in the United States of America.
- E. Non-continuous cable support assemblies from drop wire/ceiling
1. Fastener to wire/rod with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
 2. Material shall be manufactured in the United States of America.
- F. Non-continuous cable support assemblies from beam, flange
1. Fastener to beam or flange with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
 2. Material shall be manufactured in the United States of America.
- G. Non-continuous cable support assemblies from C & Z Purlin
1. Fastener to C or Z purlin with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments, cULus Listed.
 2. Material shall be manufactured in the United States of America.
- H. Non-continuous cable support assemblies from wall, concrete, or joist
1. Fastener to wall, concrete, or joist with one non-continuous cable support, factory or jobsite assembled; rated for indoor use in non-corrosive environments, cULus Listed.
 2. Material shall be manufactured in the United States of America.
- I. Non-continuous cable support assemblies from threaded rod
1. Fastener to threaded rod with one non-continuous cable support, factory or jobsite assembled, rated for indoor use in non-corrosive environments, cULus Listed.
 2. The multi-tiered support bracket shall have a static load limit of 300 lbs.

3. U-hooks and Double J-hook shall attach directly to threaded rod using standard nuts.
4. Material shall be manufactured in the United States of America.
- J. Raised floor non-continuous cable support assemblies
 1. Fastener to raised (access) floor pedestal with one non-continuous cable support, factory or jobsite assembled, rated for indoor use in non-corrosive environments; cULus Listed.
 2. Material shall be manufactured in the United States of America.
- K. Cantilever-Mounted cable supports
 1. U-hook shall be able to be assembled to a wide variety of wall mount brackets.
 2. Spacing of individual U-hooks as needed, max of 4' to 5' apart.
 3. U-hooks may have the optional attachment of a cable roller for ease in pulling cables.
 4. Material shall be manufactured in the United States of America.
- L. Installation of accessories for non-continuous cable supports.
 1. Cable Pulley
 - a. Non-continuous cable supports may be used as an installation tool when a removable pulley assembly is included. The pulley shall be made of plastic and without sharp edges. The pin and bail assembly must be able to be secured to the J-Hook during cable installation. The pulley must remain secured while cables are being pulled.
 - b. The pin and roller assembly must be removed after cables are installed.
 2. Material shall be manufactured in the United States of America.
 3. Cable Protector
 - a. The protective steel tube shall fit over threaded rod and be at least 4" in length.
 - b. The tube shall prevent damage to cables placed in or pulled through CAT-CMTM U-hooks. The tube shall not inhibit the pulling of cables.

2.3. Material shall be manufactured in the United States of America.

2.4. Finishes

- A. ASTM B633 Standard Specification for Electro-deposited Coatings of Zinc on Iron and Steel
 - ASTM B 695 Standard Specification for coatings of Zinc Mechanically Deposited on Iron and Steel
 - ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - ASTM A924/A924M Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
- B. Non-continuous cable supports used where only mildly corrosive conditions apply shall be stainless steel, AISI type 304.

3. EXECUTION

3.1. Installation

- A. Installation and configuration shall conform to the requirements of the current revision levels of California Electrical Code (CEC), ANSI/ EIA/TIA Standards 568 & 569, applicable local codes, and to the manufacturer's installation instructions.
- B. Do not exceed load ratings specified by manufacturer.
- C. Adjustable non-continuous support sling shall have a static load limit of 100 lbs.
- D. Follow manufacturer's recommendations for allowable fill capacity for each size non-continuous cable support.
- E. Locate pathways per Telecommunications Drawings.

Firestopping for Telecommunications Systems

1. GENERAL

1.1. Scope

- A. This SECTION describes the requirements for furnishing and installing firestopping for fire-rated construction. This includes all openings in fire-rated floors, walls and other rated elements of construction, both blank (empty) and those accommodating items such as cables, conduits, pipes, ducts, etc.
- B. Fire blocking for Concrete Floor or Wall Sleeved Cables.
- C. Fire blocking for Gypsum Wall Sleeved Cables.
- D. Fire blocking for Concrete Block Wall Sleeved Cables.

1.2. Related Documents:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 7 Specification Sections, apply to this Section.

1.3. Submittals

- A. Submit manufacturer's product literature and installation procedures for each type of Firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria and test data. Submit cured samples of firestop materials.
- B. Product Data: Shall be clearly marked to indicate all technical information which specifies full compliance with requirements of this section and Contract Documents, including the following:
 - 1. Copy of UL illustration of each proposed system indicating manufacturer's approved modifications.
 - 2. Each condition requiring penetration seals in proposed UL systems materials, anchorage, methods of installation and actual adjacent construction.

1.4. Quality Assurance

- A. Firestopping systems (materials and design) shall conform to both Flame (F) ratings and Time (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions.

1.5. Coordination

- A. Coordinate layout and installation of Firestopping System with other trades.
- B. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Architect.

2. PRODUCTS

2.1. Acceptable Manufacturers:

- A. Materials and products required for work of this section shall not contain asbestos or polychlorinated biphenyls (PCB).
- B. Manufacturers: 3M, STI, & Hilti
- C. Firestopping System must be approved by the local AHJ before purchase or installation.

2.2. General

Provide and install firestopping materials to meet applicable codes and installation requirements for each firestopping application. Products using caulking, putties, wrap strips, mortars, composite boards and/or mechanical devices shall be used as appropriate for the specific condition.

2.3. Caulking

When caulking is used, provide and install flexible caulking materials. Cured firestop materials 1/8 thick shall be able around a 1" mandrel without breaking.

2.4. Firestop

Do not use any firestop products which re-emulsify, leach active intumescent ingredients or dissolve when placed in water after curing. Product must withstand the passage of cold smoke, either as inherent property of the system or by the use of a separate product included as part of the UL system or device and designed to perform this function.

2.5. Penetration Seals

- A. General:
 - 1. Penetration seals (firestopping material) shall be asbestos-free and capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of ASTM E814 and UL 1479.
 - 2. Materials shall meet and be acceptable for use by all three model building codes, Basic/California Building Code, Building Code and Standard Building Code, per National Evaluation Service, Inc. report # NER-243.

3. Materials shall meet the requirements of NFPA 101 and CEC.
 4. Materials shall be suitable for the firestopping of penetrations made by steel, glass, plastic and insulated pipe, conduit, bus duct, non-insulated pipe, and ductwork.
 5. On insulated pipe, fire-rating classification must not require removal of insulation.
 6. The rating of penetration seals shall not be less than the rating of the time-rated floor or wall assembly.
 7. The systems shown below are examples and other equal systems may be approved or required by the AHJ.
- B. 2-hour Rated Concrete Floor:
1. Penetrants: Multiple pipes.
 2. UL System: No. 93.
- C. 2-hour Rated Concrete Floor:
1. Penetrants: Maximum 30" dia. Metal pipe/conduit.
 2. UL System: No.319
- D. 1-2 –Hour Rated Gypsum Board Wall:
1. Penetrant: Metal pipe/conduit.
 2. UL System: No. 147
- E. 2-Hour Rated Gypsum Board Wall:
1. Penetrant: Metal pipe/conduit.
 2. UL System: No. 147.
- F. 3-Hour Rated Concrete Wall:
1. Penetrant: Metal duct, maximum 2' square and maximum dimension of 30".
 2. UL System: No. 105.
- G. Walls Below Grade:
1. Penetrants: Pipe sleeves.
 2. Seal: Thunderline "Link Seal" casing seal.

3. EXECUTION

3.1. Inspection

Examine the areas and conditions where Firestops are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected by the contractor in a manner acceptable to the Architect.

3.2. Conditions Requiring Firestopping

- A. General – Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, safing, or otherwise.
- B. At any point where a fire rated wall is penetrated with cable or conduit.

C. Penetrations

1. Penetrations include conduit, cable wire, pipe, duct or other elements which pass through one or both outer surfaces of a fire rated floor, wall or partition.
 2. These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved firestop any annular space between the sleeve and wall opening.
- D. Provide firestopping to fill miscellaneous voids and openings in fire-rated construction as specified herein.

3.3.3.3 Installation

A. General

1. Installation of Firestops shall be performed by a applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with the manufacturer's detailed installation procedures.
2. Apply Firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
3. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all pipe, conduit, cable, and other items which penetrate fire-rated construction have been permanently installed prior to installation of Firestop.

B. Field Quality Control

1. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.
 2. Follow safety procedures recommended in the Material Safety Data Sheets.
 3. Finish surfaces of firestopping which is to remain exposed in the completed work to a uniform and level condition.
 4. All areas of work must be accessible until inspection by the applicable Code Authorities.
 5. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification at no additional cost.
- C. Calculate the maximum cable fill ratio for each Firestopping System and cable type. Do not exceed the maximum fill ratio.
- D. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.

3.4. Warranty

- A. A. Comply with General Conditions, and include but not be limited to:
1. Repairs and replacement of penetration seals which fail in joint adhesion, cohesion, abrasion, resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability, or appear to

deteriorate in any other manner not clearly specified in submitted manufacturer's data as an inherent quality of the material for exposure indicated.

3.5. Cleaning

- A. Remove spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.
- B. Leave finished work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.

Conduits and Backboxes for Communications Systems

1. GENERAL

1.1. Outlets Cat5e and Cat6

- A. Each data outlet in a wall or floor shall be served by two (2) 1 in. conduits and a double-gang deep device box with a single-gang mud ring.
- B. Wall mounted telephones shall be served by one 0.75 in. conduit and a single-gang deep device box with a single-gang mud ring. The outlet box shall be mounted at a center height of 48 in. above the finished floor, unless otherwise specified on the drawing, and shall have a clearance of 12 in. of wall surface on all sides.
- C. All outlet conduits shall be stubbed into accessible ceiling space.
- D. All outlet conduits shall have burrs and any other abrasive elements removed and an insulating bushing shall be installed on both ends.
- E. No section of conduit shall be longer than 30 m (100 ft.) between pull points.
- F. No more than 180 degrees of conduit bends shall be permitted between pull points.
- G. The minimum inside radius for any bend of an outlet conduit shall be six times the inside diameter of that conduit.

1.2. Outlets Cat6A

- A. Each data outlet in a wall or floor shall be served by two (2) 1.25 in. conduits and a 5-Square double-gang deep device box with a single-gang mud ring.
 - 1. Approved manufactures: Steel City, Rand-L, or approved equal
- B. All outlet conduits shall be stubbed into accessible ceiling space.
- C. All outlet conduits shall have burrs and any other abrasive elements removed and an insulating bushing shall be installed on both ends.
- D. No section of conduit shall be longer than 30 m (100 ft.) between pull points.
- E. No more than 180 degrees of conduit bends shall be permitted between pull points.
- F. The minimum inside radius for any bend of an outlet conduit shall be six times the inside diameter of that conduit.

1.3. Conduits

- A. Electric metallic tubing: Comply with UL 797. Tubing shall have hot dipped galvanized exterior, enamel-coated interior.
- G. Flexible conduit shall not be used in lieu of conduit bends and offsets.
- H. PVC conduit: Comply with UL 651, listed for use with 90 degrees C conductors operating at 90 degrees C.

1.4. Standards Compliance

- A. General standards: Comply with current revision of TIA 569 as amended.

1.5. Submittals

- A. Provide product data for the following:
 - 1. Manufacturers cut sheets, specifications, and installation instructions for all products (submit with bid).

1.6. Coordination

- A. Coordinate installation of labels with other trades.
- I. Storage and Handling: Avoid breakage, denting and scoring finishes. Damaged products will not be installed. Store materials in original cartons and in a clean dry space; protect from weather and construction traffic. Wet materials will be unpacked and dried before storage.

2. PRODUCTS

2.1. Approved Products

- A. Dry location device boxes: Manufacturer shall be:
 - 1. Steel City, Rand-L, Hubbell, or Raco
Equivalent products by other manufacturers may be used where approved in writing by Owner's Representative.
 - 2. Material shall be manufactured in the United States of America.
- J. Wet location boxes: Manufacturer shall be:
 - 1. Steel City, Rand-L, Hubbell, or Raco
Equivalent products by other manufacturers may be used where approved in writing by Owner's Representative.
 - 2. Material shall be manufactured in the United States of America.

3. EXECUTION

3.1. Installation

- A. Installation and configuration shall conform to the requirements of the current revision levels of California Electrical Code (CEC), ANSI/ EIA/TIA Standards 568 & 569, applicable local codes, and to the manufacturer's installation instructions.

- K. Install conduits using techniques, practices, and methods that are consistent with Category 6 or higher requirements and that supports Category 6 or higher performance of completed and linked signal paths, end to end.
- L. Follow manufacturer's recommendations for allowable fill capacity for each size non-continuous cable support.

Cable Trays for Communications Systems

1. GENERAL

1.1. Scope

- A. Continuous, rigid, welded steel or stainless-steel wire mesh cable management system.
- B. Cable tray systems are defined to include, but are not limited to, straight sections, supports and accessories.

1.2. Related Documents:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3. Quality Assurance

- A. Source Limitations: Obtain cable tray components through one source from a single manufacturer.
- B. Comply with CEC California Electrical Code, Article 392: Cable Trays; provide UL Classification and labels.

1.4. Coordination

- A. Coordinate layout and installation of cable tray with other trades.
- B. Revise locations and elevations from those indicated as required to suit field conditions and as approved by the Architect.

2. PRODUCTS

2.1. Manufacturers

- A. Subject to compliance with requirements, provide products by the following:

2.2. Materials and Finishes:

- A. Cable Tray Materials:
 - Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, bent, and surface treated after manufacture.
- B. Cable Tray Finishes:
 - Finish for Carbon Steel Wire after welding and bending of mesh.
 - 1. Electrodeposited Zinc Plating: ASTM B 633, Type III, SC-1.

2. Powder-Coated Trays – UL classified Black powder-coated surface treatment over Electrodeposited Zinc Plating (or plain steel) using ASA 61 black polyester coating.
- C. Cable tray will consist of continuous, rigid, welded steel wire mesh cable management system, to allow continuous ventilation of cables and maximum dissipation of heat, with UL Classified splices where tray(including UL Classified painted tray) acts as Equipment Grounding Conductor (EGC). Wire mesh cable tray will have continuous Safe-T-Edge T-welded top side wire to protect cable insulation and installers.
- D. Provide splices, supports, and other fittings necessary for a complete, continuously grounded system.
 - Mesh: 2 x 4 inches (50 x 100 mm).
 - Straight Section Lengths: 118 inches (3,000 mm).
 - Wire Diameter: Patented design includes varying wire sizes to meet application load requirements; to optimize tray Strength; and to allow tray to remain lightweight.
 - Safe-T-Edge: Patented Safe-T-Edge technology on side wire to protect cable insulation and installers' hands.
 - Fittings: Wire mesh cable tray fittings are field fabricated from straight tray sections, in accordance with manufacturer's instructions and Item 2.3.
- E. CF Series Cable Tray Size:
 1. Depth: Cable tray depth will be 4 inches
 2. Width: Cable tray width will be 6 ,12, 18, or 24 inches as shown on Telecommunications Drawings:
 3. Length: Cable tray section length will be 118 inches (3000mm) unless otherwise shown on drawings.
 4. Fill Ratio: Cable tray may be filled to total fill capacity per CEC. Minimum 20% spare capacity recommended to accommodate future cabling changes or additions.
 5. Load Span Criteria:
 6. Cable tray will be capable of carrying a uniformly distributed load of 50 pounds per foot on an 8 ft support span, according to load tests of standard shown in Item A above.

2.3. Cable Tray Supports & Accessories

- A. Fittings/Supports: Wire mesh cable tray fittings are field fabricated from straight tray sections, in accordance with manufacturer's instructions. Supports will include the FAS (Fast Assembly System) where possible so that screws, bolts, and additional tools are not required for cable tray mounting; installation time is reduced; and tray path can adapt to installation obstacles without the need for additional parts. Place supports so that support span does not exceed that shown on the drawings.
 1. FAS System support methods to mount from ceiling and wall structures with 1/4", 3/8" or 1/2" threaded rod, if applicable

2. Splices, including those approved for electrical continuity (bonding), as recommended by cable tray manufacturer. Select one of the following splicing methods, if applicable:
 - a. UL Classified EDRN Fast Splice: No hardware required.
 - b. UL Classified SWK Splice Washer Kit: Swaged set for splicing, turns, bends, tees
 - c. UL Classified ED Universal Splice Bar: Cut & bend to fit any configuration.
 - d. Preclick Splice: Bolted connection optional
 - e. UL Classified EDT Splice Plate: Bolted connection
 - f. UL Classified CE 25 & CE 30 Square Splice Washers: Use with EZ BN ¼" Nut & Bolt
 - g. UL Classified CE 40 Square Splice Washer: Use with EZ BN ¼" to splice trays on bends, adjustable tees
 - h. FASLock Splice: For sweeps and bends with tray 12" (300mm) and wider.
 - i. UL Classified EZ T 90 kit: For Tees and 90s
 - j. UL Classified RADT90 kit: For 5-1/2" radius Tees and 90s
- A. Accessories: As required to protect, support, and install a cable tray system. Select from the following accessories, if applicable:

2.4. Equipment Grounding Conductor Function & Grounding

- A. UL Classified cable trays (including painted tray) may act as Equipment Grounding Conductors.
- B. Use UL Classified splicing methods to ensure cable tray is electrically continuous and bonded as recommended.

Ground cable trays at end of continuous run.
- C. Test cable tray system per NFPA70B, Chapter 18 to verify grounding less than 1 ohm.
- D. Ground cable trays against fault current, noise, lightning, and electromagnetic interference by mounting grounding wire to each 10' cable tray section with grounding clamp.

3. EXECUTION

3.1. Examination:

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of cable trays. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2. Installation

- A. Install cable tray level and plumb according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards.
- B. Cutting: Field-fabricated changes in direction & elevation by cutting & bending cable tray.

1. Cut cable tray wires in accordance with manufacturer's instructions.
2. Cable tray wires must be cut with side-action bolt cutters with offset head to ensure integrity of protective galvanic layer.
3. Remove burrs and sharp edges from cable trays.

Underground Ducts and Raceways for Communications Systems

- A. Outdoor telecommunications pathways connect building, pedestals, maintenance holes, handholds, and towers. These pathways consist of underground, direct-buried or aerial. Underground or direct-buried are generally preferred over aerial because of aesthetics and security. Generally, underground duct banks are preferred over direct-buried because of security, ease of future cable installation and maintenance.

B. Conduit Types

Examples of conduit types include:

- DB-120 – For direct burial or encasement in concrete;
- Rigid Nonmetallic Conduit Schedule 40 – For direct burial or encasement in concrete;
- Rigid Nonmetallic Conduit Schedule 80 – For direct burial or encasement in concrete;
- Multiple Plastic Duct (MPD) – For direct burial or installation in conduit;
- Rigid Metallic Conduit – For direct burial or encasement in concrete;
- Intermediate Metallic Conduit – For direct burial or encasement in concrete;
- Innerduct Polyethylene (PE) – For direct burial or installation in conduit;
- Innerduct Polyvinyl Chloride (PVC) – For direct burial or installation in conduit

C. Installation

1. The length of conduit between pulling points shall not exceed 600 ft (183m).
2. Manufactured bends should be used whenever possible. No section of conduit shall contain more than two 90-degree bends, or equivalent between pull points.
3. Conduits should be installed such that a slope exists to allow drainage and prevent the accumulation of water.
4. When conduits connect maintenance holes, a slope of .125 in per foot (10 mm per meter) should exist from the middle of the span to each maintenance hole.
5. Conduits must be buried at a minimum depth of 18 in. (45.7 cm).

Identification for Communications Systems

1. GENERAL

1.1. Work Includes

- A. Work covered by this Section shall consist of furnishing labor, equipment and materials necessary for the labeling of the telecommunications infrastructure as described on the Drawings and/or required by these specifications.

1.2. Scope of Work

- A. This Section includes the minimum requirements for the Identification and labeling of the Communications Systems for the project as outlined in the Bid Document.

1.3. Summary

- A. Administration of the telecommunications infrastructure includes documentation of cables, termination hardware, patching and cross-connection facilities, conduits, other cable pathways, Telecommunications Rooms, and other telecommunications spaces. All facilities shall apply and maintain a system for documenting and administering the telecommunications infrastructure.
- B. Industry Labeling Standards and Conventions shall be used unless otherwise stated in the bid documents or by the Owner's Representative.
- C. Telecommunications Infrastructure Records must be maintained in a computer spreadsheet, or in a computer database. Paper records are encouraged, but are optional. A cable record is prepared for each backbone cable. The record will show the cable name, and must describe the origin point and destination point of the cable. The cable record will record what services and/or connections are assigned to each cable pair or strand. An equipment record is prepared for services distributed from a certain piece of equipment, such as a router, or a system such as the telephone system PBX.
- D. Installer shall maintain accurate, up-to-date Installation or Construction Drawings. At a minimum, the Installation Drawings shall show pathway locations and routing, configuration of telecommunications spaces including backboard and equipment rack configurations, and wiring details including identifier assignments.
- E. Installer shall provide a complete and accurate set of as-built drawings. The as-built drawings shall record the identifiers for major infrastructure components including; the pathways, spaces, and wiring portions of the infrastructure which may each may have separate drawings if warranted by the complexity of the installation, or the scale of the drawings.

1.4. Quality Assurance

- A. All labels shall be installed in a neat and workmanlike manner. All methods of labeling that are not specifically described or indicated in the contract

documents shall be subject to the control and approval of the Owner or Owner Representative.

- B. Labels shall be of the quality and manufacture indicated. The labels and labeling equipment specified are based upon the acceptable manufacturers listed. Where “approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.
- C. Strictly adhere to all Building Industry Consulting Service International (BICSI), Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) recommended installation practices when installing communications/data labeling.

2. PRODUCTS

2.1. Labels

- A. Shall be preprinted or computer printed type. Handwritten labels are not acceptable.
- B. Where insert type labels are used provide clear plastic cover over label.
- C. Outside plant labels shall be totally waterproof even when submerged.

3. EXECUTION

3.1. Identification & Labeling

- A. The size, color, and contrast of all labels should be selected to ensure that the identifiers are easily read. Labels should be visible during the installation of and normal maintenance of the infrastructure.
- B. Labels should be resistant to the environmental conditions at the point of installation (such as moisture, heat, or ultraviolet light), and should have a design life equal to or greater than that of the labeled component.
- C. All labels shall be printed or generated by a mechanical device.

3.2. Telecommunication Identifiers

- A. Outside Plant cabling shall be clearly marked using permanent means. Outside plant shall use the following system of numbering and labeling:
 - 1. Fiber Optic:
 - a. Identify: far-end building name, building number, fiber-type and strand-count
 - b. Label at entrance and exit points of tunnel system and at conduit entry points between 12 inches and 36 inches from the conduit or at closet point that is clearly visible and long cable length in tunnel at 200-foot intervals.
 - c. Label at termination panels at both ends.
 - 2. Copper:
 - a. Identify: far-end building name, building number and strand-count
 - b. Label at entrance and exit points of tunnel system and at conduit entry points between 12 inches and 36 inches from the conduit or at

closet point that is clearly visible and long cable length in tunnel at 200-foot intervals.

- B. Riser cabling shall be clearly marked using permanent means. Riser cabling shall use the following system of numbering and labeling:
 - 1. Fiber Optic:
 - a. Identify: far-end EF / ER / TR, fiber-type and strand-count.
 - b. When small facilities are fed from a primary location and treated as an ER, riser shall be labeled similar to Outside Plant Fiber Optic.
 - 2. Copper:
 - a. Identify: far-end EF / ER / TR and pair-count
 - b. Termination points shall be labeled as to actual pair at every fifth (5th) pair-point.

3.3. Labeling Procedures

- A. To be consistent with ANSI/TIA/EIA standards and industry practices, it is important that both labeling and color coding be applied to all telecommunications infrastructure components. Labeling with the unique identifier will identify a particular component. Proper color coding will quickly identify how that component is used in the overall telecommunications infrastructure of the facility.
- B. Visibility and durability:
 - 1. The size, color, and contrast of all labels should be selected to ensure that the identifiers are easily read. Labels should be visible during the installation of and normal maintenance of the infrastructure.
 - 2. Labels should be resistant to the environmental conditions at the point of installation (such as moisture, heat, or ultraviolet light), and should have a design life equal to or greater than that of the labeled component.
 - 3. Labels are generally of either the adhesive or insert type. All labels must be legible, resistant to defacement, and maintain adhesion to the application surface.
 - 4. Outside plant labels shall be totally waterproof, even when submerged.
 - 5. Labels applied directly to a cable shall have a clear vinyl wrapping applied over the label and around the cable to permanently affix the label.
 - 6. Other types of labels, such as tie-on labels, may be used. However, the label must be appropriate for the environment in which it is used, and must be used in the manner intended by the manufacturer.
- C. Mechanical generation
 - 1. All labels shall be printed or generated by a mechanical device.
 - 2. Hand written labels are NOT acceptable.

END of SECTION

SECTION 271000 Structured Cabling System

1. GENERAL

1.1. Related Documents

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Division-26 & 27, Basic Materials and Methods sections apply to work specified in this section.

1.2. References

- A. California Electrical Code (CEC)
- B. ANSI/TIA-492.AAAC-B – Detail Specification for 850-nm Laser-Optimized, 50-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
- C. ANSI/TIA-492.AAAD – Detail Specification for 850-nm Laser- Optimized, 50-um Core Diameter/125-um Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber
- D. ANSI/TIA-492.CAAB – Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak. Current Edition
- E. ANSI/TIA-568.0-D – Generic Communications Cabling for Customer Premises
- F. ANSI/TIA-568.1-D – Commercial Building Communications Cabling Standard
- G. ANSI/TIA-568-C.2-1 – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- H. ANSI/TIA-568.3-D – Optical Fiber Cabling and Components Standard
- I. ANSI/TIA-569-D – Telecommunications Pathways and Spaces
- J. ANSI/TIA-606-B.1 – Administration Standard for the Commercial Telecommunications Infrastructure.
- K. ANSI/TIA-607-C – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
- L. ANSI/TIA-862-B – Structured Cabling Infrastructure Standard for Intelligent Building Systems
- M. ANSI/TIA-942-A – Telecommunications Infrastructure Standard for Data Centers
- N. BICSI – TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM)

1.3. Scope of Work

- A. The intent of this specification section is to cover the materials and installation of a technology wiring system and termination equipment as outlined herein and as detailed on the drawings and room charts. Work shall consist of a copper voice and data station cabling system, a copper voice backbone cabling system, a fiber data backbone system, a coaxial video backbone and station cabling system, Video, voice and data outlets/jacks and a local audio/video cabling system as follows:
- B. Voice and Data station cabling (copper and fiber) system shall consist of:
 1. Workstation outlet jacks.
 2. Voice and data station cabling as specified herein from each workstation outlet to the termination equipment located in the Horizontal Cross-connect - Intermediate Distribution Frame Closet (HC-IDF) or the Main Cross-connect - Main Distribution Frame Closet (MC-MDF).
 3. Station Cable Termination Equipment in each HC-IDF/MC-MDF.
 4. Final connections of the station cabling at the workstation outlet jack and the termination equipment in each HC-IDF/MC-MDF.
 5. Voice and Data Backbone cabling system (copper and fiber) shall consist of:
 - a. Voice and Data backbone cabling as specified herein from each IDF to the MDF and Voice Backbone cabling from the main telephone service entrance to the MDF. Refer to the drawings for specific cabling requirements.
 - b. Backbone Cable Termination equipment in each HC-IDF/MC-MDF and at the telephone service entrance.
 - c. Final connections of the backbone cabling on the termination equipment in each HC-IDF/MC-MDF and at the telephone service entrance.
 6. Video station cabling system shall consist of:
 - a. Video jacks and termination equipment incorporated with the voice/data workstation jacks within the same coverplate as indicated on the drawings.
 - b. Video jacks and termination equipment for the Video distribution system within the building.
 - c. Local video and audio station cabling within the classroom.
 7. Telecommunications Grounding System per EIA/TIA 607.
 - a. Provide a Telecommunications Main Ground Bar (TMGB) in the MDF. This ground bar shall be electrically bonded to the Building Main Electrical Service Ground with an Insulated, #6, copper grounding conductor.
 - b. Provide a Telecommunications Ground Bar (TGB) in each IDF.

- c. Provide a Telecommunications Bonding Backbone (TBB) from the TMGB to each TGB. This backbone shall consist of a minimum #6, insulated, copper grounding conductor. The TBB shall be bonded to the ground bars at each end and shall be run with the backbone cabling from the MDF to each IDF. The TBB shall run continuously and be unspliced.
- d. Provide an additional grounding connection (minimum #6) from each ground bar to the nearest accessible Building Electrode Grounding System.
- e. All work shall be in compliance with CEC, Article 250 & 800.

1.4. Standards

- A. All work shall be installed in compliance with the latest edition of the Commercial Building Telecommunications Wiring Standard EIA/TIA, BICSI Standards and applicable California Electric Code Sections. All equipment shall be UL listed.
- B. The Contractor or Sub-Contractor shall be a member of Building Industry Consulting Service International (BICSI) and have a Registered Communication Distribution Designer (RCDD) status.
- C. The Contractor or Sub-Contractor shall provide the services and equipment of a company listed by Underwriters Laboratories, Inc. in its directory as being capable of furnishing the system specified herein. Said company shall be authorized to, and shall, issue a certificate stating that the equipment and connected wiring and devices which form the specified system, together with installation and maintenance service, are in compliance with the requirements established by Underwriters Laboratories and EIA/TIA Standards.
- D. Work shall be performed by a BICSI certified Telecommunications Contractor or Sub-Contractor. Telecommunications Contractors that wish to be considered for this project shall have an on-staff RCDD. Proof of this shall be presented in writing by the winning contractor to the Owner/Architect/engineer prior to contract signing. It shall not be acceptable for any portion of the work specified herein to be performed by a sub-contractor unless such sub-contractor has been pre-approved by the Owner/Architect in writing.
- E. BICSI Certification shall include the following:
 - 1. Copy of the BICSI RCDD certificate for the Contractor's or Sub-Contractor on-staff, full time project manager.
 - 2. Copy of the BICSI Apprentice, Installer or Technician certificate(s) for the Contractor's or Sub- Contractor on-staff, full time installation personnel. Prior to commencement of work, the Contractor shall submit the resume of personnel assigned to the project. Any approval given during bidding shall be based upon the information submitted. Change in approved personnel prior to completion of the project shall be brought to the attention of the Engineer for review.

3. Copy of the Voice/Data system Manufacturers Approval Certificate indicating that the contractor is a certified installer of the proposed voice and data cabling equipment/Cabling System Solution.

1.5. Wiring Methods

- A. The entire voice/video and data horizontal station cabling solution shall be a listed EIA/TIA, Link configuration for voice and Link/Channel configuration for data, cabling system solution from a single Manufacturer/Source as required by the Manufacturer/Source. Standard: The Cabling System Solution shall be **Panduit**, CommScope, or Leviton.
- B. All cables shall be run in conduit from the outlet to above accessible ceiling.
- C. Horizontal (station) cable shall be plenum rated. Backbone cabling shall be plenum rated.
- D. J-hooks/cable management system where specifically allowed shall be installed on 48" centers and supported from structure as required by the manufacturer.
- E. Refer to drawings for quantity and arrangement of voice/data/technology outlets including jacks and cabling.
- F. General - All Multi-Mode fiber and Single-Mode fiber shall be terminated utilizing a factory-made LC Pigtail and fusion spliced, or factory pre-terminated polished end. All fiber optic cables are to be installed in innerduct.

1.6. Quality Assurance

- A. Contractors shall assign competent person as project manager who has demonstrated the ability to supervise a project of similar size and scope. Submit a resume of the proposed Project Manager for the District's review and acceptance. The Project Manager must attend meetings as required.
- B. Use adequate numbers of skilled workers thoroughly trained and experienced on the necessary crafts and completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.
- C. The system Contractor shall warrant any equipment installed under this specification to be free from defect for a period of one (1) year from the date of final acceptance.
- D. The contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.
- E. The contractor shall coordinate with the commissioning staff and schedule appropriate walk through and testing. Testing is outlined in section 3.2 Tests and Instruction.
- F. Comply with applicable portions of CEC as to type products used and installation of components. Provide products and materials which have been

UL-listed and labeled. Comply with NEMA, ANSI and TIA standards manufacturer's recommendations for horizontal cabling.

1.7. Warranty

- A. The system Contractor shall warrant any equipment installed under this specification to be free from defect for a period of one (1) year from the date of final acceptance.
- B. A Manufactures Limited Lifetime Product & Performance Warranty covering all components, equipment and workmanship shall be provided to the Owner, submitted in writing with system documentation. The warranty period shall begin on the system's first use by the owner.
 - 1. Horizontal channels shall be completed with factory-terminated copper and/or fiber optic patch cords to be eligible for the applicable Warranty with channel performance guarantees.
 - 2. The approved product shall be listed on the most recent version of the applicable manufactures data sheets for each listed solution.
 - 3. Should the cabling system fail to perform its expected operation within this warranty period due to inferior or faulty material and/or workmanship, the contractor shall promptly make all required corrections without cost to the owner.
- C. Certified Installer shall provide labor, materials, and documentation in accordance with manufactures requirements necessary to ensure that the Owner will be furnished with the maximum available Manufacturer's Warranty in force at the time of this project.
- D. The installed structured cabling system shall provide a warranty guaranteeing the specified performance in the installed channel performance above the ANSI/TIA-568 requirements for Augmented Category 6 (CAT 6A) cabling systems or ISO 11801 requirements for Class EA.
 - 1. Standards-compliant channel or permanent link performance tests shall be performed in the field with a certification tester in the appropriate channel or permanent link test configuration.
- E. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 30 days) following 100 percent testing of cables.
 - 1. Installation Contractor shall submit test results to manufacture in the certification tester's original software files.
 - 2. Installation Contractor shall ensure that the warranty registration is properly submitted, with all required documentation, within 30 days of project completion.
 - 3. Certified Contractor/Integrator must adhere to the terms and conditions of the respective manufacturer's warranty programs.
- F. Manufacturer shall ensure that the Owner receives the project warranty certificate within 60 calendar days of warranty registration.

1.8. Submittals and Substitutions

- A. REFER TO SUBMITTAL SECTION 013300 FOR REQUIREMENTS.
- B. Provide product data for the following:
 - 1. Manufacturers cut sheets, specifications, and installation instructions for all products.
- C. The Owner has standardized on a unified, end-to-end copper and optical fiber cabling system design based on jacks, patch panels, patch cords, fiber cords, fiber connectors, trunk cables, fiber enclosures and modules, as well as field-terminable copper and fiber cables.
- D. Subject to compliance with requirements, provide products of the following:
 - 1. Panduit
 - 2. CommScope/Systemax/
 - 3. Leviton Manufacturing Co, Inc. / Berk-Tek, a Leviton Company
- E. Any substitutions must be approved by Designer, Owner and/or Owner's Representative in writing prior to acceptance of bid.
- F. Products which are proposed in the bid response which are of an alternative solution are to be prequalified as "equal or better" by the Designer and Owner, in writing, prior to bid acceptance. If substitutions are allowed, they are at the discretion of the Owner and based on performance, suitability, quality, administrative requirements, warranty, and other factors deemed important to the Owner. Written acceptance of substitutions from Owner must be included in bid package to avoid disqualification of bid.
- G. Submit manufacturer's data and installation details for all devices, plates, cable, terminal blocks, patch cords, racks, wire management, labels and similar equipment which are not in accordance with Owner standards.

2. PRODUCTS

2.1. General

- A. The UTP cabling system will have TIA/EIA T568B pin/pair termination assignment. All conductors provided will be properly and consistently terminated at both ends throughout the entire system. Maintain proper untwist of pairs and removal of jacket per TIA, BICSI, and Manufacturer's recommendations.

2.2. Copper Cabling

- A. Copper - Unshielded, twisted pair. (Standard See Section 1.4 Standards)
 - 1. "D" CABLE Category 6 riser/plenum rated (based on building construction), 4 twisted pair, non-shielded (UTP) station cable (capable of transmissions speeds up to 1 Gb and supporting IEEE 802.3ab Gigabit Ethernet) shall be used for serving data outlets. Cable shall be rated for minimum 350 MHZ. Cable shall be insulated with FEP material and sequentially marked at 2 foot intervals.

- a. Gauge 24 AWG
 - b. Nominal O.D. .2 in.
 - c. Min. Bend Radius .5 in.
 - d. Standards/Certification UL Type CMP TIA/EIA, CAT. 6
 - e. Attenuation (100 MHz) 21.3 dB
 - f. NEXT (100 MHz) 39.9 dB
 - g. PSNEXT (100 MHz) 37.1 dB
 - h. ACR (dB/100M) (100 MHz) 18.6 dB
 - i. ELFEXT (dB/100M) (100 MHz) 23.2 dB
 - j. PSELFEXT (dB/100M) (100 MHz) 20.2 dB
 - k. Return Loss (100 MHz) 12.0 dB
 2. Each cable shall be a dedicated home run from the workstation outlet jack to the data termination equipment in the local IDF/MDF. Terminate cable at the workstation and at the IDF/MDF termination equipment as specified herein and as indicated on the drawings.
 3. Cable shall be labeled at both ends to indicate patch panel and port served. Coordinate labeling scheme with A/E PRIOR TO INSTALLATION
- B. Video and Audio Station Cables (Local AV Systems)
1. Video Cable
 - a. HDMI Video Cable – HDMI cable utilizing high resolution twisted pair cables in a plenum rated jacket, (computer video) in classroom technology outlet and local classroom video outlets.
 2. Audio Cable
 - a. Stereo 3.5m Audio Cables - 22-gauge, tinned copper, 4 conductor cable with 100% overall shield, black FEP jacket. Plenum rated.

2.3. Copper Connectivity

- A. Data Jacks – Copper
1. Shall be Cat. 6 rated, 8 position, 8 wire flush mounted modular jack (RJ-45), T568A/B coded. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty.
 2. Data Jack Color shall be BLUE.
- B. Voice Jacks
1. Shall be Category 6 rated, 8 position, 8 wire flush mounted modular jack (RJ-45), T568A/B coded. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty.
 2. Voice Jack Color shall MATCH FACEPLATE.

- C. Twisted pair patch panels, rack mounted, Cat.6 rated, 110 termination, RJ-45, T568B coded, multi-port (24 or 48). Equipment to be of same manufacturer and series as required by Specified Link/Channel Solution Warranty. Provide quantity of patch panels as required by quantity of data station cable. Mount panels in data racks in each IDF/MDF. Each panel shall be fully loaded. Provide labeling for each connected port as coordinated with owner. Provide a 10ft., Cat. 6 patch cable for each connected port in each patch panel. Coordinate patch cable color with owner.
- D. Local Classroom Audio/Video Jacks
 - 1. Local Classroom Audio/Video jacks shall be by where possible same manufacturer as workstation voice & data jacks.
 - 2. Component Video - Type RCA. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner/Architect.
 - 3. HDMI Video – Computer Video. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner/Architect.
 - 4. Stereo Audio - Type RCA or 1/8th” mini. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner/Architect.
- E. Outlet Components
 - 1. Faceplates shall be modular and shall accept the approved voice/ data and video jacks including voice/data (RJ-11, RJ-45), Video (HDMI), Audio (type RCA, 1/8th “mini) and fiber (type LC). Faceplates shall cover single or dual ganged boxes. Faceplates and jacks shall be by a single manufacturer. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner/Architect.
 - 2. Outlets designated to serve wall phones shall be of a type that is designed to support a wall mounted telephone. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner/Architect.
 - 3. Every jack shall be labeled to corresponding patch panel and port. Coordinate labeling scheme with A/E. Labels shall be computer generated on an adhesive media and attached to the workstation outlet. Labels applied with pens or markers will not be acceptable.
 - 4. Provide blank inserts for all unused ports.
 - 5. Faceplates for specialized drops shall be as shown on the drawings.
 - 6. Refer to drawings for arrangement of various workstation outlets including jack types and quantities within each outlet type. All voice/data/video/audio and fiber jacks indicated in the faceplate shall be deemed included in this specification unless specifically noted otherwise.

F. Surface mounted raceway products

1. All faceplates and jacks utilized in the installed surface mounted raceway must be compatible with the raceway.

2.4. Backbone Cabling

A. General

1. Copper cables allowed for use in the backbone include: 4-pair 100-ohm unshielded twisted-pair 100% annealed-copper solid-conductor cables, 100-ohm UTP multi pair copper cables. Fiber optic backbone cables shall be 50/125um Laser-Optimized Multimode Fiber and/or 8.3um low-water peak Singlemode optical fiber cables compliant with ITU-T G.652D (or OS2). The cable shall support voice, data, and multimedia applications. The bending radius and pulling strength requirements of all backbone cables shall be observed during handling and installation.
2. All cables to be secured to walls with cable rings.
 - a. Storage rings shall provide mechanical support and protection for optical fiber and copper cabling service loop storage. Ring shall have VELCRO Brand loops to contain and secure cable. Storage rings shall be available in 12-inch and 24-inch diameters.
 - b. Approved Products
 - i. Leviton 48900-IFR comes with six removable 3-inch VELCRO® Brand loops.
 - ii. Leviton 48900-OFB comes with six fixed 9-inch VELCRO® Brand rings.
 - iii. For double the capacity, install two storage rings side by side and route the cable in a figure eight pattern.

B. Copper Backbone (Voice Riser)

1. Indoor type (used for interior applications) shall consist of a core of 24-gauge, Category 3, plenum rated unshielded twisted (UTP) solid copper conductors insulated with expanded polyethylene covered by a PVC skin. The core shall be covered by a layer of plastic tape and overlaid with a corrugated aluminum shield (to provide EMI protection), adhesively bonded to an outer jacket of plenum rated PVC plastic. Pair sizes shall be available in 25, 50, 100, 150, 200, 300, 400, 600 and 900 pairs. Pair quantities as specified herein and shown on the drawings.
 - i. Insulation thickness .006 in.
 - ii. Jacket thickness .045 in. (100 pair)
 - iii. Max. Avg. DC Resistance 26.5 Ohms/1000 ft.
 - iv. Max. Avg. DC Resistance Unbalance 1.5%
 - v. Typical Mutual Capacitance at 1 KHz 15.7pF/1000 ft.
 - vi. Max. Avg. Capacitance Unbalance

- I (pair to ground) 175pF/1000 ft.
 - vii. Max. Attenuation (dB/1000 ft.):
 - I At .772 MHz 6.7 dB b. At 1.0 MHz 7.6 dB c. At 16.0 MHz 32.0 dB
 - viii. Characteristic Impedance (Ohms):
 - I At .772 MHz $102 \pm 15\%$ b. At 1.0 - 16 MHz $100 \pm 15\%$
 - ix. Worst Pair Loss Next (dB/1000 ft.)
 - I At .772 MHz 41 dB
 - II At 1.6 MHz 37 dB
 - III At 10.0 MHz 25 dB
 - b. UL Listed
 - i. CSA Approved PCC FT4
 - c. Refer to the drawings and/or room charts for cable pair size from each IDF to the MDF. Cable shall be terminated on both ends as specified herein and as shown on the drawings.
 - d. Refer to the drawings and/or room charts for cable pair size from the phone service entrance backboard to the MDF. Cable shall be terminated on both ends as specified herein and as shown on the drawings.
 - e. Provide one (1) 1000 ft. spool of 1 pair cross-connect wire (white/blue) at each backbone cable termination point in each IDF and in the MDF.
 - f. Cable shall be labeled at both ends and at each point where the cable is accessible and can be administered. Coordinate labeling scheme with A/E. All cables must be lightning protected.
- C. Copper Backbone (Voice OSP)
- 1. Outdoor Type (used to interconnect buildings and run in underground duct) shall consist of a core of 24- gauge, Category 3, unshielded twisted (UTP) solid copper conductors dual insulated with foam skin and plastic encapsulated with a water blocking compound, surrounded by a corrugated aluminum shield, a corrugated steel shield and a polyethylene outer jacket. Pair sizes shall be available in 25, 50, 100, 150, 200, 300, 400, 600 and 900 pairs. Pair quantities as specified herein and shown on the drawings.
 - a. Gauge 24 AWG
 - b. DC Resistance 26.5 (ohms/1000 ft.)
 - c. Mutual Capacitance (1 kHz) 15 pf/ft.
 - d. Impedance (1 kHz) 100 OHM (25 pair)
 - e. Max Attenuation (1 kHz) 6.707.8 dB (25 pair)

- f. Cable shall terminate in a protector panel upon entrance to building. Cable and protector panel grounds shall be bonded to the electrical service ground as required by the C.E.C. Protector panel shall be Circa Technologies #188ENA1 series with #3B1E-W gas tube protector modules or equals by 3M. Provide protector panel fully loaded. The protector panel shall be sized to accommodate backbone cable pair count as specified herein.
- g. All cables must be lightning protected at both ends.
- h. Cable shall be labeled at both ends and at all accessible points. Coordinate labeling scheme with Owner and submit to Owner/Architect for review. PRIOR TO INSTALLATION

D. Fiber Optic

1. SINGLEMODE Optical Fiber

- a. Optical fiber cables run shall be low-water-peak Singlemode (OS2), and meet all of the requirements delineated within the specifications of ANSI/TIA-568 and ANSI/TIA-492.AAAC-B.
- b. Armored fiber optic cables will utilize an interlocking armor outer cover around an integrated tight-buffer (indoor only) or Loose-Tube (indoor/outdoor) cable construction. Plenum armored fiber may be run in open ceilings without conduit or innerduct.
- c. Indoor fiber optic cable shall be minimum 12 strands, tight buffered, and individual fiber strands shall be 900 microns jacketed.
- d. Outdoor or indoor/outdoor fiber optic cable used for building-to-building interconnections shall be minimum 12 strands, loose tube construction with 250-micron unjacketed fiber strands in a 12-strand buffer tube.
- e. Cables are typically OFNR rated for in-conduit applications but must always be constructed of materials and rated appropriate for the environment in which it is installed (Indoor, Indoor/Outdoor, Outside Plant (OSP), OFNP or OFNR, OFCP or OFCR). In-slab conduits are considered a "wet environment" and require OSP or Indoor/Outdoor rating. Cables running at least a portion of the length through an open-air plenum or air handling space must be OFNP or OFCP (plenum) rated. Contractor is solely responsible for installation of the correctly rated cable in the appropriate environment, as required by the AHJ or local ordinance
- f. Loose tube fibers shall utilize a fan-out kit to fit 250 micron fibers into a 900 micron protective sheath when terminating. Loose Tube cables are generally expected for outdoor environments.
- g. Approved Products:
 - i. Premises Indoor Tight Buffer Plenum cable, 12-strand
 - ii. Indoor/Outdoor Dry Loose-Tube Plenum cable, 12-strand
 - iii. 12-fiber, 24" fan-out Kit

2. MULTIMODE FIBER OPTIC CABLE – FIELD TERMINATED

- a. Multimode fiber optical fiber cables shall meet all of the requirements delineated within the specifications of ANSI/TIA-568 and ANSI/TIA-492.CAAB (OM3). Must be a minimum of 12 strands of Laser-Optimized 50-micron optical fiber. Cable jacketing must be appropriate for the environment in which it is installed (Indoor, Indoor/Outdoor, Outside Plant, OFNP or OFNR).
- b. Fiber optic cables will utilize an interlocking armor outer cover around an integrated Tight Buffered (indoor only) cable construction and fiber strands with a 900 micron protective sheath.
- c. See plans and scope of work for total strand count between locations.
- d. Approved Manufacturers
 - i. Indoor Plenum tight buffered cable, 12-strand OM3
 - ii. Indoor/Outdoor Plenum cable, 12 strand.
 - iii. OSP cable, Loose Tube 12-strand
 - iv. 12-fiber, 24” fan-out Kit
 - v. * Or other strand counts as specified

2.5. Fiber Optic connectivity

- A. Rack Mounted Installation - Provide fiber optic, rack mounted patch panels with type LC coupler panels as coordinated with the owner. Provide quantity of 12, 24 or 48 port panels as required by quantity of fiber backbone cables to be terminated. Equipment to be of manufacturer and series as required by Specified Link/Channel Solution Warranty. Color as selected by Owner / Architect. Provide each patch panel fully loaded. Each connected port to be labeled as coordinated with the owner. Refer to drawings for locations of rack mounted patch panels.

2.6. Frames, Racks and Cabinets

- A. Equipment Cabinets and Racks
 1. Equipment cabinets shall have vented side panels and lockable front and back doors. Floor mounted cabinets shall be 22-1/2 inches wide, 30 inches deep and 84 Inches high. Wall mounted cabinets shall be as shown in drawings. Units shall have front glass hinged doors. Each rack shall be securely mounted and provided with a #6 ground wire from rack to the local telecommunications ground bar. Multiple racks shall be bonded together with a #6 ground wire. Open equipment racks shall be 4 post, standard 19” wide 84” high.
 2. Provide a front/rear, two-space cable management panel with each rack mounted fiber/copper patch panel.
 3. Provide a full height front/rear vertical wire management panel with integral cable spools with each floor mounted rack. Coordinate location at each rack with A/E. Where multiple racks are ganged together, there

shall be one vertical wire management section between each two racks and one additional section at each end of the line up. Ladder tray shall be utilized to route cable to the racks.

4. Attached to each rack shall be a worksheet identifying each patch panel port, its associated wall jack identifier, and the date of installation.
5. Patch panels shall be mounted no higher than 60" A.F.F
6. Provide a six-outlet power strip with integral surge suppression and a 10' cord with plug in each rack. Provide a dedicated 120V, 20A circuit to a rack mounted isolated ground receptacle for each rack.
7. Refer to drawings for type, quantities, and locations of racks.

B. Horizontal Wire Managers

1. Provide 2RU duct-style horizontal wire managers above and below or between every 2RU of patch panel, as space allows.
2. Cable managers shall be flat, covered duct style with front and rear channels.
3. Use recessed flat wire manager as needed within enclosed cabinets to route patch cords to opposite sides, where the rings of the flat wire managers would interfere with cabinet door closure.

2.7. Cable Support Systems (REFER TO 27 05 00 FOR ADDITIONAL DETAIL)

A. J-Hooks

1. All cable shall be supported above ceiling on dedicated cable support hardware.
2. Cable saddles and J-hooks shall be used where cable tray or wire basket is not available. These must be supported on their own ceiling wires, threaded rod, or affixed to building structure by use of beam clamps (on metal beams) or wood screws (on wood beams). Affixing communication cable supports to existing ceiling support wires is not allowed.
3. Approved Products:
 - a. B-Line Cable Hook, BCHxx
 - b. B-Line Cable Hook, Cable to Beam Fastener, BCHxx-C2
 - c. B-Line Cable Hook, Cable to Fastener, 2", BCHxx-C442
 - d. B-Line Cable Hook, Cable to Rod Fastener, 2", BCHxx-W2
 - e. Where: xx = 21 (1.25"), 32 (2"), or 64 (4")

B. Cable Tray

1. In Telecom Rooms, a cable tray (ladder runway) shall be installed to support all cable running to racks and cabinets.
2. Cable tray to be added to all Telecom Rooms in places where cable is run horizontally.

3. Cable tray shall be aluminum, with 9" rung spacing. Rungs can be removed or repositioned to accommodate specific project or building requirements.
4. Cable shall be combed and bundled in all exposed runs outside walls, in TR/TE, and inside cabinets and wire managers.
5. All appropriate cable tray support hardware including angle brackets, rack-to-runway brackets, wall-to-runway brackets, elevation kits, junction splices, butt splices, and grounding jumpers shall be used for a complete and professional installation.
6. Approved Products:
 - a. Chatsworth Cable Runway, 12", Black, 12170-712
 - b. Chatsworth Wall-Mount Brackets, Black, 11312-712
 - c. Chatsworth Butt-Splice Kit, Black, 11301-702
 - d. All other associated mounting hardware and metals from Chatsworth

2.8. Fire Stop Systems (REFER TO 27 05 00 FOR ADDITIONAL DETAIL)

- A. A. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall:
 1. Meet the hourly rating of the floor or wall penetrated.
 2. Permit the allowable cable load to range from 0% to 100% visual fill thereby eliminating the need to calculate allowable fill ratios.
 3. Permit multiple devices to be ganged together to increase overall cable capacity.
 4. Allow for retrofit to install around existing cables.
 5. Include an optional means to lengthen the device to facilitate installation in thicker barriers without degrading fire or smoke sealing properties or inhibiting ability of device to permit cable moves, add-ons, or changes.
 6. Not require any additional action on the part of the installer to open or close the pathway device or activate the internal smoke and fire seal, such as, but not limited to:
 - a. Opening or closing of doors.
 - b. Twisting an inner liner.
 - c. Removal or replacement of any material such as sealant, caulk, putty, pillows, bags, foam plugs, foam blocks, or any other material.
 7. Where single cables (up to 0.27 in. (7 mm) diameter) penetrate gypsum board/stud wall assemblies, a fire-rated cable grommet may be substituted. Acceptable products shall be molded from plenum-grade polymer and conform to the outer diameter of the cable forming a tight seal for fire and smoke. Additionally, acceptable products shall lock into the barrier to secure cable penetration.

8. Approved Products
 - a. Specified Technologies, Inc. EZ-PATH series 22, 33 and 44+ fire-rated pathway devices.
 - b. Specified Technologies, Inc. EZ-PATH GROMMET
- B. Where non-mechanical products are utilized, provide products that upon curing do no re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during or after construction.
 1. Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.
 2. Utilize an EMT sleeve as a stub through a rated wall.
 3. Surround annular space between EMT sleeve and wall material with a hardening intumescent caulk.
 4. Utilize re-enterable, non-hardening putty around cables inside a metal sleeve. Do not exceed 40% fill capacity of sleeve and follow all rated assembly requirements per Manufacturer, local codes, and AHJ.
- C. Cable trays shall terminate at each barrier and resume on the opposite side such that cables pass independently through fire-rated pathway devices. Cable tray shall be rigidly supported independent from fire-rated pathway devices on each side of barrier.
 1. Approved Products
 - a. Specified Technologies, Inc. SSS Intumescent Caulk
 - b. Specified Technologies, Inc. SSP Intumescent Putty

3. EXECUTION

3.1. Additional Information

- A. Refer to Section 27 00 00 for the following Part 3 - Execution information.
 1. General
 2. Cable Pathways
 3. Work Area Outlets
 4. Installation Practices
 5. Labeling
 6. Firestopping
 7. Sealing of Penetrations and Openings
 8. Cable Supports
 9. Cable Protection

10. Grounding
11. Documentation
12. Training
13. Cleaning
14. Project Closeout

3.2. Cable Handling / Cable Management

- A. Proper cable handling is critical to maintaining the design integrity of high-performance cabling. Cable handling recommendations include:
 1. Cable must be conditioned above 32 degrees F for 48 hours prior to installation.
 2. Do not use excessive force when pulling the cable. The maximum pull-force guideline for a 4-pair horizontal UTP should not exceed 110N (25lbf). Meeting this guideline avoids stretching conductors during installation and the associated transmission degradation.
 3. The minimum bend radius for UTP should not exceed 4 times the cable outside diameter (O.D.) The O.D. of Cat 6A 100-ohm, balanced UTP cable is .30 in. ($4 \times .3 = 1.2$ in. bend radius).
 4. The minimum bend radius for fiber should not exceed 10x the cable outside diameter.
 5. Traditional bundling of Category 6 and 6A cabling for a combed appearance is required in all exposed locations.
 6. In TR, use appropriate horizontal cable management for patch cords on front of patch panels. Also, use appropriate cable management bar(s) for support of terminated horizontal cable.
 7. Do not use vinyl or plastic cable ties due to the potential for over-clinching of cable bundles which can alter the cable geometry and degrade the system cabling performance. Use only hook and loop ("Velcro") fasteners for bundling of horizontal cables.
 8. Store cable slack in an extended loop configuration to alleviate cable stress. Excessive cable slack in bundled loops or traditional 'service loops' to provide additional cable length in TR has been shown to degrade cabling performance and are not recommended.

3.3. Separation of Data and Power cabling

- A. Design cable pathways to avoid potential sources of EMI. Avoid installing cable near sources of EMI (X-ray equipment, large motors/generators, electrical power cabling and transformers, Radio frequency (RF) sources and transmitters, lighting, copiers, etc.).
- B. Physically separate power & data cabling according to relevant code and standard requirements when run in a common pathway.
 1. Never run data and Class 1 power cabling in parallel closer than 2".

2. Avoid crossing cables if possible. If necessary, always cross cables at 90 degrees.
3. Maintain a minimum of 5 in. separation between data cable and all ballast-controlled lighting.
- C. Minimum separation distances of telecommunications cabling from potential sources of EMI exceeding 5kVA:
 1. 24" away from Unshielded power lines or electrical equipment in proximity to open or nonmetal pathways
 2. 12" away from Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway
 3. 6" away from Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit pathway
 4. 47" away from Electrical motors and transformers

3.4. Installation of Structured Cabling System

- A. PRE-Installation Conference
 1. Schedule a conference a minimum of five calendar days prior to beginning work of this section.
 2. Agenda: Clarify questions related to work to be performed, scheduling, coordination, etc.
 3. Attendance: Communications system installer, General Contractor, Owners Representatives, and any additional parties affected by work of this section. Owner's Information Technology must be represented at a pre-conference meeting prior to scheduling of any work.
 4. Copy of manufactures warranty application will be provided by Contractor.
 5. Pre-Installation conference may be waived only by Owner.
- B. Warranty
 1. A lifetime performance warranty covering all components, equipment and workmanship shall be submitted in writing with system documentation. The warranty period shall begin on the system's first use by the Owner.
 2. Should the cabling system fail to perform within its expected operation within this warranty period due to inferior or faulty material and/or workmanship, the Contractor shall promptly make all required corrections without cost to Owner.
- C. Drawings and Specifications
 1. The Contract drawings and specifications form an integral part of the contract documents. Neither the drawings nor the specifications shall be used alone. Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work. Work omitted from the drawings but mentioned or reasonably implied in the specifications,

or vice versa, shall be considered as properly and sufficiently specified and shall be provided. Misinterpretation of any requirements on drawings, or specifications shall not relieve the Contractor of his or her responsibility of properly completing the Contract.

2. The Owner's Project Manager has the option of changing the location of Electrical and Communication outlets to within 3 meters of designed location prior to rough-in stage at no extra cost to Owner. Owner and Owner's Representative requests a chalk/rough-in walk prior to installation to verify locations.
3. The Contractor is responsible for taking field measurements where equipment and material dimensions are dependent upon building dimensions and to coordinate and provide a chalk/rough-in walk prior to installation to verify locations.
4. The Contractor shall coordinate with General, Mechanical and Electrical trades as well as Furniture Layout Designer for final workstation outlet locations.
5. Where conflict exists between drawings and specifications the Contractor shall, make allowance for provision of the component, system, or installation process in a manner which will provide the highest monetary cost components, systems, or installation process. Contractor shall inform the Owner's Project Managers of the conflict and obtain approvals prior to taking corrective measures.

D. Pathways and Topology

1. Utilize "thin film" lubricants only! It has been shown that cable-pilling lubricants will affect your testing as the cable needs several weeks to dry before attenuation levels recover. Use of incorrect cable lubricants will erode cable jacket and void cable warranty.
2. All cable and wire shall be concealed in conduits, floor ducts, paneling, ceiling, or similar areas except at mutually agreed upon areas.
3. Fill capacity in conduit, modular furniture and other horizontal pathways should not exceed 40%. A maximum of 60 % pathway fill is allowed to accommodate unplanned additions after initial installation. The Cat 6A cable is a larger O.D. (0.275" – 0.30" vs. .23" typical for Cat6 cable). The increased diameter of Cat 6A cable will require appropriate design considerations when sizing conduit and other pathways. In most installations, conduit sizes will have to be increased to accommodate all of the cables being installed. This will impact the design and material selection of the project. To calculate the fill ratio, divide the sum of the cross-sectional area of all cables, by the most restricted cross-sectional area of the pathway.
4. Fill ratios for Augmented CAT6 cable (CAT6A) requires 1" EMT for 4 cables and sized larger for additional cables as required to maintain a 60% fill ratio.

5. Flat-rung and/or solid bottom cable tray shall be utilized for large, high-density installations. J-hooks and other specific cable support hardware shall be used at all locations outside of cable tray.
6. Pathway design should not exceed (2) 90-degree bends between pull points or pull boxes (PB). If more than (2) 90-degree bends are required, install a pull box between bends.
7. Provide pull boxes for any run greater than 100 feet, or with more than two ninety-degree bends.
8. J-hooks should be randomly spaced 60" or less. Do not exceed J-hook capacity for size and weight limitations.
9. Land wireless access cabling above ceiling, secured onto in-ceiling bracket. A slack loop in the horizontal cabling is not required. Utilize varying-length patch cords when installing wireless access point devices for flexibility in length.
10. Crimp-on plugs at wireless access points are not allowed. Terminate all WAP cabling onto jacks and ceiling-mount brackets and test all cables as appropriate.
11. Mixing of various Category cables in the same pathway is allowed as long as the applications are appropriate for each category of cable used.
12. Prior to placing any cable pathways or cable, the contractor shall survey the site to determine job conditions will not impose any obstructions that would interfere with the safe and satisfactory placement of the cables. The arrangements to remove any obstructions with the Project Manager need to be determined at that time.
13. Maintain a distance of at least 12 inches from all power conduits and cables, and 6 inches from all fluorescent lighting fixtures. Do not install power feeders 100 amps or greater above or within 5 feet of telecommunications backboard. Do not install telecommunications conduits above power panels or switchboards.
14. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
15. The backbone subsystem shall include cable installed in a vertical manner between floor telecommunications room/closets (TCs or IDFs) and the main or intermediate cross-connect in a multi-story building and cable installed horizontally between telecommunications room/closets and the main or intermediate cross-connect in a long single story building.
16. Unless otherwise recommended by the Owner, all fiber cables will be encased in interlocking armor. All fibers will be terminated in the Telecom Rooms or Cabinets in rack-mounted enclosures equipped with sufficient ports to allow for growth, slack storage space and splice trays if required to terminate and secure all fibers.

17. Adequate riser sleeve/slot space shall be available with the ability to ingress the area later in all Telecommunications rooms/closets, such that no drilling of additional sleeves/slots is necessary. Sleeves may need to be provided and installed under the scope of this Project.
18. The backbone cables shall be installed in a star topology, emanating from the main cross-connect to each telecommunications room/closet. An intermediate cross-connect may be present between the main cross-connect and the horizontal cross-connect.
19. For voice or data applications, 4 pair UTP or fiber optic cables shall be run using a star topology from the telecommunications room/closet serving that floor to every individual information outlet.
20. Backbone and Horizontal pathways shall be installed or selected such that the minimum bend radius is maintained both during and after installation.
21. All horizontal pathways shall be designed, installed and grounded to meet applicable local and California building and electrical codes.
22. Install $\frac{3}{4}$ " x 4' x 8' fire-rated plywood across all walls in telecom rooms, from 6" AFF to 8'-6" AFF. Coat with 2 coats of white paint. Do not paint over fire rating stamp.
23. Contractor shall firestop all used pathways which enter or leave the telecom rooms via conduit, cable tray or slot. Contractor is responsible for installing sleeves at each wall or partition penetration, and firestopping all fire-rated penetrations. Intumescent caulk shall be applied around the outside of each sleeve, and intumescent putty inside the sleeve or conduits around the cables. Appropriate fill ratios must be followed when penetrating fire-rated walls.
24. Do not run fiber cables in conduits which are less than 2" in diameter.
25. Abandoned cable shall be removed from pathways (i.e., from tunnels, manholes, plenum spaces, and conduit) under scope of this project. Previously unknown or unidentified cable which is apparently abandoned prior to work shall be brought to the attention of the Owner for authorization prior to removal.

E. Grounding

1. Refer to section 27 05 26 for specifications on Grounding and Bonding.
2. All grounding (earthing) and bonding shall be done to applicable codes, standards, and regulations.
3. Shielded cabling channels shall include appropriate method of bonding shield to approved ground for proper EMI/RFI mitigation.
4. Shield Continuity Testing shall be Enabled when shielded cabling channels are installed.
5. All shielded and armored cables shall be bonded to a telecom grounding system via shielded patch panels at the rack locations. Shielded Category-rated connectors must be properly installed to maintain

electrical ground conductivity along the entire length of cable and at both ends of the cable. UTP connectors shall not be used on shielded cables at either end.

6. Shielded Patch cords shall be provided for use and employed at each workstation location utilizing shielded cable. Shielded patch cords can be identified by their gray color and metallic RJ45 plug. Shielded patch cords are not required at the patch panels.
7. Telecom Contractor shall bond and ground all telecom room metals. Telecom Contractor shall provide and install TIA-rated Telecommunications Grounding Busbar (TGB) at all MDF and IDF locations, and an in-cabinet grounding busbar at each remote wall-mounted cabinet or telecom enclosure. All ground lugs shall be 2-hole make-up.
8. An electrician will provide connection between TGB and building ground; Telecom contractor (if separate, otherwise electrician) will provide a busbar and ground all equipment and telecom metals to the busbar.
9. Telecom installers will ground and bond all armored and/or shielded cables, racks, cabinets, cable tray, ladder racking, and shielded panels to telecom grounding busbar.

F. Cables and Terminations

1. Check plans and symbology for final determination of faceplate constitution or consult with Owner prior to bid.
2. Install additional cables at drop locations and in quantities indicated on the drawings. Do not exceed manufacturers' recommendations for maximum allowable pulling tension, side wall pressure or minimum bending radius. Use pulling compound as recommended by cabling manufacturer.
3. All horizontal cables, regardless of media type, shall not exceed 90 m (295 ft) from the telecommunications outlets in the work area to the horizontal cross connect.
4. The combined length of jumpers, or patch cords and equipment cables in the telecommunications room/closet and the work area shall not exceed 10m (33 ft).
5. The Contractor shall observe the bending radius and pulling strength requirements of the 4 pair UTP and fiber optic cable during handling and installation.
6. No run of UTP cable between horizontal portions of the cross-connect in the telecommunication closet and the information outlet shall contain splices.
7. In a false ceiling environment, a minimum of 3 inches (75 mm) shall be observed between the cable supports and the false ceiling. Minimum 6" is preferred.

8. J-hooks shall be provided for all suspended cables, at a semi-irregular spacing not to exceed 5 feet between supports. Cables shall be supported by dedicated low-voltage cable support hardware. Support of cables or hanging hardware by means of supports or surfaces related to other trades or applications is not allowed.
9. Provide a full-size service loop (at least once around the inside edge of the box) in each J-box in the communications system.
10. Install all cable in plenum spaces with J-hooks of at least 1" in width to disperse the weight on the bottom cables. Homerun all cable to nearest TR Cabinet.
11. Comply with ANSI/TIA-569 for conduit and splice box sizing.
12. Install modular jacks at all outlets shown; one data jack for each data cable at each faceplate or termination point. Install additional cables and modular jacks as indicated on the drawings. Do not "split pairs" between different jacks.
13. Terminate cables at each jack location and at termination board or patch panel. Follow industry guidelines and manufacturers' recommendations and procedures as required. All termination hardware shall be rated to exceed their associated Category rating as specified above.
14. For enclosed ceiling WAP locations, install and terminate CAT6A cables to approximate location as shown on plans. For open-ceiling environments, secure cables, and surface-mount boxes to nearest appropriate support structure.
15. For in-ceiling WAP locations, secure jacks inside a surface-mount block mounted to in-ceiling metal assembly, and provide a 5' patch cord or longer, as needed, to connect device to its final determined location in ceiling.
16. For wall-mounted device locations, utilize an in-wall bracket in lieu of faceplate as described above. Secure mounting bracket and device hardware directly over backbox. Connect device with 1' CAT6A cord (Security, AV, or WAP), or 1' high-flex CAT6 patch cord for other CAT6-based devices. Coil patch cord inside backbox.
17. Label and identify each outlet and cable for data circuits. Label at outlet end and at termination board or patch panel with matching designations.
18. Provide data outlets in surface raceway at 26" on center unless otherwise indicated.
19. Extreme care must be taken not to nick any of the copper conductors when removing the jacket. Use rip cord to expose pairs for termination onto Insulation Displacement Contacts. You can also use a precision stripper that allows the technician to set the depth of the blade.
20. Maintain twists as close as possible to the point of termination. Untwisting of copper pairs should not exceed ¼" to the termination point.

21. Manage the cable bundles in a symmetrical orientation. For example, in a 48-port patch panel, distribute 24 cables through the vertical cable management on the left rear side of the rack and 24 cables through the vertical cable management on the right rear side of the rack.
 22. Do not dress cables in bundles larger than 24 cables. Multiple 24-cable bundles may be run in parallel with evenly spaced Velcro cable ties in an orderly sequence.
 23. For cable management on rear of patch panel, cable shall sweep into termination points and be supported by appropriate rear cable management.
 24. Horizontal patch cord management is required on all installations which do not use angled patch panels.
 25. Maintain cable bend radius 4X outer diameter (UTP only) when mounting faceplate onto EMT backbox, box-eliminators or furniture knockouts.
 26. Faceplates and SMBs shall be fully installed and labeled prior to testing.
- G. Above-Ceiling and wall mounted wireless access points and devices.
1. All WAP locations shall receive (2) Category 6A cables from the nearest TE or TR (IDF). Multimedia, security, and other video devices shall receive CAT6A cables as shown on drawings, documents and details.
 2. IP Clock/Speakers and other low-bandwidth mounted devices shall receive (1) CAT6 cable.
 3. WAP, IP Camera and other communications cables shall terminate on patch panels in the TE/TR (IDF).
 4. WAP cables shall terminate on Category 6A information outlets and shall be supported by an in-ceiling termination bracket. Affixing of a 2-port SMB to the bracket is recommended.
 5. SMB shall be mounted in the ceiling on a specially designed clip attached to a cable support ceiling wire or threaded rod support per cable management section in Part 2. SMB shall not be tie wrapped to supports or left on ceiling tiles or other equipment located above the ceiling.
 6. Wall-mounted devices not requiring faceplates will be mounted directly to the backbox. Jacks will be secured inside backbox on a specially designed in-wall bracket clip per cable management section in Part 2.
 7. The contractor shall mount Access Point (AP) electronics to the drop-ceiling suspended T-grid system. (AP and mounting hardware provided by Owner). Contractor to provide and install (2) white Cat 6A patch cords from the overhead WAP outlets to the AP. Contractor shall neatly cut holes into the ceiling tile and finish the holes with grommets or other industry-standard finishing piece for a professional look.
- H. Terminal Blocks and Patch Panels

1. Arrange all terminal blocks in a manner that allows natural wiring progression and minimizes crossing of wires.
 2. Dress and comb all incoming cable bundles in groups of 24 cables each. Eliminate crossed cables and “divers”.
 3. Ground all shielded patch panels to telecom ground source via paint-piercing washers to a grounded rack, or via direct ground wire to telecom bus bar.
- I. DATA/TELCOM Rooms (MC/MDF, HC/IDF)
1. The Data and Telco Rooms are a transition point between the backbone and horizontal distribution pathways. The rooms shall be able to contain data or telecommunications equipment, cable terminations and associated cross-connection wiring. Closet spaces are not to be shared with electrical installations, other than those directly for telecommunications, video, security, and information systems equipment. The rooms are not to be shared with other unrelated building services, for example plumbing. Any conflicts with these specifications require the approval of the Owner’s project manager.
 2. Contractor shall submit a drawing of the IDF room showing layout of all components including necessary and required electrical outlets, conduits, environmental requirements, and wire termination fields prior to start of the job. Any jack densities noted in these specifications are estimates only. The drawing will designate the most effective, scalable, jack termination cabling design to facilitate data/telecom outlets shown on the lease exhibits. Owner’s Project Managers must approve drawings prior to installation.
 3. All racks, panels, and equipment finished shall be anchored to meet local seismic zone requirements and industry standards. The equipment racks are to be anchored to the concrete floors via “Unistrut or equal metal framing strut systems”, threaded rod, concrete anchors, bolts, and washers.
 4. The overhead cable ladder system will provide a route for Category 6 and 6A, and other communication cables while providing stability to the equipment racks.
 5. The vendor is responsible for providing and install the specified count of 19” EIA rackmount 7’ (45U) 2- post racks, Black, as required in the new IDF. The vendor is responsible for submitting IDF layout drawings to Owner for approval prior to installation.
 6. The contractor shall provide high capacity horizontal and vertical cable manager channels are required in all data and equipment racks, and the racks will contain sufficient vertical and horizontal cable managers to facilitate the patch panel density and placement installed by the contractor.
 7. The contractor will install raceways, boxes, managers, and enclosures as indicated according to manufacturer’s written instructions. Securely

fasten each component to the surface to which it is mounted and remove burs and sharp edges from all cable trays.

8. A 12" ladder rack system is required and will be provided by the contractor and installed in the IDF to provide cable support to the rack system. This includes all the required ladder rack support items such as rack to runway kits, wall angle brackets, ceiling supports, splices (junction and butt), radius drops and j-bolts. The final ladder rack layout will be included in the IDF layout drawing described above.
9. Provide and install as needed in the room 4' x 8" x 3/4" fire-rated plywood board and labeled with fire rating stamp facing into the room to accommodate rack ladder support, cabling support, grounding platform, data, and voice equipment. Paint the backboard white (leave fire stamp visible) to match the existing backboard in room, if appropriate. Location of installation is to be determined with approval by Owner.

J. Patch Cords

1. Contractor to provide and install fiber and copper patch cords in quantities as described below. Neatly install patch cords in lengths as appropriate to reduce unnecessary length in wire managers.
2. Install patch cords at the equipment cabinet between patch panel and owner-provided switches for each patch panel and workstation location. Patch cords shall directly connect between patch panel and networking switch or other electronics equipment. Dress and bundle patch cords as appropriate for final installation. Provide any unused equipment patch cables to Owner in original packaging upon completion of project.
3. Install Wireless Access Point patch cords as described above and connect Cameras and other field-installed networkable device via a vendor-supplied patch cord at the remote locations. Return unused patch cords to Owner in original packaging.
4. Provide workstation patch cords to Owner in original packaging.
5. Use the following guidelines for project bid. Verify all lengths with Owner prior to purchase:
 - a. Provide and install one (1) 7-foot patch cord of the same category rating, for each cable terminated at the patch panel.
 - b. Provide one (1) 10-foot patch cord of the same category rating, for each cable terminated at the terminal outlet location.
 - c. Provide one (1) 2-meter patch cord of the same grade of fiber, for each LC connector pair installed at the IDF, MDF, and all other terminal enclosure locations.
6. All fiber patch cords and required workstation/equipment patch cords not installed shall be provided in hand to Owners Representative prior to project closeout.

K. Labeling

1. Provide machine-generated labels appropriate for all components supplied and installed. Under no circumstances shall handwritten labels be used.
2. Each faceplate, cable, or data outlet (drop) will be numbered with a unique identifier clearly indicating the voice and data jacks by floor number, station, and outlet identification. This labeling scheme will be independent of any assigned telephone numbers.
3. The labeling scheme shall not include duplicates of any new or existing cable identification across the entire cable plant.
4. Labeling procedure will meet TIA-568, TIA-606 (Class 2 Administration) and BICSI Standards.
5. The labeling scheme will be provided at all locations within the cable infrastructure:

3.5. Testing of Structured Cabling System

A. Copper Testing

1. Test all equipment and each outlet, horizontal cable, termination block, patch cords, etc. to verify compliance with requirements. Testing shall consist of attenuation and NEXT across all splices and devices installed in the field and shall meet the latest requirements of EIA/TIA. Re-terminate any cable or connection found to be defective.
2. Tester is to be a Level IV device or better, and configured with the specific cable installed, and the Permanent Link test will be performed according to the Category's standard methodology. All parameters must exhibit a PASS test result prior to project completion. PASS*, FAIL* or FAIL test results will not be accepted.
3. Only a permanent link test for Category 6A will be required. If situations demand a "hybrid", "Mixed" or a standard "Channel" design, approval must be obtained for those specific circumstances prior to testing.

B. Fiber Optic Testing

1. Each pre-terminated fiber strand shall be tested for continuity and attenuation with an Optical Power Meter and light source for actual length and splice/connector loss. Each field-terminated fiber strand (if any) shall be tested for attenuation with an Optical Power Meter and light source and with an Optical Time Domain Reflectometer (OTDR) for actual length and splice/connector loss.
2. Cable length shall be verified using sheath markings. The guidelines and procedures established for Tier 1 testing in TIA/TSB-140 shall apply.
3. All fiber optic cables shall be tested from the site's MDF to each fiber terminal located in the IDF.
4. The Contractor shall conduct a bi-directional power meter (loss) test of each fiber optic station and riser cable at both wavelengths, 850/1300nm for MM and 1310/1550nm for SM.

5. No individual station or riser fiber link segment (including connectors) shall measure more than 2.0 dB loss for LC, and 1.5dB loss for MTP. LC links shall be tested with LC jumpers from the LC cassette to the tester. MTP links shall be tested either with an MTP tester and array cord, or with an MTP-LC breakout harness and LC duplex fiber tester.
 6. Tests shall be conducted using ANSI/TIA-526-14A, Method B. Test results evaluation for the panel to panel (backbone) shall be based on the values set forth in ANSI/TIA-568.
 7. The Contractor shall provide an electronic printout for each strand tested with the Power Meter and the OTDR.
 8. The Contractor shall submit proof of Tester software/firmware being up to date.
 9. Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the Owner and the Contractor prior to the start of the test.
 10. All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps and all expenses necessary to clean, repair or replace any optic link not meeting the standard.
- C. Test Results
1. Repair and resolve any shortcomings in the test results. Mitigation efforts may require re-termination or replacement of the jack, outlet, or cable. Repairs or attempts to resolve test failures will be completed solely at the expense of the Contractor.
 2. Provide test results to Manufacturer and Owner representative in native Tester format. Upon request, provide a copy of the tester software and license, if needed, at no charge to Owner representative.
 3. Include PDF of full test results, summary index in electronic format on CD or memory stick in the O&M package upon project completion.
 4. Cabling systems shall meet or exceed the electrical and transmission characteristics of the systems specified.
 5. Cable segments and links shall be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).
 6. The system shall not be considered certified until the tester has acknowledged that the performance of the physical layer of the system has been fully tested and is operational at the completion of the installation phase.

7. After the installation is complete, in addition to any other required testing as described herein, and at such times as the Owner/Engineer directs, the Contractor shall be present while the Owner conducts an operating test for approval. The installation shall be demonstrated to be in accordance with the requirements of this specification. Any defects revealed shall be corrected promptly at the Contractor's expense and the tests performed again.
8. After reviewing the completed test results, the Owner reserves the right to retest cables, utilizing the Contractor's tester and the Contractor's labor.
9. The test results information for each link shall be recorded in the memory of the field tester upon completion of the test. The tester shall be capable of storing test data in either internal or external memory. The external media used shall be left to the discretion of the user.
10. Test results saved by the tester shall be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.
11. Test results shall be provided in both native Tester format as well as comma separated variable (.csv), Portable Document File (.pdf), plain text (.txt), or hypertext markup language (.html/.htm). A copy of the tester native test software must be provided to Owner or Owner's representative for comparison of results.
12. Test Results for CAT6/6A shall include the following:
 - a. Applicable room number of jack location (room number per Contract Documents)
 - b. Applicable Telecommunications Room number
 - c. Circuit I.D. number with corresponding jack identifier
 - d. Wire Map – shall include the following:
 - e. Continuity to the remote end
 - f. Shorts between any two or more conductors
 - g. Crossed pairs
 - h. Reversed pairs
 - i. Split pairs
 - j. Any other mis-wiring
 - k. Length
 - l. Insertion Loss
 - m. Near-end Crosstalk (NEXT) Loss
 - n. PS-NEXT (Power Sum Near End Cross Talk)

- o. FEXT (Far End Crosstalk)
 - p. ELFEXT (Equal Level Far End Cross Talk)
 - q. PS-ELFEXT (Power Sum Equal Level Far End Cross Talk)
 - r. Propagation Delay
 - s. Delay Skew
 - t. Return loss
 - u. PSFEXT (Power Sum Far End Crosstalk)
 - v. PSACRF (Power Sum Attenuation to Crosstalk Ratio, Far End)
13. Test Results for CAT6A shall include all the above, plus the following:
- a. AACRF (Alien Attenuation to Crosstalk Ratio, Far End)
 - b. AFEXT (Alien Far End Crosstalk)
 - c. ANEXT (Alien Near End Crosstalk)
 - d. PSANEXT (Power Sum Alien Near End Crosstalk)
 - e. PSAACRF (Power Sum Alien Attenuation to Crosstalk Ratio, Far End)
14. Approved Tester Products:
- a. Fluke DTX or later platform Cable Certification testers
 - b. Softing WireXpert series tester
 - c. Linkware Record Management Software

3.6. Project Closeout

- A. Operating and maintenance manuals shall be submitted prior to testing of the system. A total of (4) manuals shall be delivered to the Owner. Manuals shall include all service, installation, and programming information.
- B. Provide a full set of “as-built” (redline) drawings in AutoCAD DWG and PDF format. Drawings to depict final location and drop/cable identification numbers and labels which match the test reports. Include (1) hard copy paper format of all as-builts in 30”x42” size or equivalent, posted in each telecom room involved in the project.
- C. Contractor to provide all warranty information to manufacture for processing. Manufacture will send warranty document direct to Owner.

3.7. Training

- A. Provide four (4) hours training on the operation and installation of the data system, at job site, at no cost to owner.
- B. Training shall be a walk thru of all systems cabling locations and required maintenance procedures.

END of SECTION

27 51 26 Assistive Listening Systems (CBC 2022/ADA 2010)

1. GENERAL

1.1. Work Includes

- A. This specification is to be used where an Assistive Listing System is not called for within a specific audio-visual system or room but is required by the CBC and/or ADA.
- B. All labor, materials, appliances tools, equipment, facilities transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section. Complete as specified herein.
- C. The Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system, so that the system shall perform the function listed herein compliance with all the specified requirements.

1.2. Scope of Work

- A. Provide Assistive Listening Systems per CBC Section 11B.219 & 11B.706.
 - 1. CBC 11B-219.3 Receiver Quantity based on space.
 - a. The minimum number of receivers to be provided shall be equal to 4 percent of the total number of seats, but in no case less than two. Twenty-five percent minimum of receivers provided, but no fewer than two, shall be hearing-aid compatible in accordance with Section 11B-706.3.
- B. The Americans with Disabilities Act (ADA) 2010 ADA Standards requires public facilities to provide auditory assistance devices.

<http://www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards.pdf>

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Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats*	2
201 to 500	2, plus 1 per 25 seats over 50 seats*	1 per 4 receivers*
501 to 1000	20, plus 1 per 33 seats over 500 seats*	1 per 4 receivers*
1001 to 2000	35, plus 1 per 50 seats over 1000 seats*	1 per 4 receivers*
2001 and over	55 plus 1 per 100 seats over 2000 seats*	1 per 4 receivers*

*Or fraction thereof

1.3. References

- A. Americans with Disabilities Act (ADA)
- B. California Building Code (CBC 2022)
- C. National Electrical Manufacturer's Association (NEMA)
- D. American National Standards Institute (ANSI)
- E. National Electric Code (NEC)
- F. Institute of Electrical and Electronic Engineers (IEEE)
- G. Underwriters Laboratories, Inc. (UL)
 - 1. All cabling shall comply with all appropriate requirements of NEC Articles 770 and 800 and shall comply with the State Fire Codes as interpreted by the State Fire Marshall's Dept.
 - 2. All publications referred to in this document shall be the latest edition thereof together with any amendments and/or addenda current ten days before the date fixed for return of bids.

1.4. Quality Assurance

- A. Contractor shall assign competent person as project manager who has demonstrated the ability to supervise a project of similar size and scope. Submit a resume of the proposed Project Manager for the District's review and acceptance. The Project Manager must attend meetings as required.
- B. Use adequate numbers of skilled workers thoroughly trained and experienced on the necessary crafts and completely familiar with the specified requirements and methods needed for the proper performance of the work of this Section.
- C. The system Contractor shall warrant any equipment installed under this specification to be free from defect for a period of one (1) year from the date of final acceptance.
- D. The contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.
- E. The contractor shall coordinate with the commissioning staff and schedule appropriate walk through and testing. Testing is outlined in section 3.2 Tests and Instruction.

1.5. Submittals

- A. REFER TO SUBMITTAL SECTION 013300 FOR REQUIREMENTS.
- B. Provide product data for the following:
 - 1. Manufacturers cut sheets, specifications and installation instructions for all products.

2. PRODUCTS

2.1. Assistive Listening Systems

- A. Furnish and install an FM wireless assistive listening system for use by the hearing-impaired. The assistive listening system (ALS) shall be capable of broadcasting on 57 channels and be frequency agile. The ALS system shall have 80dB SNR or greater, end-to-end. Receivers shall be frequency agile and frequency set with a "seek" button. The receiver will incorporate a stereo headset jack that allows the user to plug in either a mono or stereo headset and listen to audio normally. The portable receivers and transmitters shall incorporate automatic battery charging circuitry for recharging of Ni-MH batteries. Listen Technologies Corporation products are specified. Approved equals; Williams Sound, Shure, Phonic Ear, Telex and Sennhieser of equal type and quantities.
- B. Minimum system requirements (small conference room)
 - 1. LKS-4-A1 4-Person Portable RF System (72 MHz)
 - a. LT-700 Portable RF Display Transmitter (72 MHz) (Qty: 1 ea.)
 - b. LA-278 Behind-the-Head Microphone (Qty: 1 ea.).
 - c. LR-400 Portable Display RF Receiver (72 MHz) (Qty: 7 ea.).
 - d. LA-164 Ear Speaker (Qty: 4 ea.).
 - e. LA-361 High-Capacity AA Alkaline Batteries (Qty: 8 ea.)
- C. Contractor to provide additional equipment as required by ADA assembly area table.
- D. The Contractor shall provide coordination until the proper functionality of the system is complete and accepted by the District Representative.

3. EXECUTION

3.1. Installation

- A. Hand deliver to school representative.

3.2. Tests and Instruction

- 1. Allow a minimum of four (4) hours on site for the instruction portion of this requirement.

END of SECTION

SECTION 28 31 00

FIRE DETECTION AND ALARM SYSTEM INTELLIGENT FIREARM DETECTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. This section of the specification includes the furnishing, installation, and connection of an intelligent reporting, microprocessor controlled, addressable, fire detection and emergency alarm communication system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.
- B. The fire alarm shall comply with requirements of NFPA Standard 72 for Fire Alarm Control Unit except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.
- C. The system shall be an active/interrogative type system where each addressable device is repetitively scanned, causing a signal to be transmitted to the main Fire Alarm Control Unit (FACU) indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACU shall result in a trouble indication as specified hereinafter for the particular input.
- D. The facility shall have an Emergency Voice/Alarm Communication System (EVACS). Digitally stored message sequences shall notify the building occupants that a fire or life safety condition has been reported. Message generator(s) shall be capable of automatically distributing up to eight (8) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event. The Fire Command Center (FCC) shall also support Emergency manual voice announcement capability for both system wide or selected audio zones and shall include provisions for the system operator to override automatic messages system wide or in selected zones.
- E. The system shall support additional, alternate Fire Command Centers, which shall be capable of simultaneous monitoring of all system events. Alternate Fire Command Centers shall also support an approved method of transferring the control functions to an alternate Fire Command Center where necessary.
- F. Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.
- G. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994

Intelligent Fire Alarm Detection System

- H. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall comply with the UL listing.
- I. The installing company shall employ NICET (minimum Level II Fire Alarm Systems) technicians on site to guide the final checkout and to ensure the systems integrity.
- J. System Programming:
 - 1. Ability to program the system via the local user interface.
 - 2. The system shall be capable of off-line/on-line programming by the manufacturers programming utility.
- K. Provide a cloud base connected life safety platform with the ability to remotely monitor the buildings fire system and capable of providing system diagnostics with full detail reports on annual test and inspections from a web-based server or mobile device application. The software shall also expand to allow for future offerings and provide dedicated account access to facility users and service personal.
- L. The system shall automatically track NFPA 72 installation and testing requirements for all fire system devices to ensure that every device is functionally tested upon installation and then periodically as required by Code. A gateway/hub shall be utilized to retrieve the system information using its native protocol and/or bar codes without the need of additional tools and accessories.
- M. This section includes the minimum requirements for the following equipment:
 - Main Fire Alarm Control Unit
 - Signal Line Circuit Control Module
 - Enclosures
 - Digital Voice Command Center
 - Addressable Main Power Supply
 - Auxiliary Addressable Power Supply
 - Power Supply Expander
 - System Circuit Supervision
 - Audio Amplifiers
 - CLSS Gateway
 - Digital Alarm Communicator Transmitter
 - Speaker Notification Devices
 - Audible/Visual Combination Devices
 - Manual Fire Alarm Stations
 - Projected Beam Detectors
 - Waterflow Indicator
 - Annunciator Control Display
 - Network Node Communication

Intelligent Fire Alarm Detection System

- ONYX Works Workstation
- Network Control Display
- Gateway Communication
- Addressable Wireless Devices
- Intelligent Photoelectric Smoke Detectors
- Intelligent Thermal Detectors
- Self-testing Photoelectric Smoke Detectors
- Self-testing Thermal Detectors
- Self-testing Photo Thermal Detectors
- High Sensitivity Photo Smoke Detectors
- Multi-Criteria Smoke Detectors
- Low Frequency Sounder Base
- Intelligent Duct Smoke Detectors
- CO Detectors
- Photoelectric Smoke and CO Detectors
- Batteries and External Charger

1.2 APPLICABLE STANDARDS AND SPECIFICATIONS

A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards, if applicable.

B. National Fire Protection Association (NFPA) – USA

No. 13	Sprinkler Systems
No. 70	National Electric Code
No. 90A	Air Conditioning Systems
No. 72	National Fire Alarm Code
No. 101	Life Safety Code

C. Underwriters Laboratories Inc. (UL) – USA

- No. 268 Smoke Detectors for Fire Protective Signaling Systems
- No. 864 Control Units for Fire Protective Signaling Systems
- No. 217 Smoke Detectors, Single and Multiple Station
- No. 228 Door Closers - Holders for Fire Protective Signaling Systems
- No. 268A Smoke Detectors for Duct Applications
- No. 521 Heat Detectors for Fire Protective Signaling Systems
- No. 464 Audible Signaling Appliances
- No. 38 Manually Actuated Signaling Boxes
- No. 1481 Power Supplies for Fire Protective Signaling Systems
- No. 346 Waterflow Indicators for Fire Protective Signaling Systems
- No. 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
- No. 1971 Visual Notification Appliances

Intelligent Fire Alarm Detection System

No. 2017 Standard for General-Purpose Signaling Devices and Systems

- D. Local and State Building Codes.
- E. Latest Adopted Edition of the International Building Code
- F. Latest Adopted Edition of the International Fire Code
- G. All requirements of the Authority Having Jurisdiction (AHJ)

1.3 APPROVALS

- A. The system shall have proper listing and/or approval from the following nationally recognized agencies:

UL	Underwriters Laboratories, Inc.
FM	Factory Mutual
NYFD	New York Fire Department
CSFM	California State Fire Marshal

- B. The Fire Alarm Control Unit and all transponders shall meet the modular listing requirements of the tenth edition of UL Standard 864 (Control Units). Each subassembly, including all printed circuits, shall include the appropriate UL modular label. This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems that do not include modular labels may require return to the factory for system upgrades and are not acceptable.

1.4 SCOPE

- A. A new intelligent reporting, microprocessor-controlled fire detection system shall be installed in accordance to the project specifications and drawings.
- B. The system shall be designed such that each signaling line circuit (SLC) is limited to only 80% of its total capacity at initial installation.
- C. Basic Performance:
 - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Class B Signaling Line Circuits (SLC).
 - 2. Initiation Device Circuits (IDC) shall be wired Class B as part of an addressable device connected by the SLC Circuit.
 - 3. Notification Appliance Circuits (NAC) shall be wired Class B.
 - 4. On Class A configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

Intelligent Fire Alarm Detection System

5. Alarm signals arriving at the FACU shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
6. Speaker circuits may be controlled by NAC outputs built into the amplifiers, which shall function as addressable points on the Digital Audio Loop.
7. Notification Appliance Circuits (NAC) speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone whichever is greater.
8. Audio amplifiers and tone generating equipment shall be electrically supervised for normal and abnormal conditions.
9. Notification Appliance Circuits (NAC) speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.
10. Speaker circuits shall be arranged such that there is a minimum of one speaker circuit per smoke zone.
11. Speaker circuits shall be electrically supervised for open and short circuit conditions. If a short circuit exists on a speaker circuit, it shall not be possible to activate that circuit.
12. Audio amplifiers and tone generating equipment shall be electrically supervised for abnormal conditions. Digital amplifiers shall provide built-in speaker circuits, field configurable as four Class B, two or four Class A circuits where necessary
 - a. Speaker circuits shall be <25 or 70V> VRMS Speaker circuits shall have 20% space capacity for future expansion or increased power output requirements.

D. Basic System Functional Operation

When a fire alarm condition is detected and reported by one of the systems initiating devices, the following functions shall immediately occur:

1. The System Alarm shall flash on display.
2. A local piezo electric signal in the control panel shall sound.
3. The touchscreen LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
4. Printing and history storage equipment shall log the information associated each new Fire Alarm Control Unit condition, along with time and date of occurrence.
5. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.
6. The audio portion of the system shall sound the proper audio signal to the appropriate zones.

1.5 SYSTEM MAINTENANCE ANALYSIS AND REPORTING

- A. The software shall automatically report fire system events during usage and via Push Notifications when the App is not in the foreground on a mobile device. The software shall also record active events during test and inspection mode and capable of silencing alarm/trouble during the test period remotely.
- B. The software shall be capable of downloading and uploading such data to approved handheld devices via web portal or bar codes. Systems that rely solely on the use of bar codes shall not be considered as equal. No proprietary software of any kind shall be required for viewing reports online.
- C. The software shall have the capability to provide several services with open protocol to allow for future expansion. At minimum the software shall have the following functionalities:
 - 1. Check point access for commissioning.
 - 2. Detail commissioning reports.
 - 3. Facility Management.
 - 4. Service Site Management
 - 5. Check point remote access for service monitoring
 - 6. User Management
- D. The software shall be secure and encrypted with user authentication to meet cyber security requirements. Each user shall have a dedicated account with limitations based on designated clearances. Online access to the web-based reporting system shall run 24/7 with no downtime.
- E. Allow active control of fire system during test and inspection when connected to the buildings network for authentication. Off premise services shall only allow for monitoring and history of the system.
- F. Forwarding of event notifications and reports by utilizing a mobile device or PC.
- G. Full capability to monitor an unlimited number of buildings and shall display events customizable to the user.

1.6 SUBMITTALS

- A. Shop Drawings
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

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3. Show annunciator layout, configurations, and terminations.

B. Manuals

1. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
2. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
4. Approvals will be based on complete submissions of manuals together with shop drawings.

C. Software Modifications

1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

D. Certifications

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.7 GUARANTY

- A. All work performed, and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be included in the submittal bid.

1.8 POST CONTRACT MAINTENANCE

- A. Complete maintenance and repair service for the fire detection system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of one (1) years after expiration of the guaranty.

- B. As part of the bid/proposal, include a quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Include also a quote for unscheduled maintenance/repairs, including hourly rates for technicians trained on this equipment, and response travel costs for each year of the maintenance period. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of One (1) year after expiration of the guaranty.
- C. Maintenance and testing shall be on a semiannual basis or as required by the AHJ. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:
 - 1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
 - 2. Each circuit in the fire alarm system shall be tested semiannually.
 - 3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 7.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Product: Subject to compliance with requirements, provide product indicated on drawings as manufactured by NOTIFIER; a Honeywell company.

2.2 EQUIPMENT AND MATERIAL, GENERAL

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system. The materials, equipment, and devices shall be tested to function with manufacturers approved FACU via a cloud base life safety services system.
- B. The system shall fully comply with commissioning and test and inspect reports as outline in NFPA-72. System test shall automatically retrieve the fire systems connected devices utilizing a gateway. In applications where a gateway is not applicable the systems peripheral devices shall be entered manually and/or by using barcodes.
- C. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.

- D. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.3 CONDUIT AND WIRE

A. Conduit

1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.
2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross-sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760.
4. Wiring for 24-volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduit shall not enter the Fire Alarm Control Unit, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACU manufacturer.
6. Conduit shall be 3/4-inch (19.1 mm) minimum.

B. System Wiring

1. All fire alarm system wiring must be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 14 AWG (1.02 mm) for initiating device circuits #12 AWG, signaling line circuits, and notification appliance circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. The system shall permit the use of IDC and NAC wiring in the same conduit with the multiplex communication loop.
6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.

7. All analog voice speaker and analog telephone circuits shall use twisted/shielded pair to eliminate cross talk.

C. Terminal Boxes, Junction Boxes

1. All boxes and cabinets shall be UL listed for their intended purpose.

- D. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.

- E. The Fire Alarm Control Unit shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire Alarm Control Unit primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold-water pipe or grounding rod.

2.4 MAIN FIRE ALARM CONTROL UNIT

- A. The main FACU Central Console shall be a NOTIFIER INSPIRE N16 Series Model and shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system-controlled devices.
- B. The FACU will be based on a licensing model to allow for future expansion. Licensable features shall include but not limited to additional general zones, logic zones, CLIP mode support and network display support. The FACU shall be backwards compatible to support previous Onyx series devices.
- C. The FACU shall be fully networkable to support traditional NOTI-Fire-Net standard and high speed networks.
- D. The main FACU shall include the capability to function as a master network controller along with its main functions.
- E. Functionality of the FACU shall allow for the ability to annunciate and specify commands directly from the LED touchscreen without the need of a external programmer.
- F. In conjunction with intelligent Signaling Loop Modules the main FACU shall perform the following functions:
1. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
 2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.

3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to local mode. Such local mode shall treat the corresponding SLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.

Visually and audibly annunciate any trouble, supervisory, security or fire or CO (Carbon Monoxide) alarm condition on operator's terminals, panel display, and annunciators.
4. When a fire alarm condition is detected and reported by one of the systems initiating devices or appliances, the following functions shall immediately occur:
 - a. The system alarm shall flash on the display.
 - b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
 - c. The touchscreen LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
 - d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
 - e. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
 - f. When a trouble condition is detected and reported by one of the systems initiating devices or appliances, the following functions shall immediately occur:
 - g. The system trouble shall flash on the display.
 - h. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
 - i. The touchscreen LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
 - j. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
 - k. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.
6. When a supervisory, security alarm or pre-alarm condition is detected by an initiating devices or appliance, the following functions shall immediately occur:
 - a. The system trouble shall flash on the display.
 - b. A local piezo-electric audible device in the control panel shall sound a distinctive signal.

- c. The touchscreen LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.
- d. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
- e. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

G. Operator Control

1. Acknowledge

- a. Activation of the control panel acknowledge selection in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble indicators from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, selection of acknowledge shall advance the LCD display to the next alarm or trouble condition. In addition, the FACU shall support Block Acknowledge to allow multiple trouble conditions to be acknowledged with a single tap on the touchscreen button
- b. Tapping on the Acknowledge button shall also silence all remote annunciator piezo sounders.

2. Signal Silence

- a. Tapping of the Signal Silence button shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACU software shall include silence inhibit and auto-silence timers.

3. Drill Switch

Selection of the Drill mode shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

4. System Reset

Tapping the System Reset button shall cause all electronically latched initiating devices to return to their normal condition. Initiating devices shall re-report if active. Active notification appliance circuits shall not silence upon Reset. Systems that de-activate and subsequently re-activate notification appliance circuits shall not be considered equal. All programmed Control-By-Event equations shall be re-evaluated after the reset sequence is complete if the initiating condition has cleared. Non-latching trouble conditions shall not clear and re-report upon reset.

5. Lamp Test
Tapping the Lamp Test button shall activate all local system LED's as well as illuminate the LCD display.
6. About Screen
The system shall provide an "About Screen" that offers panel software and hardware version as well as provide a means to upgrade the software for service personnel.
7. Scrolling
 - a. Provide a programmable Alert bar such that Tapping on an active events category in the Alert Bar shall vector the display to those categorized events including but not limited to, Fire Alarm, Supervisory, Trouble, CO Alarm and Disable. Tapping on the display and dragging in a upward or downward motion shall scroll through active events
8. Printing
 - a. When connected to a supported printer the panel shall print live events. History may also be exported to USB drive.

H. System Capacity and General Operations

1. The control panel shall be scalable up to 10 SLC modules without the need of replacing the CPU. Each SLM module shall support a maximum of 318 analog/addressable devices for a system capacity of 3,180 points. The system shall be capable of up to 2,400 annunciation points per system regardless of the number of addressable devices.
2. The Fire Alarm Control Unit shall include a full featured high definition 10 inch color 1024x600 resolution LCD with capacitive touch display, including audible and visible feedback, adjustable brightness solid-state LCD. It shall also include a graphical QWERTY-style keypad on the color, touchscreen display. The display shall have the ability to scroll events by type (i.e. Fire Alarm, Supervisory Alarm, Trouble, etc) using the touchscreen.
3. The touchscreen LCD shall be intuitive and allow for custom configuration of actionable events to be program as a selectable icon on the screen.
4. The touchscreen LCD shall have the ability to display up to 3,000 events in order of priority and time of occurrence. Counters shall be provided to indicate the total number of events by type
5. The panel display may be converted to a Network control display through licensing

6. The touchscreen LCD shall include indication of Fire Alarm, CO Alarm, Trouble, Supervisory, Signals Silenced, Disabled Points, and other (non-fire) events. The LCD will also include LEDs to indicate primary power status and any off-normal event
7. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Unit.
8. The FACU shall be able to provide the following software and hardware features:
 - a. Pre-signal and Alarm Delay: The system shall provide means to cause alarm signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds after start of alarm processing. In addition, an Alarm Delay selection shall be available that allows a 15-second time period for acknowledging an alarm signal from a fire detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local and remote outputs shall automatically activate immediately.
 - b. Smoke Detector Pre-alarm Indication at Control Panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-alarm indication shall be available at the control panel: alert and action.
 - c. Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.
 - d. Action: If programmed for Action and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on Alarm level.
 - e. The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds.
 - f. Device Blink Control: Provide a means to enable or disable detector/module LED indicators for special areas.
 - g. NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meet the requirements of NFPA 72.
 - h. Programmable Trouble Reminder: The system shall provide means to automatically initiate a reminder that a Fire Alarm or CO Alarm or supervisory event or troubles exist in the system. The reminder will appear on the system display and (if enabled) will sound a piezo alarm.
 - i. On-line or Off-line or Remote programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected online or remotely connected to the panel via a secured gateway. The system shall also support upload and download of programmed database to a Personal Computer/cloud.

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- j. History Events: The panel shall be capable maintaining a history file up to the last 10,000 events, each with a time and date stamp and shall allow to scroll through all stored events. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall be able to export the history to a USB drive.
- k. The system shall provide means for all SLC devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID's and associate that ID with the corresponding address of the device.
- l. Drill: The system shall support means to activate all silence able fire output circuits in the event of a practice evacuation or "drill". If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function.
- m. Passwords and Users: The system shall support 5 access levels System Operator, Building Maintenance User, Technician User, Admin User, Master User. and up to 50 usernames and passwords. Each role has default permissions that can be customized. Only the master password shall allow access to password change screens.
- n. Two Wire Detection: The system shall support standard two wire detection devices specifically from the following manufacturer; System Sensor.
- o. Block Acknowledge: The system shall support a block Acknowledge for Trouble and Disable conditions
- p. Service mode: Panel shall support a Service Mode in which state, the panel can be accessed remotely for programming, testing and control. Service mode shall have a time out feature that can be customized. While in Service Mode the panel shall display a trouble condition.
- q. Magnet test – Panel shall support A/V magnet test with compatible A/V appliances which allows to test individual A/V appliances on the NAC circuit by applying the magnet to appliance shortly without activating the entire circuit minimizing disruptions during testing and inspection
- r. Sensitivity Adjust: The system shall provide Automatic Detector Sensitivity Adjust based on Occupancy schedules including a Holiday list of up to 15 days.
- s. Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.
- t. Custom Action Messages: The system shall provide means to enter up to 100 custom action messages of up to 160 characters each. It shall be possible to assign any of the 100 messages to any point.

- u. Custom Action Button: Panel will support up to 32 programmable custom action buttons on the LCD touchscreen display to enable/disable or control panel outputs without the use of additional hardware
- v. Print Functions: When connected to a supported printer the panel shall print live events. History may also be exported to USB drive
- w. Local Mode: If communication is lost to the central processor the system shall provide added survivability through the intelligent loop control modules. Inputs from devices connected to the SLC and loop control modules shall activate outputs on the same loop when the inputs and outputs have been set with point programming to participate in local mode or when the type codes are of the same type: that is, an input with a fire alarm type code shall activate an output with a fire alarm type code.
- x. Resound based on type for security or supervisory: The system shall indicate a Security alarm when a monitor module point programmed with a security Type Code activates. If silenced alarms exist, a Security alarm will Resound the panel sounder. The system shall indicate a Supervisory alarm when a monitor module point programmed with a supervisory Type Code activates. If there are silenced alarms, a Supervisory alarm will Resound the panel sounder.
- y. Read status preview - enabled and disabled points: Prior to re-enabling points, the system shall inform the user that a disabled device is in the alarm state. This shall provide notice that the device must be reset before the device is enabled thereby avoiding activation of the notification circuits.
- z. Custom Wallpaper: The panel display shall permit uploading of a custom background wallpaper.
- aa. Multi-Detector and Cooperating Detectors: The system shall provide means to link one detector to up to two detectors at other addresses on the same loop in cooperative multi-detector sensing. There shall be no requirement for sequential addresses on the detectors and the alarm event shall be a result or product of all cooperating detectors chamber readings.
- bb. Tracking/Latching Duct detector : The system shall support both tracking and latching duct detectors photo types.
- cc. Alarm Verification, by device, with timer and tally: The system shall provide a user-defined global software timer function that can be set for a specific detector or indicating panel module input. The timer function shall delay an alarm signal for a user-specified time period and the control panel shall ignore the alarm verification timer if another alarm is detected during the verification period. It shall also be possible to set a maximum verification count between 0 and 20 with the "0" setting producing no alarm verification. When the counter exceeds the threshold value entered, a trouble shall be generated to the panel.

I. Central Processing Unit

1. The Central Processing Unit shall be the same component with the ability to expand to a larger system as required by the project without the need to be replaced.
2. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display by the Central Processing Unit.
3. The Central Processing Unit shall contain and execute all control-by-event (including Boolean functions including but not limited to AND, OR, NOT, ANYX, and CROSSZONE) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory and shall not be lost with system primary and secondary power failure.
4. The Central Processing Unit shall also provide a real-time clock for time annotation, to the second, of all system events.
5. Consistent with UL864 standards, the CPU and associated equipment are to be protected so that voltage surges or line transients will not affect them.
6. Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.
7. The CPU shall provide three EIA-485 ports for the serial connection to annunciation and control subsystem components.
8. The EIA-232 serial output circuit shall be optically isolated to assure protection from earth ground.
9. The CPU shall provide one high-speed serial connection for support of network communication modules.
10. The CPU shall provide a trouble relay.
11. The EIA-232 interface may be used for network connection to a proprietary-receiving unit.
12. An expandable power supply shall be allowed for future system modifications.

J. System Display

1. The system display shall provide all the controls and indicators used by the system operator and may also be used to program operational parameters.
2. The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
The system display shall provide a full featured high definition 10 inch color LCD with touch capability display, including audible and visible feedback, adjustable brightness solid-state LCD. It shall also include a graphical QWERTY-style keypad when needed on the color, touchscreen display. The display shall have the ability to scroll events by type (i.e. Fire Alarm, Supervisory Alarm, Trouble, etc) using the touchscreen. The display shall indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM, SECURITY, SUPERVISORY, SYSTEM TROUBLE, OTHER

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EVENT, SIGNALS SILENCED, POINT DISABLED, and any off normal conditions.

3. The system display shall provide a graphical QWERTY style keypad when needed with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Five access levels System Operator, Building Maintenance User, Technician User, Admin User, Master User. Up to 50 usernames and passwords shall be accessible through the display interface to prevent unauthorized system control or programming.
4. The system display shall include the following operator control selections: ACKNOWLEDGE, SIGNAL SILENCE, RESET, DRILL, and LAMP TEST. Additionally, the display interface shall allow scrolling of active events including,
5. FIRE ALARM, CO ALARM, SECURITY, SUPERVISORY, TROUBLE, DISABLE and OTHER EVENTS. The touchscreen LCD shall be intuitive and allow for custom configuration of actional events to be program as a selectable icon on the screen.

K. Loop (Signaling Line Circuit) Control Module

1. The Loop Control Module shall monitor and control a minimum of 318 intelligent addressable devices. This includes 159 intelligent detectors (Photoelectric, or Thermal) and 159 monitor or control modules.
2. The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/ mode (any addressable device input shall be capable of activating any or all addressable device outputs) in the unlikely event of a failure in the main CPU.
3. The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Class A, B or X circuit.
4. The SLC interface board shall be able to drive a twisted unshielded circuit up to 12,500 feet in length. The SLC Interface shall also be capable of driving an NFPA Class A, no twist, no shield circuit for limited distances determined by the manufacturer. In addition, SLC wiring shall meet the listing requirements for it to exit the building or structure.
"T"-tapping shall be allowed in either case.
5. The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to annunciate an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

L. Enclosures

1. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

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2. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.
3. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side and dress plates can be installed and removed without requiring any specialized tools.
4. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.
5. The FACU shall have a modular dress panel and door design with interchangeable door hinge locations.

M. Digital Voice Command Center

1. The Digital Voice Command Center located with the FACU, shall contain all equipment required for all audio control, signaling and supervisory functions. This shall include speaker zone indication and control, digital voice units, and master microphone
2. Function: The Voice Command Center equipment shall perform the following functions:
 - a. Operate as a supervised multi-channel emergency voice communication system. The system shall have the capability to support up to eight (8) simultaneous messages.
 - b. Operate as a two-way emergency telephone system control center.
 - c. Audibly and visually annunciate the active or trouble condition of every speaker circuit and emergency telephone circuit.
 - d. Audibly and visually annunciate any trouble condition for digital tone and voice units required for normal operation of the system.
 - e. Provide all-call Emergency Paging activities through activation of a single control switch.
 - f. As required, provide vectored paging control to specific audio zones via dedicated control switches.
 - g. Provide a factory recorded "library" of voice messages and tones in standard WAV. File format, which may be edited and saved on a PC running a current Windows® operating system.
 - h. Provide a software utility capable of off-line programming for the DVC operation and the audio message files. This utility shall support the creation of new programs as well as editing and saving existing program files. Uploading or downloading the shall DVC not inhibit the emergency operation of other nodes on the fire alarm network.
 - i. Support an optional mode of operation with four analog audio outputs capable of being used with UL 864 fire-listed analog audio amplifiers and SCL controlled switching.
 - j. The Digital Voice Command shall be modular in construction and shall be capable of being field programmable without requiring the return of any components to the manufacturer and without requiring use of any external computers or other programming equipment.

- k. The Digital Voice Command and associated equipment shall be protected against unusually high voltage surges or line transients.

N. Addressable Main Power Supply

1. The Addressable Main Power Supply shall be universal input and shall accept either 120/240 VAC, 50/60 Hz, without any modifications and shall provide all necessary power for the FACU.
2. The Addressable Main Power Supply shall provide the required power to the CPU using a switching 24 VDC regulator and shall incorporate a battery charger for 24 hours of standby power using dual-rate charging techniques for fast battery recharge.
3. The Addressable Main Power Supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries ranging in capacity from 7-100 amp-hours within a 48-hour period.
4. The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. The Addressable Main Power Supply shall be power-limited per UL864 requirements.
6. Up to three addressable main power supplies may be added within the same FACU to expand power capacity.
7. Each addressable main power supply shall provide a minimum of 4 programmable Notification appliance circuits (NAC)
8. Power distribution of Each addressable main power supply can be customizable to provide system power, NAC, power, Auxillary power and battery charging

O. Auxiliary Addressable Power Supply

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.
2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24-volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24-volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0-amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.
4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.

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6. The interface to the power supply from the Fire Alarm Control Unit (FACU) shall be via the Signaling Line Circuit (SLC) or other multiplexed means. Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACU to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACU via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACU will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.
9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
10. The addressable power supply mounts in either the FACU backbox or its own dedicated surface mounted backbox with cover.
11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.
12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of an end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

P. Power Supply Expander

The PSE is a device designed for use as either a remote 24-volt power supply or used to power Notification Appliances.

1. The PSE shall offer up to 6.0 amps or 10 amps of regulated 24volt power. It shall include an integral charger designed to charge up to 33-amp hour batteries.

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2. The Power Supply Expanders shall have two or three fully isolated input triggers configurable, pairing any input with any output. The input trigger shall be a Notification Appliance Circuit (from the Fire Alarm Control Unit) or a control module. Five or Seven outputs shall be available for connection to the Notification devices Class B or Class A (without losing any output using converter card)
3. UL-Listed NAC synchronization using System Sensor, Wheelock, Gentex or AMSECO appliances. Sync signal maybe triggered from FACU NAC or remote sync outputs allowing cascading or daisy chain multiple power supplies.
4. The PSE shall include trouble history modes for diagnostic support. PSE shall include individual NAC power and trouble LEDs for diagnostic efficiency.
5. The Power Supply Expanders shall include the ability to delay the AC fail delay per NFPA requirements.
6. Self-Contained in compact, locking cabinet constructed of heavy gauge steel with a corrosion-resistant powder coat chip and scratch-resistant finish. Cabinet shall consist of 10 double knockouts and a removable door for ease of installation and wiring.
7. The PSE shall be capable of utilizing a wide range of end of line supervision values (normal 2K- 27K ohms).
8. The PSE shall be completely configurable via onboard dip switches, with no extra software required.

Q. System Circuit Supervision

1. The FACU shall supervise all circuits to intelligent devices, transponders, annunciators and peripheral equipment and annunciate loss of communication with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate which device or devices are not responding and print the information in the history buffer and on the printer.
2. Transponders that lose communication with the CPU shall sound an audible trouble and light an LED indicating loss of communications.
3. Sprinkler system valves, standpipe control valves, PIV, and main gate valves shall be supervised for off-normal position.
4. All speaker and emergency phone circuits shall be supervised for opens and shorts. Each transponder speaker and emergency phone circuit shall have an individual ON/OFF indication (green LED).

R. Field Wiring Terminal Blocks

All wiring terminal blocks shall be the plug-in/removable type and shall be capable of terminating up to 12 AWG wire. Terminal blocks that are permanently fixed to the PC board are not acceptable.

S. Audio Amplifiers

1. The Audio Amplifiers will provide Audio Power (@25 Volts RMS & 70V RMS) for distribution to speaker circuits.
2. Multiple audio amplifiers may be mounted in a single enclosure, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).
3. The audio amplifier shall provide the following built-in controls:
 - a. Amplifier Address Selection Switches
 - b. Signal Silence of communication loss annunciation Reset
 - c. Level adjustment for background music
 - d. Enable/Disable for Earth Fault detection on DAP A
 - e. Switch for 2-wire/4-wire FFT riser
4. Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.
5. Includes audio input and amplified output supervision, back up input, and automatic switch over function, (if primary amplifier should fail).
6. System shall be capable of backing up digital amplifiers.
7. One-to-one backup shall be provided by either a plug-in amplifier card or a designated backup amplifier of identical model as the primary amplifier.
8. One designated backup amplifier shall be capable of backing up multiple primary amplifiers mounted in the same or adjacent cabinets.
9. Multi-channel operation from a single amplifier shall be supported by the addition of an optional plug-in amplifier card.

T. Audio Message Generator (Prerecorded Voice)/Speaker Control:

1. Each initiating zone or intelligent device shall interface with an emergency voice communication system capable of transmitting a prerecorded voice message to all speakers in the building.
2. Actuation of any alarm initiating device shall cause a prerecorded message to sound over the speakers. The message shall be repeated four (4) times. Pre- and post-message tones shall be supported.
3. A built-in microphone shall be provided to allow paging through speaker circuits.
4. System paging from emergency telephone circuits shall be supported.
5. The audio message generator shall have the following indicators and controls to allow for proper operator understanding and control:
 - Lamp Test
 - Trouble
 - Off-Line Trouble
 - Microphone Trouble
 - Phone Trouble
 - Busy/Wait

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- Page Inhibited
 - Post Announcement Tone
6. Emergency Two-Way Telephone Control Switches/Indicators:
- The emergency telephone circuit control panel shall include visual indication of active and trouble status for each telephone circuit in the system.
 - The telephone circuit control panel shall include switches to manually activate or deactivate each telephone circuit in the system.
- U. Controls with associated LED Indicators
1. Speaker Switches/Indicators
- a. The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.
 - b. The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.
- V. Remote Transmissions
- 1. Provide local energy or polarity reversal or trip circuits as required.
 - 2. The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.
 - 3. Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.
 - 4. Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation and other required features.
- W. System Expansion
- 1. Design the main FACU and required components so that the system can be expanded in the future (to include the addition of twenty percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.
- X. Field Programming
- 1. The system shall be programmable, configurable and expandable in the field using the programming utility provided by the manufacturer .
 - 2. All field defined programs shall be stored in non-volatile memory.
 - 3. Five levels of password protection shall be provided in addition to a key-lock cabinet. Building Maintenance User, Technician User, Admin User, Master User and up to 50 usernames and passwords. Each role has default permissions that can be customized. Only the master password shall allow access to password change screens.

4. The system shall enforce the change from factory default password and it shall be a minimum of Eight (8) characters with a maximum of 16
5. The system programming shall be "backed" up via an upload/download program and stored on compatible removable media and also provide means to backup the file to the cloud.
A system back-up disk shall be completed and given in duplicate to the building owner and/or operator upon completion of the final inspection. The program that performs this function shall be "non-proprietary", in that, it shall be possible to forward it to the building owner/operator upon his or her request.
6. The installer's field programming and hardware shall be functionally tested on a computer against known parameters/norms which are established by the FACU manufacturer. A software program shall test Input-to-Output correlations, device Type ID associations, point associations, time equations, etc. This test shall be performed on windows- compatible PC with a verification software package. A system generated report of the test results shall be provided to the engineer(s) on record.

Y. Specific System Operations

1. Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.
2. Alarm Verification: Each of the Intelligent Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification function shall be programmable from 5 to 50 seconds and each detector shall be able to be selected for verification during the field programming of the system or any time after system turn-on. Alarm verification shall not require any additional hardware to be added to the control panel. The FACU shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

Z. System Point Operations

1. Any addressable device in the system shall have the capability to be enabled or disabled through the system display.
2. System output points shall be capable of being turned on or off from the system display
3. Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point shall be annunciated for the parameters listed:
 - a. Device Status.
 - b. Device Type.
 - c. Custom Device Label.
 - d. Software Zone Label.
 - e. Device Zone Assignments.

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- f. Analog Detector Sensitivity.
 - g. All Program Parameters.
- 4. System History Recording and Reporting: The Fire Alarm Control Unit shall contain a history buffer that will be capable of storing up to 10000 system events. Each of these events will be stored, with time and date stamp, until an operator requests that the contents be either displayed or printed. The contents of the history buffer may be manually reviewed; one event at a time, and the actual number of activations may also be displayed and or printed. History events shall include all alarms, troubles, operator actions, and programming entries.
- 5. The history buffer shall use non-volatile memory. Systems which use volatile memory for history storage are not acceptable.
- 6. Automatic Detector Maintenance Alert: The Fire Alarm Control Unit shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.
- 7. If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the trouble mode, and the particular Intelligent Detector will be annunciated on the system display and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
- 8. The system shall include the ability (programmable) to indicate a "pre-alarm" condition. This will be used to alert maintenance personal when a detector is at 80% of its alarm threshold in a 60 second period.

2.5 CLOUD BASED REPORTING AND MONITORING REQUIREMENTS

- A. All equipment, components and software shall be new and meet manufacturer's current model. The materials, equipment, and devices shall be tested to function with manufacture's approved FACU via a cloud-based life safety services system.
- B. The system shall fully comply with commissioning and test and inspect reports as outlined in NFPA-72. System test shall automatically retrieve the fire systems connected devices utilizing a gateway. In applications where a gateway is not applicable the systems peripheral devices shall be imported from the panel programming file, entered manually and/or by using barcodes.
- C. Connected Life Safety Services Software Platform:
 - 1. The software shall meet all the requirements outline in the System Maintenance and Analysis Reporting section of this specification.
 - a. System shall be compatible with IOS and Android mobile functionality and have web-based access with Windows and MAC based platforms without the need to install software on a dedicated network server.

- b. Functions through the mobile App and Web access should have all the following features:
 - 1) Device count per building
 - 2) Event log on App and Web access
 - 3) Control and reporting via Mobile App
 - 4) Automatic data input
 - 5) Automatic report generation
 - 6) Cause & Effect testing
 - 7) Ability to change panel device labels
- 2. The system shall support an IP based gateway to enable the panel or local Noti-Fire-Net to be connected to an ONYX-Works workstation via the Inter-net or Intranet. This gateway shall also support the ability to integrate the system to an interactive firefighter's display.
- D. Permanently installed Fixed Gateway: The system shall be capable of being interfaced with a fixed gateway to integrate with 3rd Party Service Management Software.
- E. CLSS Gateway:
 - 1. Provide a CLSS gateway for connection to a NOTIFIER fire system panel, serving as an interface between the FACU, Cloud and peripheral devices. The CLSS gateway shall be capable of reading the connected device system data base from a single or network of panels and shall transmit the data to the Connected Life Safety Services (CLSS) cloud.
 - 2. Equipment standard features shall allow Blue Tooth mobile paring for gateway configuration and control capability.
 - 3. Connection to NOTIFIER INSPIRE N16 series fire system panels utilizing Universal Protocol Ports via NUP
 - 4. Provide Nominal Voltage consumption of 12V to 32V DC from the FACU or an external power supply.
 - 5. The CLSS gateway shall allow for alarm transmission to a central station via IP and CELLULAR (LTE).
 - 6. The system shall support the ability to generate automated commissioning reports or test and inspection reports for installation or test & inspection personnel via the Connected Life Safety Service (CLSS) platform. The reports should be stored in cloud, enabling appropriate stakeholders to retrieve test and inspect report immediately after completion of the system commissioning or test and inspection.
 - 7. Inspection report shall indicate the method in which the device disposition was captured. Either by event received from a connected gateway, barcode scan, or manual user entry,
 - 8. The CLSS platform shall support the ability to automatically capture every addressable device connected to the system ensuring that each addressable device is accounted for and properly tested. CLSS shall also support importing any non-addressable devices associated with the system to ensure all system devices are accounted for and properly tested.

9. For self-testing devices CLSS shall identify any issues associated with the integrity or the ability for the smoke detector to properly detect smoke such as a dust cap not being removed or someone tampering with the detector by obstructing the smoke detector chamber.
10. The CLSS Gateway shall support the ability to send events from a single Notifier N16 panel or a network of up to 16 panels using standard BACnet communications protocol
11. The CLSS Gateway shall support the ability to send events from single Notifier N16 panel or a network of up to 10 panels using standard MODbus communications protocol

2.6 SYSTEM COMPONENTS

A. Speakers: Notifier-System Sensor PN, SPRL or SPRL Series

1. All speakers/audibles shall operate on 25 VRMS or 70VRMS with field selectable output taps from 0.5 to 2.0 Watts.
2. Speakers/audibles in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3m).
3. Frequency response shall be a minimum of 400 HZ to 4000 HZ. Capable of producing 520 HZ low Frequency for hearing impaired, etc.

B. Audible/Visual Combination Devices

1. Shall meet the applicable requirements of Section A listed above for audibility.
2. Shall meet the requirements of Section D listed below for visibility.
3. Visuals shall be installed at a height no less than 90 inches from the floor and no less than 6 inches below the finished ceiling when the greater of the two cannot be achieved as required per NFPA-72

C. Programmable Electronic Sounders

1. Electronic sounders shall operate on 24 VDC nominal.
2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 80 dBA measured at 10 feet from the device & low frequency 520Hz sounders shall provide sound level at least 75 dBA measured at the pillow per NFPA 72
3. Shall be flush or surface mounted as shown on plans.

D. Strobe lights, such as the Notifier-System Sensor PN SRL series, shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 20 milliseconds.
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.

E. Manual Fire Alarm Stations

1. Manual fire alarm stations shall be non-code, non-break glass type, equipped with key lock so that they may be tested without operating the handle.
2. Stations must be designed such that after an actual activation, they cannot be restored to normal except by key reset.
3. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of 100 feet (30.5 m) front or side.
4. Manual stations shall be constructed of high impact Lexan, with operating instructions provided on the cover. The word FIRE shall appear on the manual station in letters one half inch (12.7 mm) in size or larger.
5. Manual Fire Alarm station shall be located within 5ft of each exit door and mounted between 42-48 inches from the finish floor as required per NFPA-72 and ADA requirements.
6. Add additional manual fire alarm stations when the distance between stations exceeds 200ft.

F. Intelligent Duct Smoke Detector

The smoke detector housing shall accommodate an intelligent photoelectric detector that provides continuous analog monitoring and alarm verification from the panel. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system. The Intelligent Duct Smoke Detector shall support the installation of addressable Photoelectric detector capable or being tested remotely. The Intelligent Duct Detector housing shall be model # DNR(W) and the remote test capable photoelectric smoke detector shall be NOTIFIER model # FSP-951R.

G. Waterflow Monitoring

1. The FACU shall be capable of monitoring any 3rd party water flow devices and annunciating with unique indication for alarm or supervisory condition
2. The FACU addressable monitoring point shall monitor normally open contacts and display status
3. Need to add points around monitoring for opens/shorts, ground faults

H. LED Annunciator Control Display

1. The annunciator shall provide the FACU or NCD with local or remote, serially connected annunciators. Arrays of LED's indicate, at the panel or at the remote location the status of the system.
2. The annunciator shall provide 60 RGB LEDs allowing for multiple programmable color indications
3. The annunciator shall provide 30 capacitive touch programmable control points.

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4. The annunciator communicates to the FACU via a two-wire serial interface. Power is provided by the FACU via 24 VDC power and is inherently supervised
5. Up to 80 annunciators can be supported by the FACU., it shall allow up to 10 annunciators to be configured as routers with each router supporting an additional 15 annunciators

2.7 NETWORK NODE

A. Standard Network Communication

1. The network architecture shall be based on a Local Area Network (LAN), a firmware package that utilizes a peer-to-peer, inherently regenerative communication format and protocol. The protocol shall be based on ARCNET or equivalent. The network shall use a deterministic token-passing method. Collision detection and recovery type protocols are not acceptable substitutes due to life safety requirements. In addition, there shall be no master, polling computer, central file computer, display controller or other central element (weak link) in the network which, on failure, may cause complete loss of network communications or cause major degradation of network capability. There shall be no cascading of CPUs or master/slave relationships at the network level to facilitate network communications. Failure of any node shall not cause failure or communication degradation of any other node or change the network communication protocol among surviving nodes located within distance limitations. Each node/panel shall communicate on the network at a baud rate of not less than 312 KBPS (kilobits per second). A node may be an intelligent Fire Alarm Control Unit (FACU), ONYX Workstation (ONYX Works), Gateways (Modbus protocol, BACnet protocol etc), , Network Control Display (NCD), The network shall be capable of expansion to at least 103 nodes.
2. Each network node address shall be capable of storing Event equations. The event equations shall be used to activate outputs on one network node from inputs on other network nodes.
3. The network shall be capable of communicating via wire or fiber optic medium. A wire network shall include a fail-safe means of isolating the nodes in the unlikely event of complete power loss to a node.
4. A network repeater shall be available to increase the twisted-pair distance capability in 3,000 ft. increments. As an option, a repeater shall be available for fiber optics that increases the wire distance in 8 dB increments. A mix (hybrid) fiber/wire network repeater shall also be supported. Systems that have distance limitations, and have no available means to regenerate signals are not suitable substitutes.

2.8 SYSTEM COMPONENTS – ADDRESSABLE DEVICES

A. Addressable Devices – General

1. Addressable devices shall provide an address-setting means using rotary decimal switches. Addressable devices that require the address be programmed using a programming utility are not an allowable substitute.

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2. Addressable devices shall use simple to install and maintain decade (numbered 0 to 15) type address switches. Devices which use a binary address or special tools for setting the device address, such as a dip switch are not an allowable substitute.
3. Detectors shall be Analog and Addressable and shall connect to the Fire Alarm Control Unit's Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual (2) status LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs can be programmed via the fire control panel program.
5. The Fire Alarm Control Unit shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
6. Using software in the FACU, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7. The detectors shall be ceiling mounted and shall include a separate twist-lock base which includes a tamper proof feature.
8. The following bases and auxiliary functions shall be available:
 - a. Sounder base rated at 85 Db(high) and 75 Db (low)
 - b. Form-C Relay base
 - c. Isolator base
 - d. Where required a Low Frequency 520 HZ
9. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
10. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (example: Duct, PHOTO, THERMAL).

Self-testing initiating devices shall be capable of providing both a functional test and smoke entry test using a self-test function. The detector shall transmit a wireless beacon activated only during self-test mode designed to communicate with the CLSS app to prove successful completion of a visual inspection.

11. Detector Sensitivity Level

High = 1.6% obs/m (0.5% obs/ft),

Enhanced = 4% obs/m (1.3% obs/ft)

Standard = 8% obs/m (2.5% obs/ft)

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12. The detector shall have a test port per detection chamber to facilitate centralized smoke test under user control.

B. Addressable Manual Fire Alarm Box (manual station)

1. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual fire alarm boxes shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

C. Addressable Wireless Devices

1. The system shall be capable of supporting intelligent addressable wireless detectors, modules, pull stations and AV devices with similar capabilities as wired addressable intelligent devices.
2. Intelligent wireless devices shall utilize a gateway device to communicate with the intelligent Fire Alarm Control Unit, so that the wireless devices report to the panel using the established SLC protocol.
3. Wireless devices shall be capable of co-existing on the same panel with wired devices, and shall be capable of participating in common control-by-event programming sequences.
4. Wireless devices (excepting the gateway) shall operate on batteries recommended by the manufacturer and shall be UL tested and listed for 2 years of system operation on one set of batteries.
5. Intelligent wireless devices shall use a UL approved Class A mesh communication protocol to provide redundant supervised wireless communication links.
6. Wireless AV systems shall offer synchronization within a single mesh network.
7. Available Wireless devices shall include:
 - a. Intelligent wireless smoke detector (photoelectric technology)
 - b. Intelligent wireless smoke/heat combo detector
 - c. Intelligent wireless fixed temperature heat detector, 135 degrees F.
 - d. Intelligent wireless rate of rise heat detector, 135 degrees F.
 - e. Wireless monitor module
 - f. Wireless relay module
 - g. Wireless synchronization module
 - h. Wireless AV base for use with wired AV devices
 - i. Wireless pull station
 - j. Wireless gateway

8. A program that supports qualification of potential wireless applications, configuration and installation, and diagnostics shall be available. This program shall be installed on a Windows® PC, and shall be capable of communicating with wireless devices by use of a USB adapter that plugs into the computer.

D. Intelligent Photoelectric Smoke Detector

1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.

E. Intelligent Thermal Detectors

1. The intelligent thermal detectors shall be NOTIFIER FST- series addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. A high heat thermal detector rated at 190 degrees Fahrenheit shall also be available. The thermal detectors shall connect via two wires to the fire alarm control panel signaling line circuit.

F. High Sensitivity Photo Smoke Detector

1. The intelligent high sensitivity photoelectric smoke detector shall include a smoke sensing chamber and patented optic block designed to amplify signals from smoke.
2. The intelligent LED photo detector shall have nine sensitivity levels and be sensitive to a minimum obscuration of 0.02 percent per foot.
3. The detector shall be listed to meet UL 268 requirements and UL268A for duct applications.
4. The intelligent High sensitivity photo detector shall support standard, relay, isolator and sounder detector bases.
5. The High sensitivity photo detector shall not require other cleaning requirements than those listed in NFPA 72. Replacement, refurbishment or specialized cleaning of the detector head shall not be required.

G. Multi-Criteria Smoke Detectors

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire alarm control unit.
3. Automatically adjusts its sensitivity by means of drift compensation and smoothing algorithms. The detector shall send trouble alarm if it is incapable of compensating for existing conditions.

4. An operator at fire alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present sensitivity selected.
 - d. Sensor range (normal, dirty, etc.).
6. Categories of multicriteria detector should offer the following variants for different applications:
 - Fire / CO
 - PTIR (Photo, Thermal, Infrared)
 - Photo/Thermal
 - Photo/CO
 - Each sensor shall be separately listed according to requirements for its detector type (Except IR).

H. Low Frequency Sounder Base

1. Low frequency sounder base shall be listed to UL 268 and UL 464. The low frequency sounder shall have an option to switch between a temporal three-pattern, temporal four pattern, non-temporal (continuous) or march time pattern.
2. The low frequency sounder base shall offer two volume levels. The alarm current shall not exceed 140 mA at 16 VDC and operate between 10% and 93% relative humidity.
3. The low frequency sounder base shall have the ability to synchronize with notification devices without the use of added accessories. A manual locking feature shall be available to prevent removal of the attached sensor head.

I. Intelligent Duct Smoke Detector

1. The smoke detector housing shall accommodate intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACU, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

J. Addressable Control Module

1. Addressable control modules shall provide supervised monitoring of wiring to load devices that require an external power supply to operate, such as horns, strobes, or bells. It shall be capable of Class B (Style Y) and Class A (Style Z) supervision. Upon command from the control panel, the control module shall be able to disconnect the supervision and connect the external power supply across the load device. The disconnection of the supervision shall provide verification to the panel that the control relay state changed. The external power supply shall always be relay isolated from the communication loop. The control module shall transmit full analog measurement of the

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supervised wiring back to the panel and can be used to detect impedance changes or other special test functions.

2. The modules shall provide address-setting means on the module using rotary switches. Because of the possibility of installation error, systems that use binary jumpers or DIP switches to set the module address are not acceptable. The modules shall also store an internal identifying code that the control panel shall use to identify the type of detector. Systems that require a special programmer to set the module address (including temporary connection at the panel) are labor intensive and not acceptable. Each module occupies any one-off at least 99 possible addresses on the signaling line circuit (SLC) loop. It responds to regular polls from the system and reports its type and status. The module shall have an LED that is controlled by the panel to indicate module status. Coded signals, transmitted from the panel, can cause the LED to blink, latch on, or latch off. Refer to the control panel technical documentation for module LED status operation.
3. The module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, surface mounted backbox listed, or compatible duct smoke detector housing. The notification appliance circuit (NAC) shall wire in a Class B (Style Y) or Class A (Style Z) fashion. Each control module shall support up to 1 amp of inductive or 2 amps of resistive audible/visual signals. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply. The module shall use SEMS screws for easy wiring. Wiring terminals shall be easily accessible for troubleshooting while installed.

K. Addressable Relay Module

1. Addressable relay modules shall allow a compatible control panel to switch discrete contacts by code command. The relay module shall provide two isolated sets of Form-C contacts, which operate as a double pole double throw switch. The module shall allow the control panel to switch these contacts on command. The module shall not provide supervision for the notification appliance circuit (NAC). Module shall have both normally open and normally closed connections available for field wiring.
2. The modules shall provide address-setting means on the module using rotary switches. Because of the possibility of installation error, systems that use binary jumpers or dipswitches to set the module address are not acceptable. The modules shall also store an internal identifying code that the control panel shall use to identify the type of module. Systems that require a special programmer to set the module address (including temporary connection at the panel) are labor intensive and not acceptable. Each module occupies any one of at least 99 possible addresses on the SLC loop. It responds to regular polls from the system and reports its type and status. The module shall have an LED that is controlled by the panel to indicate module status. Coded signals, transmitted from the panel, can cause the LED to blink, latch on, or latch off.

3. The module shall mount in a standard 4-inch square, 2-1/8" deep electrical box or to a surface mounted backbox. The relay module contact ratings shall support up to 1 amp/30 VDC of inductive load or 2 amps/30VDC (coded) of resistive load (up to 3 amps in non- coded applications). The relay coil shall be magnetically latched to minimize wiring connection requirements and to ensure that 100% of all auxiliary relays may be energized simultaneously on the same pair of wires. The module will use SEMS screws for easy wiring. Wiring terminals shall be easily accessible for troubleshooting while installed.

L. Addressable Releasing Control Module

1. An addressable Flash-Scan releasing module shall be available to supervise and control compatible releasing agent solenoids.
2. The module shall operate on a redundant protocol for added protection.
3. The module shall be configurable for Class <A or B> and support one 24 volt or two 12-volt solenoids.

M. Isolator Module

1. Isolator modules shall automatically isolate wire-to-wire short circuits on a signaling line circuit (SLC) loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section of the SLC loop.
3. The isolator module shall not require any address-setting, and its operations shall be fully automatic. It shall not be necessary to replace or reset an isolator module after its normal operation. The module shall have an LED that is controlled by the panel to indicate module status.
4. Coded signals, transmitted from the panel, can cause the LED to blink, latch on, or latch off. Refer to the control panel technical documentation for module LED status operation.
5. The module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, in a surface mounted backbox, or in the Fire Alarm Control Unit. The module shall use SEMS screws for easy wiring. Wiring terminals shall be easily accessible for troubleshooting while installed.
6. Meets Agency Standards:
 - ANSI/ UL 864- Control Units and Accessories for Fire Alarm Systems
 - ULC S527- Control Units for Fire Alarm Systems
 - FM- ANSI/NFPA 72- National Fire Alarm Code.

N. Serially Connected Annunciator Requirements

1. The annunciator shall communicate to the Fire Alarm Control Unit via an EIA 485 (multidrop) two-wire communications loop. The system shall support two 6,000 ft. EIA-485 wire runs. Up to 32 annunciators, each configured up to 96 points, may be

- connected to the connection, for a system capacity of 3,072 points of annunciation.
2. An EIA-485 repeater shall be available to extend the EIA-485 wire distance in 3,000 ft. increments. An optional version shall allow the EIA-485 circuit to be transmitted over Fiber optics. The repeater shall be UL864 approved.
 3. Each annunciator shall provide up to 96 alarm and 97 trouble indications using a long-life programmable color LED's. Up to 96 control switches shall also be available for the control of Fire Alarm Control Unit functions. The annunciator will also have an "ONLINE" LED, local piezo sounder, local acknowledge and lamp test switch, and custom zone/function identification labels.
 4. The annunciator may be field configured to operate as a "Fan Control Annunciator". When configured as "Fan Control," the annunciator may be used to manually control fan or damper operation and can be set to override automatic commands to all fans/dampers programmed to the annunciator.
 5. Annunciator switches may be programmed for System control such as, Global Acknowledge, Global Signal Silence, Global System Reset, and on/off control of any control point in the system.
 6. An optional module shall be available to utilize annunciator points to drive EIA-485 driven relays. This shall extend the system point capacity by 3,072 remote contacts.
 7. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

2.9 BATTERIES AND EXTERNAL CHARGER

A. Battery

- a Shall be 12-volt, Gel-Cell type.
- b Battery shall have sufficient capacity to power the fire alarm system for not less than <24/twenty-four> hours plus <15/fifteen> minutes of alarm upon a normal AC power failure.
- c The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

B. External Battery Charger

1. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 120/240-volt 50/60 hertz source.
2. Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.
3. Shall have protection to prevent discharge through the charger.
4. Shall have protection for overloads and short circuits on both AC and DC sides.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the OEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
- B. All conduit, junction boxes, conduit supports, and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- D. Manual Pull Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

3.2 TYPICAL OPERATION

- A. Actuation of any manual station, smoke detector heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:
 - 1. Activate all programmed speaker circuits.
 - 2. Actuate all strobe units until the panel is reset.
 - 3. Light the associated indicators corresponding to active speaker circuits.
 - 4. Release all magnetic door holders to doors to adjacent zones on the floor from that the alarm was initiated.
 - 5. Return all elevators to the primary or alternate floor of egress.
 - 6. A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
 - 7. Smoke detectors in the elevator machine room or top of hoist-way shall return all elevators in to the <primary/ alternate> floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.
 - 8. Duct type smoke detectors shall, in addition to the above functions shut down the ventilation system or close associated control dampers as appropriate.
 - 9. Activation of any sprinkler system low pressure switch or valve tamper switch shall cause a system supervisory alarm indication.

3.3 TEST AND INSPECTION REPORT

- A. Only a factory-authorized service representative trained shall be allowed to test and inspect components, assemblies, and equipment installations, including connections.
- B. All test and inspection shall be completed by using the CLSS platform.

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C. Perform the following tests and inspections via the mobile app:

1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Documentation" chapter in NFPA 72.
 - b. Comply with the "Visual Inspection" table in the "Inspection" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. Verification shall take place carrying out an automated self-testing process (without need of manual intervention or a smoke/ heat pole). The detectors shall be able to carry out the following;
 - a. Functional test on heat or smoke
 - b. Smoke entry test for smoke alarms
 - c. Determine that the dust cover is in place during construction.
 - d. Determine that the dust cover has been removed when the building becomes ready for occupation.
 - e. Provide an automated summary report of above points.
3. The system will register real events from all initiating devices not in test mode after each test. Upon an alarm condition during the self-test process the system will be overwritten and initiate an alarm at the FACU.
4. System Testing: Comply with the "Testing" table in the "Testing" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72.
5. During inspection the software shall automatically comply and generate "Fire Alarm System Record of Completion" in the "Documentation" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing, and Maintenance" chapter in NFPA 72.

- D. Annual Test and Inspection: One year after date of Substantial Completion, test fire alarm system complying with visual and testing inspection requirements in NFPA 72. A report shall be automatically be generated from the mobile app upon completion and provide to applicable parties.

3.4 SYSTEM TEST

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.
- B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

- C. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACU.
- D. Open initiating device circuits and verify that the trouble signal actuates.
- E. Open signaling line circuits and verify that the trouble signal actuates.
- F. Open and short notification appliance circuits and verify that trouble signal actuates.
- G. Ground initiating & Signaling device circuits and verify response of trouble signals.
- H. Ground notification appliance circuits and verify response of trouble signals.
- I. Check presence and audibility of tone at all alarm notification devices.
- J. Check installation, supervision, & operation of intelligent smoke detectors during a walk test.
- K. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACU and the correct activation of the control points.
- L. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

3.5 FINAL INSPECTION

At the final inspection a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

3.6 INSTRUCTION

- A. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- B. The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

END OF SECTION

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Clear and grub the site as shown on the Drawings and specified in this Section.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 31 2000: Earthwork.
 - 3. Section 02 4100: Selective demolition.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
- C. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.
 - 4. Barricade and post or backfill all open trenches outside of fenced areas when not on job site.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.3 CLEARING

- A. Prior to earthwork operations, strip entire site of vegetation, organic topsoil. Clear surface and subsurface obstructions and miscellaneous debris from the proposed building, exterior concrete, and paving areas.
 - 1. Stripping: Approximately 2 to 4 inches deep, or until organics in excess of 3 percent by volume are removed. The actual depth of stripping will be reviewed by the responsible inspecting Geotechnical Engineer.
- B. Clear organic matter, vegetation, rubbish, debris, and loose soil deposits from the banks and bottoms of the irrigation canal and ditch.

3.4 CONSERVATION OF TOPSOIL

- A. Stockpile the stripped organic topsoil in an area clear of new construction in order to provide topsoil for areas shown on the Drawings to be turfed or planted, and to fill planters, without contamination with subsoils.
- B. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.
 - 1. Maintain stockpile free from debris and trash.
 - 2. Keep the topsoil damp to prevent dust and drying out.

3.5 DISPOSAL

- A. Remove brush, grass, roots, trash, and other material from clearing operations. Dispose of away from the site in a legal manner.
- B. Do not store or permit debris to accumulate on the job site.
- C. Dispose of any excess topsoil after fine grading has been accepted by the Architect.
- D. Do not burn debris at the site.
- E. Excavated Soils and Land Clearing Debris: 100% of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled, except for reuse, either on site or off site of vegetation or soil contaminated by disease or pest infestation.
 - 1. Refer to Section 01 7425.

3.6 UTILITIES

- A. Coordinate with utility companies and agencies as required. See Section 02 3100.
- B. Where utility cutting, capping, or plugging is required, perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

END OF SECTION 31 1000

SECTION 31 2000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. In accordance with pertinent provisions of this Section, trench, excavate, fill, backfill, compact, and grade the site to the elevations shown on the Drawings and as needed to meet the requirements of the construction shown in the Contract Documents.
- B. The work of this Section includes, but is not limited to, the following:
 - 1. Preparation of sub-grade for buildings, walks, pavements, and landscaping.
 - 2. Site grading, cut, fill, and finish, off-haul or import of soil necessary to meet finish grades indicated on the Drawings.
 - 3. Excavation, backfill and compaction for filling construction and trenches.
- C. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Section 00 3100: Geotechnical data.
 - 3. Section 01 4520: Testing and inspection requirements.
 - 4. Section 01 5725: Storm Water Pollution Protection Plan.
 - 5. Section 01 7120: Field engineering.
 - 6. Section 22 0000: Excavation and backfill for plumbing work.
 - 7. Section 26 6000: Excavation and backfill for electrical work.
 - 8. Section 31 1000: Site clearing, removal and storage of top soil.
 - 9. Section 31 3115: Termite control.

1.2 QUALITY ASSURANCE

- A. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- B. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the geotechnical engineer.
- C. Verify all grade and trench elevations as specified in Section 01 7120.
- D. All improvements within property owned by a City, County or State Entity shall be in accordance with the Standard Specifications of the authority having jurisdiction.

1.3 TRENCHING AND EXCAVATION SAFETY

- A. All trenches and excavation in excess of 4'-0" in depth and areas of visibly unstable soils shall be shored or otherwise stabilized in conformance with current local or state codes, ordinances and requirements. In addition, the Contractor shall notify the Owner of suspected hazardous waste or other unusual physical conditions as provided by law.
- B. All open trenches and excavations outside the fenced construction area shall be properly barricaded for public and worker safety. Trenches shall be adequately covered or backfilled prior to ceasing work or leaving the work site.

- C. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations, (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

1.4 EXISTING UTILITIES

- A. Field verify the location of all existing underground utilities prior to beginning any earthwork. Work around and protect all existing utilities during the course of the Work. Raise or lower each existing utility box flush with new finish surface.
- B. Where existing utilities are indicated on the drawings, extreme care shall be exercised in excavating near these utilities to avoid damage, and the Contractor will be held responsible for any damage caused by construction operations.
- C. Should utilities not indicated on the drawings be found during construction, the Contractor shall promptly notify the Architect for instructions as to further action. Failure to do so will make the Contractor liable for any damage arising from construction operations after discovery of these utilities.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 SOIL MATERIALS

- A. Fill and Backfill Materials: Fill shall consist of select material. Non-Expansive Native soil, free from organic matter and rocks or cobbles larger than 4", may be used as fill at the site as follows:
 - 1. Satisfactory Soil Materials: Are defined as those complying with ASTM D2487 Soil Classification Groups GW, GP, GM, SM, SW, and SP.
 - 2. Unsatisfactory Soil Materials: are defined as those complying with ASTM D2487 Soil Classification Groups GC, SC, MH, ML, CL, CH, OL, OH, and PT.
- B. Import Material: Import material, if required, shall consist of homogenous, non-corrosive, non-expansive, inorganic granular soils free of toxic materials and conforming to the following criteria:
 - 1. Gradation:
 - a. 3" Sieve: 100% passing
 - b. 3/4" Sieve: 80-100% passing
 - c. No. 4 Sieve: 60-100% passing
 - d. No. 200 Sieve: 20-50% passing
 - 2. Plasticity Index, ASTM D4318:
 - a. Liquid limit: < 25
 - b. Plasticity index: < 10
 - 3. Expansion Index: < 15
 - 4. Organic Content: < 3% by dry weight.
 - 5. Minimum "R" Value (pavement area): 40
 - 6. Corrosivity:
 - a. pH: 6 to 8
 - b. Minimum resistivity (ohm-cm): > 2,000
 - c. Soluble sulfate (ppm): < 2,000

- d. Soluble chloride (ppm): < 500
- 7. Import fill material shall be approved by the geotechnical engineer prior to transport to the site and provided at no additional cost to the Owner.
- C. Engineered Fill Materials:
 - 1. Satisfactory Soil Materials as defined in paragraph 2.2.A.1 above, or
 - 2. Import Material defined in 2.2.B above.
- D. Sand for Utility Bedding: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
- E. Toxic Testing of Import Fill Material:
 - 1. The Contractor shall notify the Owner, Architect, and Testing Laboratory for the project, of the location and origin of all fill material intended for this project. Such notification shall be not less than 21 days prior to transport of the material.
 - 2. Both native and stockpile soils shall be subject to testing to determine suitability of the soil as related to toxic substances on school sites.
 - 3. The Owner will pay for only one passing test from one import source. Additional tests, and retests of failed material shall be paid by the Contractor.
 - 4. Should testing indicate toxic substances at levels above those acceptable on school sites by the State of California, Department of Toxic Substance Control (DTSC), the subject soil will not be permitted on the proposed school site.
 - 5. Any delay caused by materials found not to be compliant, shall not be accepted as justification for contract time extension or related claims.

2.3 TOPSOIL

- A. Topsoil:
 - 1. Friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoils, roots, heavy or stiff clay, stones and gravel, noxious weeds, sticks, brush, litter, and other deleterious matter.
 - 2. Provide from stockpile developed on site as specified in Section 31 1000.

2.4 ACCESSORY MATERIALS

- A. Utility Identification Tape: 2" wide metallic plastic material inscribed with caution message related to the buried utility below (i.e., **ELECTRICAL LINE BURIED BELOW, SEWER LINE BURIED BELOW**, etc.) by McMaster-Carr or approved equal.
- B. Provide a dry, free-flowing, dust-free chemical compound, soluble in water, capable of inhibiting growth of vegetation, and approved for use on this Work by governmental agencies having jurisdiction.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINISH ELEVATIONS AND LINES

- A. Comply with pertinent provisions of this Section, Section 01 7120, and the Grading Plan.

3.3 DEWATERING AND WATER CONTROL

A. Water Control:

1. Establish and construct storm drainage features at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils.
2. Completely drain construction site during periods of construction to keep soil materials sufficiently dry.
3. Temporary excavations for the project construction should be left open only for as short a time as possible and should be protected from water runoff.

B. Dewatering:

1. Remove all water, including rain water, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
2. Keep excavations and site construction area free from water.
3. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
4. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.
5. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from open excavations, unfinished fills, or other low areas to prevent softening of exposed surfaces.
6. Dispose of water away from the work in a suitable manner without damage to adjacent property or menace to public health.
7. Protect existing storm drain system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the Owner.

- C. Unsuitable Soil Support: When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified.

3.4 DUST CONTROL

- A. The San Joaquin Valley Air Pollution Control District regulates all dust control and emission standards throughout the Central Valley. Regulation VIII – Fugitive PM10 Prohibitions requires that a Dust Control Plan be completed for a large majority of construction projects.
- B. This project is less than 5.0 acres, thus a Dust Control Plan is not required.
- C. A Construction Notification form shall be submitted to the San Joaquin Valley Air Pollution Control District at least 48 hours prior to commencing any earthmoving activities. A copy of the Construction Notification form is provided at the end of this section.
- D. Whether a Dust Control Plan is required for the project or not, the Contractor shall be responsible for complying with the requirements of Rule 8021.

3.5 PROCEDURES

- A. Utilities:

1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
 2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Architect and secure his instructions.
 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Utility Company.
- B. Protection of Persons and Property:
1. Barricade open holes and depressions occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
- C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- D. Maintain access to adjacent areas at all times.

3.6 BORING

- A. Provide mechanical boring equipment to bore under existing asphalt, concrete, or other surfaces or objects as noted on the drawings. All borings shall be a minimum of 24" under the substrate material unless otherwise authorized by the Architect.
- B. Holes shall be bored not to exceed 1" larger diameter than the largest component remaining in the excavation.
- C. **Water or air pressure jetting** are not permitted, unless they comply with the following requirements.
1. All surfaces of the hole can be visually inspected with 6' maximum length and,
 2. All objects shall be supported continuously to prevent sagging and,
 3. The hole shall be filled with compacted damp sand and inspected by the Project Inspector or Materials Testing Lab technician.
- D. Comply with requirements of Section 01 7330.

3.7 SITE PREPARATION

- A. Over-excavation and Preparation at Buildings:
1. After clearing and 1' minimum of fill removal, excavate exposed native soils to a depth of 3'-0" min. below exposed ground surface.
 2. At a minimum, include entire building areas, and extend at least 5'-0" beyond exterior footing line, including 5'-0" beyond exterior column footing edges.
 3. Remove roots and other vegetation remaining in excavated area which are larger than ½" in diameter.
 4. Prior to any backfill placement, the bottom of the excavation shall be proofrolled and observed by the project Geotechnical Engineer to verify stability. Soft or pliant areas encountered shall be excavated to firm native ground.
 5. Scarify bottom of excavation to minimum depth of 6".
 6. Bring moisture conditions to a minimum of 2 percent above optimum moisture content and compact excavated area to a minimum of 90% of maximum dry density; ASTM D1557.

7. Place engineered fill materials required to establish finish grade in lifts no greater than 6" loose depth and compact to a minimum of 90% of maximum dry density; ASTM D1557. The upper 24 inches of subgrade supporting proposed building shall consist of 24 inches of engineered fill. Additionally, the upper 18 inches of building pad subgrade shall consist of Non-expansive Fills (Expansion Index Less than 15).
- B. Over-excavation and Preparation at Asphalt Pavement and Concrete Flatwork areas:
 1. After clearing and 1' min. of fill removal, excavate exposed native soils to a depth of 1'-0" min. below exposed ground surface.
 2. At a minimum, include entire hardscape areas, and extend at least 2'-0" min. beyond edge of pavement and concrete surfaces.
 3. Remove roots and other vegetation remaining in excavated area which are larger than ½" in diameter.
 4. Prior to any backfill placement, the bottom of the excavation shall be proofrolled and observed by the project Geotechnical Engineer to verify stability. Soft or pliant areas encountered shall be excavated to firm native ground.
 5. Scarify bottom of excavation to minimum depth of 6".
 6. Bring moisture conditions to near optimum moisture content and compact excavated area to a minimum of 90% of maximum dry density; ASTM D1557.
 7. Place engineered fill materials required to establish finish grade in lifts no greater than 6" loose depth and compact to a minimum of 90% of maximum dry density; ASTM D1557. The upper 18 inches of pavement and flatwork subgrade shall consist of Non-expansive Fills (Expansion Index Less than 15).
 8. Compact the top 12" of subgrade in Pavement areas to a minimum of 95% of maximum dry density; ASTM D1557.
- C. Root Removal at Trees:
 1. Completely remove root systems to a minimum depth of 24" below the bottom of the lowest structure or footing or 36" below finished subgrade, whichever is lower.
 2. Excavate root systems deeper than the elevation indicated above to allow no roots larger than 2" in diameter.
 3. Treat roots remaining in the soil with a weed killer approved by the State of California for that purpose.
 4. Backfill cavities resulting from root removal with earth materials placed and compacted as required by this Section.

3.8 EXCAVATION

- A. Perform excavation of every type of material encountered within the limits of the Work to the lines, grades, and elevations indicated and specified herein.
- B. Earth excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
- C. Rock excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cubic yard (heaped) capacity, 42" wide bucket on a track-mounted power excavator equivalent to Caterpillar Model 215, rated at not less than 90 HP flywheel power and 30,000 lb. drawbar pull. Trenches in excess of 10'-0" in width and pits in excess of 30'-0" in either length or width are classified as open excavation.
- D. Surplus Materials: Dispose of unsatisfactory excavated materials, and surplus satisfactory excavated material, away from the site at disposal areas arranged and paid for by the Contractor.
- E. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect who will make an inspection of conditions. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect/Engineer. Removal of

unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

- F. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.
- G. Unauthorized Excavation:
 - 1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Architect or the geotechnical engineer.
 - 2. Under footings, foundations, or retaining walls:
 - a. Fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
 - b. When acceptable to the geotechnical engineer, lean concrete (minimum 2000 psi) may be used to bring bottom elevations to proper position.
 - 3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the geotechnical engineer.
- H. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
- I. Stability of Excavations:
 - 1. Slope sides of excavation to comply with local codes and ordinances having jurisdiction.
 - 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
 - 3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- J. Shoring and Bracing:
 - 1. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
 - 2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
 - 3. Carry shoring and bracing down as excavation progresses.
- K. Use of Explosives: **NOT PERMITTED.**

3.9 FILLING AND BACKFILLING

- A. Backfill excavations as promptly as progress of the Work permits, but not until:
 - 1. Acceptance of construction below finish grade:
 - 2. Inspecting, testing, approving, and recording locations of underground utilities;
 - 3. Concrete formwork is removed;
 - 4. Shoring and bracing are removed, and voids have been backfilled with satisfactory materials;
 - 5. Trash and debris have been removed; and
 - 6. Horizontal bracing is in place on horizontally supported walls.
- B. Placing and Compaction:
 - 1. Place backfill and fill materials in layers not more than 8" in loose depth.
 - 2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
 - 3. Compact each layer to required percentage of maximum density for the area.
- C. Moisture Content:
 - 1. When the moisture content of fill material is below the lower limit specified by the Geotechnical Engineer, add water until the moisture content is as specified.
 - 2. When the moisture content of fill material is above the upper limit specified, the material shall be aerated by blading or other satisfactory methods until the moisture content is as specified.

3. Do not place, spread, or compact fill while it is frozen or thawing or during unfavorable weather conditions. When work is interrupted by weather conditions, do not resume fill operations until moisture content and density of previously placed fill are satisfactory.
4. Where soil has been softened or eroded by flooding, by placement during unfavorable weather, remove damaged areas and recompact as described for fill and compaction.
5. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
6. Where subgrade is spongy or pumping due to conditions beyond the Contractor's control, and aeration or other methods do not bring moisture content within specified levels, stop work and contact the Architect and Geotechnical Engineer for further direction.

3.10 TOPSOIL

- A. Place topsoil to the following compacted thicknesses:
 1. Areas to be seeded: 6"
 2. Areas to be sodded: 4"
 3. Shrub beds: 18"
 4. Flower beds: 12"
- B. Topsoil Placement:
 1. Where topsoil is to be placed, scarify surface to depth of 6".
 2. Place topsoil during dry weather.
 3. Remove roots, weeds, rocks, and foreign material while spreading.
 4. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
 5. Roll placed topsoil.

3.11 TRENCHING

- A. Trenching:
 1. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
 2. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
 3. Do not interfere with 45 degree bearing splay of foundations.
 4. Cut trenches wide enough to allow inspection of installed utilities.
 5. Hand trim excavations. Remove loose matter.
 6. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
 7. Remove lumped subsoil, boulders, and rock up to 1.0 cu yd measured by volume.
 8. Remove excavated material that is unsuitable for re-use from site.
 9. Stockpile excavated material to be re-used in area designated on site in accordance with this Section 31 2000.
 10. Remove excess excavated material from site.
- B. Preparation for Utility Placement:
 1. Cut out soft areas of subgrade not capable of compaction in place. Backfill with engineered fill.
 2. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
 3. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.
- C. Backfilling:
 1. Backfill to contours and elevations indicated using unfrozen materials.
 2. Employ a placement method that does not disturb or damage other work.
 3. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
 4. Maintain optimum moisture content of fill materials to attain required compaction density.

5. Slope grade away from building. Make gradual grade changes. Blend slope into level areas.
 6. Correct areas that are over-excavated.
 7. Reshape and re-compact fills subjected to vehicular traffic.
- D. Utility Installation: Install underground utilities according to the manufacturer's written recommendations. In addition to the manufacturer's recommendations, install underground utilities as follows:
1. Underground Utility Line Cover: No less than 12".
 2. Bedding: Minimum of 6" compacted sand bedding under the pipe or conduit.
 3. Envelope: Compacted sand extending 6" above and around the pipe or conduit.
 4. Backfill Material: Remaining backfill material may consist of native soil or engineered fill material as described above.
 5. Place and compact utility trench backfill in accordance with the requirements for engineered fill.
- E. Utility Identification:
1. Utility Identification Tape: 2" wide metallic plastic material inscribed with a CAUTION message related to the buried utility.
 2. Identify each utility pipe or conduit by the use of a continuous underground warning tape.
 3. Locate tape 12" directly above the pipe or conduit, but not more than 12" below or not less than 6" below the finished grade.
 - a. Where the top of the pipe or conduit exceeds 4'-0" below finish surface, locate one tape 12" directly above the pipe or conduit and one tape not less than 6" below the finished grade.
 4. Provide one strip of identification tape for each 18" of trench width, horizontally.

3.12 GRADING

- A. General: Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas. Smooth the finished surfaces within specified tolerance.
- B. Finish Grading Outside Building Lines:
1. Grade areas adjacent to buildings to achieve drainage away from the structures, and to prevent ponding.
 2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade, and cross-section, with finished surface not more than 0.10 foot above or below the required subgrade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross-section, with finished surface not more than 0.10 feet above or below the required subgrade elevation.
 - c. Shape finish grade adjacent to building to slope a minimum of 2% away from the exterior footings and wall, for a distance of 5'-0".

3.13 COMPACTION

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557.
- B. Moisture Control: Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
- C. Densities: Provide not less than the following maximum density of soil material compacted at each layer of soil material in place, and as approved by the geotechnical engineer.
1. **Buildings, Asphalt Paving and Site Concrete:** As specified in paragraph 3.7.
 2. **Lawn and unpaved areas:** Compact the top 6" of subgrade and each layer of fill material or backfill material at 85% of maximum density;

3. **Trenches:** Provide a minimum of 6" of compacted sand bedding under pipe or conduit, and provide envelope extending 12" above pipe or conduit. Compact remaining backfill to 90% of maximum density except the upper 24" of those trenches located within structures, walks, and pavement areas which shall be compacted as specified in section 3.7.

3.15 FIELD QUALITY CONTROL

- A. Secure the Geotechnical Engineer's inspection and approval of subgrades and fill layers before subsequent construction is permitted thereon.
- B. The Owner's testing laboratory will provide at least the following tests:
 1. At paved areas, at least 1 field density/moisture test for every 10,000 sq. ft. of paved area, but not less than 3 tests.
 2. In each compacted underlying fill layer, 1 field density/moisture test for every 7,500 sq. ft. of overlaying paved area, but not less than 3 tests.
 3. In building areas, at least 1 field density/moisture test for every 2,000 sq. ft. of building coverage.
 4. At least 1 field density/moisture test per every 200 lineal foot of trench over 3'-0" of trench depth.
- C. If, in the Geotechnical Engineer's opinion based on reports of the testing laboratory, subgrade or fills which have been placed are below specified density, provide additional compacting and testing under the provisions of Section 01 4520 of these Specifications.

END OF SECTION 31 2000

San Joaquin Valley Air Pollution Control District Regulation VIII – Fugitive PM10 Prohibitions

Construction Notification

Pursuant to section 6.4 of **District Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities**, the owner or operator of a construction project of at least 1.0 acre in size shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities. Use the first two pages of this form to submit a written Construction Notification. There are no fees for filing a construction notification.

Larger construction projects, as outlined below, may be required to submit a full Dust Control Plan. If a Dust Control Plan is required the owner/operator does not need to submit a separate construction notification.

Dust Control Plan

Pursuant to section 6.3 of **Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities**, the owner or operator shall submit a Dust Control Plan to the District for a construction project that will involve any of the following:

- Residential developments that will include ten acres or more of disturbed surface area, or
- Non-residential developments that will include five acres or more of disturbed surface area, or
- Will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days of the project.

A Dust Control Plan identifies the fugitive dust sources at the construction site and describes all of the dust control measures to be implemented before, during, and after any dust generating activity for the duration of the project. The District will review and approve, conditionally approve, or disapprove the Dust Control Plan within 30 days of submittal. **Construction activities shall not commence until the Dust Control Plan has been approved or conditionally approved by the District.** A copy of the approved Dust Control Plan must be retained at the project site and made available upon request by a District inspector.

At least one key individual representing the owner or operator, or any person who prepares a Dust Control Plan must complete a Dust Control Training Course presented by the District. Please contact the District to find out when courses are being offered.

Pursuant to **District Rule 3135 – Dust Control Plan Fee**, payment must accompany each Dust Control Plan submitted to the District. A separate fee is charged for any major modification made to an approved plan, such as modifying the size and scope of the project or making significant changes to the types of control or preventative measures. No fees are charged for administrative changes to an approved plan.

Regardless of whether a Construction Notification or Dust Control Plan is required, the owner or operator of any construction project shall comply with all other applicable requirements of Regulation VIII, and other District Rules.

Construction Notifications and Dust Control Plans should be submitted to the District's Compliance Division at:

<i>San Joaquin, Stanislaus, Merced Counties</i>	<i>Madera, Fresno, Kings Counties</i>	<i>Tulare, Kern Counties</i>
Northern Region Office 4800 Enterprise Way Modesto, CA 95356 (209) 557-6400 Fax: (209) 557-6475	Central Region Office 1990 East Gettysburg Avenue Fresno, CA 93726 (559) 230-5950 Fax: (559) 230-6062	Southern Region Office 34946 Flyover Court Bakersfield, CA 93308 (661) 392-5500 Fax: (661) 392-5585

Section 1 – General Information – Page 1

☐ **Construction Notification** (Complete section 1)

☐ **Dust Control Plan** (Complete sections 1-7)

Date Received:
(For District Use)

1-A Project Name and Location

Project Name: _____

Project Address: _____

Major X-Streets: _____

City: _____ County: _____

GPS Coordinate(s): _____

Expected Construction Start Date: _____ End Date: _____

1-B Project Details

This project is: ☐ Residential ☐ Non-Residential (commercial, industrial, institutional, public, etc.)

Total project site area: _____ Acres

Total disturbed surface area: _____ Acres

Total disturbed areas that will be left inactive for more than seven days: _____ Acres

Maximum daily volume of earthmoving: _____ Cubic Yards

Average daily volume of earthmoving: _____ Cubic Yards

1-C Provide a brief description of the project's operations.

1-D Indirect Source Review (ISR) (Rule 9510)

Air impact Assessment (AIA) application submitted to the District? ☐ Yes ☐ No

If yes, ISR Project ID #: _____

For more information regarding ISR, please visit www.valleyair.org/ISR/ISRHome.htm or contact the District's Technical Services team at (559) 230-6000.

Section 1 – General Information – Page 2

Project Name: _____

1-E Contacts

Property Owner: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Mobile: _____ Email: _____

Developer: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Person: _____

Phone: _____ Fax: _____

Mobile: _____ Email: _____

General Contractor: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Person: _____

Phone: _____ Fax: _____

Mobile: _____ Email: _____

Other Contact: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Mobile: _____ Email: _____

STOP HERE FOR CONSTRUCTION NOTIFICATION ONLY

Section 2 – Dust Control Plan Implementation – Page 1

Project Name: _____

2-A This Dust Control Plan was prepared by:

Name: _____ Title: _____
Company Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Mobile: _____ Email: _____

Date training completed: _____ ☐ Copy of course certificate attached.

2-B Contractors

Provide the names, addresses, and phone numbers of the contractors involved in dust generating activities **or** performing dust control as part of this project (Rule 8021 Sec. 6.3.6.1). A supplemental list may be attached.

1. _____

2. _____

3. _____

4. _____

2-C Who will have the primary responsibility for implementing this Dust Control Plan? (Rule 8021 Sec 6.3.6.1)

☐ Property Owner ☐ Developer ☐ General / Prime Contractor
☐ Sub-Contractor(s) ☐ Other: _____
Primary Project Contact: _____
Title: _____
Company Name: _____
Address: _____
City: _____ State: _____ Zip: _____
On-Site Phone: _____ Fax: _____
Mobile: _____ Email: _____
Date training completed: _____ ☐ Attach a copy of the course certificate

Section 2 – Dust Control Plan Implementation – Page 2

Project Name: _____

2-D Dust Generating Activity Dates

The expected start and completion dates of **dust generating activities and soil disturbance activities** to be performed on site. For phased projects, it may be necessary to report expected start and completion dates separately. (Rule 8021 Sec. 6.3.6.4)

Expected start date: _____ Completion Date: _____

Phase Project Start – A: _____ Completion – A: _____

Phase Project Start – B: _____ Completion – B: _____

Phase Project Start – C: _____ Completion – C: _____

2-E Other Locations

Identify whether any other locations should be included with this plan that are involved with this project. An example may include listing any site where bulk materials will be imported from or exported to. This does not need to include quarries or retailers of building materials. (Rule 8021 Sec. 6.3.2)

☐ No other locations are included with this project.

Location 1: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 2: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Location 3: _____

☐ No Dust Control Plan Required ☐ Included with this plan ☐ Included with another plan

Section 3 – Fugitive PM10 Sources – Page 1

Project Name: _____

3-A Sources of Fugitive Dust

This section describes the minimum requirements for limiting visible dust emissions from activities that cause fugitive dust emissions. (Rule 8021 Sec. 6.3.6.5) **Check at least one box under each category.**

Structural Demolition. (Rule 8021 Sec. 5.1, 6.3.3, & 6.3.6.5)

- ☐ No demolitions are planned for this project.
- ☐ Asbestos NESHAP notification and fees will be submitted to the District. (Rule 3050 and Rule 4002)
Water will be applied to the following areas for the duration of the demolition activities:
 - Building exterior surfaces;
 - Unpaved surface areas where equipment will operate;
 - Razed building materials; and
 - Water or dust suppressants will be applied to unpaved surface areas within 100 feet of structure during demolition.

Pre-Activity (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C).
- ☐ The site will be pre-watered and work will be phased to reduce the amount of disturbed surface area at any one time (Complete Section 4-A).

Active Operations (Rule 8021 Sec. 5.2)

- ☐ Water will be applied to dry areas during leveling, grading, trenching, and earthmoving activities (Complete Section 4-A).
- ☐ Wind barriers will be constructed and maintained, and water or dust suppressants will be applied to the disturbed surface areas (Complete Sections 4-A or 4-B, and 4-C).

Inactive Operations, Including After Work Hours, Weekends, and Holidays (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C).
- ☐ Water or dust suppressants will be applied on disturbed surface areas to form a visible crust, and vehicle access will be restricted to maintain the visible crust. (Complete Section 4-A or 4-B, and 4-C)

Temporary stabilization of areas that remain unused for seven or more days (Rule 8021 Sec. 5.2)

- ☐ Not applicable for this project (Please explain why in Section 3-C)
- ☐ Vehicular access will be restricted and water or dust suppressants will be applied and maintained at all un-vegetated areas (Complete Section 4-A or 4-B, and 4-C).
- ☐ Vegetation will be established on all previously disturbed areas (Complete Section 4-C).
- ☐ Gravel will be applied and maintained at all previously disturbed areas (Complete Section 4-C).
- ☐ Previously disturbed areas will be paved (Complete Section 4-C).

Unpaved Access and Haul Roads, Traffic and Equipment Storage Areas (Rule 8021 Sec. 5.2 and 5.3)

- ☐ Not applicable for this project (Please explain why in Section 3-C)
- ☐ Apply water or dust suppressants to unpaved haul and access roads (Complete Section 4-A or 4-B)
- ☐ Post speed limit signs of not more than 15 miles per hour at each entrance, and again every 500 feet. (Complete Section 4-C)
- ☐ Water or dust suppressants will be applied to vehicle traffic and equipment storage areas (Complete Section 4-A or 4-B).

Wind Events (Rule 8021 Sec. 5.4)

- ☐ Water application equipment will apply water to control fugitive dust during wind events, unless unsafe to do so. Outdoor construction activities that disturb the soil will cease whenever visible dust emissions cannot be effectively controlled.

Section 3 – Fugitive PM10 Sources – Page 2

Project Name: _____

3-B Bulk Materials (Rule 8021 Sec. 6.3.6.6 and Rule 8031)

Outdoor Handling of Bulk Materials (Rule 8031 Sec. 5.0 A)

- ☐ No bulk materials will be handled during this project.
- ☐ Water or dust suppressants will be applied when handling bulk materials.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained, and water or dust suppressants will be applied.

Outdoor Storage of Bulk Materials (Rule 8031 Sec. 5.0 B)

- ☐ No bulk materials will be stored during this project.
- ☐ Water or dust suppressants will be applied to storage piles.
- ☐ Storage piles will be covered with tarps, plastic, or other suitable material and anchored in such a manner that prevents the cover from being removed by wind action.
- ☐ Wind barriers with less than 50 percent porosity will be installed and maintained around the storage piles, and water or dust suppressants will be applied.
- ☐ A three-sided structure (< 50% porosity) will be used that is at least as high as the storage piles.

On-Site Transporting of Bulk Materials (Rule 8031 Sec. 5.0 C)

- ☐ No bulk materials will be transported on the project site.
- ☐ Vehicle speed will be limited on the work site.
- ☐ All haul trucks will be loaded such that the freeboard is not less than six inches when transported across any paved public access road.
- ☐ A sufficient amount of water will be applied to the top of the load to limit visible dust emissions.
- ☐ Haul trucks will be covered with a tarp or other suitable cover.

Off-Site Transporting of Bulk Materials (Rule 8031 Sec. 5.0 D)

- ☐ No bulk materials will be transported to or from the project site.
- ☐ Measures in section 5-B will be implemented to prevent haul trucks from becoming a source of visible emissions or carryout onto public roads. (complete Section 5-B)

Outdoor Transport using a Chute or Conveyor (Rule 8031 Sec. 5.0 E)

- ☐ No chutes or conveyors will be used.
- ☐ Chute or conveyor will be fully enclosed.
- ☐ Water spray equipment will be used to sufficiently wet the materials.
- ☐ Transported materials will be washed or screened to remove fines (PM10 or smaller).

3-C Comments

Section 4 – Dust Control Methods – Page 1

Project Name: _____

4-A Water Application

Complete this section if water application will be used as a control method for limiting visible dust emissions and stabilizing surface areas. Check and answer everything that applies to this project.

(Rule 8021 Sec. 6.3.6.6)

Water Application Equipment:

☐ Sprinklers: Describe the activities that will utilize sprinklers:

Minimum treated area: _____ ☐ Square Feet ☐ Acres

Maximum treated area: _____ ☐ Square Feet ☐ Acres

Minimum water flow rate: _____ Gallons/minute Duration: _____

☐ Water Truck, ☐ Water Trailer, ☐ Water Wagon, ☐ Other: _____

Describe the activities that will utilize this equipment:

Number of application equipment available: _____

Application equipment capacity: _____

Application frequency (on a typical dry day): _____

Application rate: ☐ 650 gallons per acre ☐ _____ gallons per acre (Greater than 650)

Hours of operation: _____ to _____ ☐ Daily ☐ Mon-Fri ☐ Other: _____

Water application equipment is available to operate after normal working hours, on weekends, and holidays.

After-hours contact: _____ Phone No.: _____

After-hours contact: _____ Phone No.: _____

Water Supply: *Include the relative locations of these sources on the plot plan in Section 6.*

☐ Fire hydrants Number of hydrants available On-Site: _____ Off-Site: _____

☐ Storage tanks Number and capacity: _____

☐ Wells Number and flow rate: _____

☐ Canal, River, Pond, Lake, etc. Describe: _____

☐ Other: _____

Approval granted by the owner or public agency to use their water source for this project.

Owner or Agency: _____

Contact: _____ Phone No.: _____

Section 4 – Dust Control Methods – Page 2

Project Name: _____

4-B Dust Suppressant Products

Complete this section if a dust suppressant product will be used. These materials include, but are not limited to: hygroscopic suppressants (road salts), adhesives, petroleum emulsions, polymer emulsions, and bituminous materials (road oils). (Rule 8021 Sec. 6.3.6.6)

Copy this page if more than one dust suppressant product will be used.

☐ **Not Applicable.** No dust suppressant products will be used. **Skip to 4-C.**

Application Area: _____

Product Name: _____

Contractor's Name: _____ Phone No: _____

Application Rate: _____ Gallons of undiluted material per ☐ mile or ☐ acre treated.

Application Frequency: _____ Applications per ☐ week, ☐ month, ☐ year

Application Equipment: _____

Number of Application Equipment Available: _____

Application Equipment Capacity: _____

Attach each of the following information that fully describes this product. Use the checklist below to make sure all information is submitted with this plan.

- ☐ Product Specifications (MSDS, Product Safety Data Sheet, etc.)
- ☐ Manufacturer's Usage Instructions (method, frequency, and intensity of application)
- ☐ Environmental impacts and approvals or certifications related to the appropriate and safe use for ground application.

Section 4 – Dust Control Methods – Page 3

Project Name: _____

4-C Other Dust Control Methods

Check below the other types of dust control methods that will be employed at the construction site.
(Rule 8021 Sec. 5.2)

- ☐ Restricting unauthorized vehicle access:
- ☐ Fences ☐ Gates ☐ Posts ☐ Berms ☐ Concrete Barriers ☐ Signs
- ☐ Other: _____
- ☐ Wind barriers Describe: _____
- ☐ Posted speed limit signs that meet State and Federal Department of Transportation standards.
(Rule 8021 Sec. 5.3)
- ☐ Posted at 15 miles per hour ☐ Posted at _____ miles per hour (less than 15 MPH)
- ☐ Re-establish vegetation for temporarily stabilizing previously disturbed surfaces.
Explain: _____
- ☐ Apply and maintain gravel:
- ☐ On haul roads ☐ On access roads ☐ At equipment storage yards
- ☐ At vehicle traffic areas ☐ For temporarily stabilizing previously disturbed areas.
Explain: _____
- ☐ Apply pavement:
Explain: _____
- ☐ Other: _____

4-D Contingencies

Contingencies to be implemented should the listed control measures fail to meet the stability and visible emission requirements. Examples include, but are not limited to: replacement equipment, additional equipment, increased water application, additional water resources, adding chemical/organic dust suppressants, restricting access, and additional staffing. Attach any additional information if needed.
(Rule 4102 and Rule 8021 Sec. 5.2)

4-E Record Keeping (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained, but only for those days when a control measure is implemented. The District has developed record keeping forms that may be used for complying with this requirement. Check one or both below:

- ☐ Records will be maintained using the forms developed by the District.
- ☐ Records will be maintained using documents or forms developed by the owner or operator.
- Explain and include copies: _____

Section 5 – Carryout and Trackout – Page 1

Project Name: _____

5-A Treatments for Preventing Trackout

Select the control devices that will be used for preventing trackout from occurring onto paved public roads. Trackout is any material that adheres to vehicle tires and is deposited onto a paved public road or the paved shoulder of a paved public road. Check one or a combination that will apply to this project.

- ☐ **Grizzly:** Rails, pipes, or grates used to dislodge debris off of vehicles before exiting the site. Extends from the intersection with the paved public road surface for the full width of the unpaved exit surface for a distance of at least 25 feet. (Rule 8041 Sec. 5.9.1)

Width: _____ Feet Length: _____ Feet

- ☐ **Gravel Pad:** A layer of washed gravel at least one (1) inch or larger in diameter, three (3) inches deep, and extends from the intersection with the public paved road surface for the full width of the unpaved exit surface for a distance of at least 50 feet. (Rule 8041 Sec. 5.9.2)

Width: _____ Feet Length: _____ Feet Depth: _____ Inches

Gravel Size: _____ Inches Clean-up Frequency: _____

- ☐ **Paved Surface:** Extends from the intersection with the paved public road surface for the full width of the unpaved access road for at least 100 feet to allow mud and dirt to drop off of vehicles before exiting the site. (Rule 8041 Sec. 5.9.3)

Width: _____ Feet Length: _____ Feet

Mud and dirt deposits accumulating on paved interior roads used for trackout control will be removed with sufficient frequency, but not less frequently than once per workday. Cleanup will commence within ½ hour of generating any carryout and trackout onto public roads. (Rule 8041 Sec. 5.8.2 and 5.9.3)

Clean-up Frequency: _____

- ☐ **Wheel Washer:** Uses water to dislodge debris from tires and vehicle undercarriage. (Rule 8011 Sec. 3.73)

Describe: _____

- ☐ **Other:** (Rule 8041 Sec. 5.8.1.2) _____

5-B Treatments for Preventing Carryout

Report the required treatments that will be used for preventing carryout from occurring on paved public roads. Carryout occurs when materials from emptied or loaded haul trucks, vehicles, or trailers falls onto a paved public road or paved shoulder of a paved public road. (Rule 8031 Sec 5.0)

- ☐ No haul trucks will be routinely entering or leaving the project site.
- ☐ Spillage or loss of bulk materials from holes or other openings in the cargo compartment's floor, sides, and tailgates will be prevented when material is transported onto any paved public access road.

Emptied Haul Trucks:

- ☐ Interior cargo compartments will be cleaned before leaving the project site.
- ☐ Cargo compartment will be covered with a tarp or suitable cover before leaving the project site.

Loaded Haul Trucks:

- ☐ Haul trucks will be loaded such that the freeboard is not less than six inches with water applied to the top of the load before leaving the project site.
- ☐ Cargo compartment and load will be covered with a tarp or suitable cover before leaving the project site.

- ☐ **Other:** _____

Section 5 – Carryout and Trackout – Page 2

Project Name: _____

5-C Cleaning up Carryout and Trackout

Check and report below the methods and frequency for cleaning up carryout and trackout from the surface and paved shoulders of paved public roads.

The use of blower devices, or dry rotary brushers or brooms, for removal of carryout and trackout from paved public roads is prohibited. (Rule 8041 Sec. 5.0)

Projects subject to a dust control plan are required to prevent and mitigate carryout and trackout beyond the minimum cleanup requirements. (Rule 8041 Sec. 5.3)

Cleanup Frequency:

- ☐ In the event the control device becomes insufficient to prevent carryout and trackout, removal of any carryout and trackout must be accomplished within one-half hour of the generation of such carryout and trackout. (Rule 8041 Sec. 5.8.2.)

Cleanup Method: Check the method below that will be used for cleaning carryout and trackout.

- ☐ Manually sweeping and picking up. (Rule 8041 Sec. 5.7.1)
- ☐ Mechanical sweeping with a rotary brush or broom accompanied or preceded by water.
(Rule 8041 Sec. 5.7.2)

Describe the types of equipment that will used:

- ☐ Operating a PM10-efficient street sweeper. (Rule 8041 Sec. 5.7.3)

Make and Model: _____

- ☐ Flushing with water: allowed if: (Rule 8041 Sec. 5.7.4)
- No curbs or gutters are present.
 - Using water will not result as a source of trackout and carryout.
 - Using water will not result in adverse impacts on storm water drainage systems.
 - Using water will not violate any National Pollutant Discharge Elimination System permit program.

5-D Record keeping for Cleanup of Carryout and Trackout (Rule 8011 Sec. 6.2)

Records and any other supporting documents for demonstrating compliance must be maintained. The District has developed a record keeping form specific for cleaning carryout and trackout from paved public roads and may be used for complying with this requirement. Check one or both below:

- ☐ Records will be maintained using the form developed by the District.
- ☐ Records will be maintained using documents or forms developed by the owner or operator.

Explain and include copies: _____

Section 6 – Plot Plan

Project Name: _____

6-A Plot Plan

A plot plan identifies the type and location of each project. Attach appropriately sized maps with the project boundaries outlined or use the space in section 6-B to draw a plot plan. Attached maps may include tract maps, site maps, and topographic maps. Use the checklist below to make sure all areas have been identified on the plot plan. (Rule 8021 Sec. 6.3.6.2 & 6.3.6.5)

Identify the relative locations of actual and potential sources of fugitive dust emissions.

- ☐ Bulk material handling and storage areas.
- ☐ Paved and unpaved access roads, haul roads, traffic areas, and equipment storage yards.
- ☐ Exit points where carryout and trackout onto paved public roads may occur.
- ☐ Water supply locations if water application will be used for controlling visible dust emissions.

Identify the relative locations of sensitive receptors within ¼ mile of the project. (Rule 4102 Sec. 4.1)

- ☐ No sensitive receptors within ¼ mile of the project.
- ☐ Residential areas, schools, day care, churches, hospitals, nursing facilities, commercial, retail, etc.
- ☐ Freeways, roads, or traffic areas that may be affected by the dust generating activities.
- ☐ Other: _____

6-B Draw Plot Plan (if one is not attached)

May use the back of this form
Include a North Arrow

☐ Plot plan is attached (Skip to Section 7).

Section 7 – Certification

Project Name: _____

7-A Certification

The owner, principle operator, or the individual implementing must certify the plan. (Rule 8021 Sec 6.3). For Title V sources, the responsible official must provide the certification. (Rule 2520 Sec. 3.28 and 10.0).

I certify that all information contained herein and information submitted in the attachments to this documents are true and correct.

Print Name

Title

Signature

Date

Phone Number

Fax Number

Cell Number

E-Mail Address

SECTION 31 3115 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide soil poisoning to control subterranean termites as specified herein and needed for a complete and proper treatment.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 31 2000: Earthwork.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures. **Provide additional copy of manufacturer's application recommendations and rates, to Architect and Inspector of Record, not less than 72 hours prior to application of termite treatment.**

1.3 QUALITY ASSURANCE

- A. Qualifications of Applicator:
 - 1. Properly licensed to provide such services by governmental agencies having jurisdiction.
 - 2. Not less than five years' successful experience in soil treatment for subterranean termites.

1.4 SPECIAL WARRANTY

- A. Upon completion of the Work, and as a condition of its acceptance, deliver to the Architect two copies of a special warranty and maintenance agreement signed by an authorized representative of the installing subcontractor, and co-signed by the Contractor, agreeing:
 - 1. To make an inspection of the Work once each year for a total period of five years following Date of Substantial Completion for the purpose of detecting termite infestation;
 - 2. If termite infestation is found during that five year period, to retreat in accordance with prevailing practices of the trade and within ten calendar days after such infestation is discovered;
 - 3. To repair damage to the Work caused by termites during that five year period, to a maximum cost of \$5,000;
 - 4. To make such inspections, retreatment, and repairs at no additional cost to the Owner.
 - 5. This Warranty and Maintenance Agreement shall be in addition to the warranty requirements of the Contract Documents, and the enforcement of its provisions, shall not deprive the Owner of any action, right, or remedy otherwise available to him.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions and requirements of State of California, and EPA.

PART 2 - PRODUCTS

2.1 TERMITE CONTROL MATERIALS

- A. Acceptable Products:
 - 1. Wisdom TC Flowable by AMVAC.
 - 2. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Product Characteristics:
 - 1. Approved by governmental agencies having jurisdiction.
 - 2. Active ingredients: Minimum of 7.9% Bifenthrin.
- C. If combinations of toxicants are approved by governmental agencies having jurisdiction, provide toxicants having such approval and in the maximum strength so approved, at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 APPLICATION

- A. Apply toxicant at following locations:
 - 1. Under slabs-on-grade.
 - 2. At both sides of foundation surface.
- B. Place all termite control materials in strict accordance with the manufacturer's requirements and recommendations. Follow printed labels and instructions in a manner as to provide complete coverage without jeopardizing public safety.

END OF SECTION 31 3115

SECTION 32 1210 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide asphalt paving, aggregate base, and wheel stops where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
 - 1. The Work of this Section includes patching and repair of asphaltic concrete paving removed for installation of underground utilities.
 - 2. The work of this Section includes patching and repair of asphaltic concrete paving removed for installation of new work.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 31 2000: Earthwork
 - 3. Section 32 1720: Pavement Marking

1.2 COMPENSATION FOR ASPHALT OIL

- A. The compensation payable for asphalt oil will be increased or decreased in conformance with the provisions of this section for fluctuations in crude oil prices exceeding 5 percent higher or lower than the price index at the time of bid.
- B. The adjustment in compensation in each monthly billing will be determined in conformance with the formulae indicated in Exhibit A attached at the end of this section.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Certificates, signed by the asphaltic concrete paving materials producer and the asphaltic concrete paving subcontractor, stating that materials meet or exceed the specified requirements.

1.4 QUALITY ASSURANCE

- A. All improvements within property owned by a City, County or State Entity, shall be in accordance with the Standard Specifications of the authority having jurisdiction.

1.5 SPECIAL WARRANTY

- A. In addition to the warranty requirements of the Contract Documents, provide a material and workmanship warranty signed by an authorized representative of the installing subcontractor and cosigned by the Contractor with an extended warranty correction period of 2-years.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 6200.
- B. All materials and products shall be in conformance with the current construction standards and construction specifications of the governing jurisdiction.

2.2 ASPHALT CONCRETE

- A. Asphalt Concrete: Type B; Standard Specifications Section 39, California Department of Transportation, 2010 edition.
- B. Aggregate: 1/2" maximum (medium).
- C. Asphalt Binder: Steam refined paving asphalt classified as PG 64-10; Section 92 of the State of California Standard Specifications, 2010 edition.

2.3 AGGREGATE BASES, SUBBASES, AND RECYCLED BASES

- A. Aggregate Bases:
 - 1. Class 2 conforming to Section 26 of the Caltrans Specifications, 2010 edition.
 - 2. Gradation: As specified for 3/4" maximum aggregate.
- B. Aggregate Subbase:
 - 1. Conform to Section 25 of the Caltrans Specifications, 2010 edition.
 - 2. Class as noted on the Drawings.
- C. Recycled Base and Subbase Courses: Aggregate base or subbase may be composed of salvaged oiled earth and asphalt concrete from the existing roadway recycled and mixed with imported materials to meet the requirements of the base or subbase class noted on the Drawings.
 - 1. Contractor shall be responsible for paying for "R" Value testing and other required testing of the salvaged materials.
 - 2. Contractor must show that "R" Value and other properties of the salvaged material meets or exceeds the requirements of the base or subbase class noted on the Drawings.
 - 3. The amount of recycled/reclaimed material in the mix may be up to 100 percent of the total volume of the aggregate used.

2.4 OTHER MATERIALS

- A. Weed Killer: SFM 75 by Alligare.
- B. Wheel Stops: 6"x6"x48" reinforced precast concrete with two 3/4"x24" steel anchor pins set in epoxy.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINAL PREPARATION OF SUBGRADE

- A. After preparation of subgrade as specified in another Section of these Specifications, thoroughly scarify and sprinkle the entire area to be paved, and then compact to a smooth, hard, even surface of 95% compaction to receive the aggregates.
- B. Apply the specified weed killer to the entire area to be paved. Adhere to the manufacturer's application recommendations.

3.3 PLACEMENT OF BASE COURSES

- A. Base:
 - 1. Spread specified base material to a thickness providing the compacted thickness indicated.
 - 2. Place in lifts not exceeding 8" in thickness.
 - 3. Compact to 95%.
- B. Moisture Content: Use only the amount of moisture needed to achieve the specified compaction.

3.4 PLACEMENT OF ASPHALTIC CONCRETE PAVING

- A. Install the specified headers and stakes to achieve the arrangement of paving indicated.
- B. Remove all loose materials from the compacted base.
- C. Apply the specified prime coat, and tack coat where required, and allow to dry, in accordance with the manufacturer's recommendations.
- D. Adjust frames and covers, if so required, to meet final grades.
- E. Receipt of Asphaltic Concrete Materials:
 - 1. Do not accept material unless it is covered with a tarpaulin until unloaded, and unless the material has a temperature of not less than 280 degrees F.
 - 2. Do not commence placement of asphaltic concrete materials when the atmospheric temperature is below 50 degrees F, nor during fog, rain, or other unsuitable conditions. Begin placement only when temperature is above 51 degrees F **and rising**.
- F. Spreading:
 - 1. Spread material in a manner which requires the least handling.
 - 2. Where thickness of finished paving will exceed 2.5", spread in two or more layers, with top layer no thinner than 1.5". No lift shall exceed 2.5".
 - 3. Provide compacted thicknesses shown on the Drawings within a tolerance of minus 0.0" to plus 0.5".
- G. Rolling:
 - 1. After the material has been spread to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown on the Drawings.
 - 2. Roll in at least two directions until no roller marks are visible.
 - 3. Finished paving smoothness tolerance:
 - a. Free from birdbaths.
 - b. No deviations greater than 1/8" in 6 feet.
 - c. Compact to a maximum relative compaction of 97%, with no single test value being below a minimum relative compaction of 91% based on a 50 blow Marshall maximum density.
 - d. **Percentage of voids shall not exceed 9%**

3.5 FLOOD TEST

- A. Perform a flood test in the presence of the Architect.

- B. Method: Flood the entire asphaltic concrete paved area with water by use of a tank truck or hoses.
 - 1. If a depression is found where water ponds to a depth of more than 1/8" in six feet, fill or otherwise correct to provide proper drainage.
 - 2. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible.

3.6 INSTALLING WHEEL STOPS

- A. Install the specified precast concrete wheel stops as shown on the Drawings, driving the approved 3/4" dia. anchor pins not less than 2'-0" through the paving into the earth.

3.7 FIELD QUALITY CONTROL

- A. Secure the geotechnical engineer's inspection and approval of subgrades before subsequent construction is permitted thereon.
- B. In-Place Density: Owner's testing laboratory will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.
 - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D1188 or ASTM D2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726.
- C. In-place Compacted Thickness: Owner's testing laboratory will determine compacted thickness according to ASTM D3549.
- D. Repair or remove and replace unacceptable paving as directed by the Architect.
- E. Replace and compact asphalt where core tests were taken.

END OF SECTION 32 1210

EXHIBIT "A"

COMPENSATION ADJUSTMENTS FOR CRUDE OIL PRICE INDEX FLUCTUATIONS

The compensation payable for asphalt oil will be increased or decreased in conformance with the provisions of this Exhibit "A" for crude oil fluctuations more than 5 percent higher or lower than the price index at the time of bid.

The adjustment in compensation will be determined in conformance with the following formula:

DETERMINE ASPHALT QUANTITIES:

Calculate the quantity of asphalt oil in hot mix asphalt using the following formula:

$$Qh = HMATT \times [Xa / (100 + Xa)]$$

Qh = quantity in tons of asphalt oil used in hot mix asphalt

$HMATT$ = hot mix asphalt total tons placed

Xa = theoretical asphalt oil content from job mix formula expressed as percentage of the weight of dry aggregate

DETERMINE PAYMENT ADJUSTMENTS:

If material containing asphalt oil is placed within multiple months, calculate separate adjustments for each month.

Each adjustment is calculated using the price index for the month in which the quantity of material containing asphalt oil subject to adjustment is placed in the work. The sum of all the adjustments is used for increasing or decreasing payment.

Calculate each payment adjustment as follows:

$$PA = Qh \times A$$

PA = Payment adjustment in dollars for asphalt oil contained in materials placed in the work for a given month.

Qh = quantity in tons of asphalt oil used in hot mix asphalt.

A = Adjustment in dollars per ton of asphalt oil used to produce materials placed in the work rounded to the nearest \$0.01.

$$A = [(Iu / Ib) - 1.05] \times Ib \times [1 + (T / 100)] \text{ for an increase in the crude oil price index exceeding 5\%}$$

$$A = [(Iu / Ib) - 0.95] \times Ib \times [1 + (T / 100)] \text{ for a decrease in the crude oil price index exceeding 5\%}$$

Iu = California Statewide Crude Oil Price Index for the month in which the quantity of asphalt oil subject to adjustment was placed in the work.

Ib = California Statewide Crude Oil Price Index for the month in which the bid opening for the project occurred

T = Sales and use tax rate, expressed as a percent, currently in effect in the tax jurisdiction where the material is placed. If the tax rate information is not submitted timely, the statewide sales and use tax rate is used in the payment adjustment calculations until the tax rate information is submitted.

ADJUST THE CONTRACT SUM:

The Contract Sum will be increased or decreased based on the sum of the Payment Adjustments.

If the price index at the time of placement increases:

50% percent or more over the price index at bid opening, notify the Architect.

100% or more over the price index at bid opening, do not furnish material containing asphalt oil until the Architect authorizes the work to proceed. The Owner decrease or eliminate asphalt paving work.

The adjustment shall also be subject to the following:

The Contractor shall be liable to the Owner for decreased compensation adjustments and the Owner may deduct the amount thereof for moneys due or that may become due the Contractor.

In the event of an overrun of contract time, adjustment in compensation for asphalt oil during this overrun period will be determined using the California Statewide Crude Oil Price Index in effect on the first business day of the month within the month in which the overrun began.

CALIFORNIA STATEWIDE CRUDE OIL PRICE INDEX:

The California Statewide Crude Oil Price Index is determined each month on or about the 1st business day of the month by the California Department of Transportation using the average of the posted prices in effect for the previous month as posted by Chevron, ExxonMobil, and ConocoPhillips for the Buena Vista, Huntington Beach, and Midway Sunset fields.

If a company discontinues posting its prices for a field, the California Department of Transportation determines the index from the remaining posted prices. The Department may include additional fields to determine the index.

For the California Statewide Crude Oil Price Index, go to:

<http://www.dot.ca.gov/hq/construc/crudeoilindex/>

SUBMITTALS:

Before placing material containing asphalt oil, submit the current sales and use tax rate in effect in the tax jurisdiction where the material is to be placed.

Submit certified weight slips for hot mix asphalt, including those materials not paid for by weight.

SECTION 32 1720 - PAVEMENT MARKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide pavement marking in the types and arrangements shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
 - 1. Crosswalk, striping and graphics.
 - 2. Parking lot striping and graphics.
 - 3. Other lines and graphics as indicated.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Photographs, scale drawings, or other data acceptable to the Architect, showing types of graphics proposed to be used.

PART 2 - PRODUCTS

2.1 MATERIALS GENERAL

- A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.1 PAVEMENT MARKING PAINT

- A. Provide paint specifically formulated for use as pavement marking in automobile traffic areas, and in the colors selected by the Architect from standard no lead colors of the approved manufacturer.
 - 1. Slip-resistant coefficient of friction ≥ 0.6 ; ADA Standard A4.5.1, for all paint.
 - 2. Blue at accessible parking to be color #15090; Federal Standard 595B or equal.
- B. Available 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. Zoneline by PPG Architectural Coatings; 100% acrylic.
 - 2. SetFast Acrylic Waterborne Traffic Marking Paint by Sherwin-Williams.
 - 3. Vin-L-Stripe W801 Series by Dunn-Edwards.
 - 4. 506 Traffic Paint by Frazee; 100% acrylic.

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Allow a minimum of 24 hours before applying striping over asphalt paving fog seal.

3.2 APPLICATION

- A. Secure the Architect's approval of graphics design and layout prior to start of application.
- B. Using proper masking, stencils, and application equipment recommended for the purpose by the manufacturer of the approved paint, apply the approved paint in strict accordance with its manufacturer's recommendations.
- C. **Provide 2 coats** of paint material at all markings.

3.3 PROTECTION

- A. Provide traffic cones, barricades, and other devices needed to protect workmen and the paint until it is sufficiently dry to with-stand traffic.

3.4 CLEANUP

- A. When paint is thoroughly dry, visually inspect the entire application, touchup as required to provide clean, straight lines and surfaces throughout.
- B. Using a permanently opaque paint identical in color to the surface on which the paint was applied, block out and eliminate all traces of splashed, tracked, and/or spilled pavement marking paint from the background surfaces.

END OF SECTION 32 1720

SECTION 32 1725 - TACTILE WARNING SURFACES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide tactile warning surface mats and accessories in the types and arrangements shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Samples: Submit 3 samples of each kind or type of tile.

1.3 QUALITY ASSURANCE

- A. Americans with Disabilities Act (ADA): Provide tactile warning surfaces which comply with the detectable warnings on walking surfaces section of the ADA (Title 49, CFR Transportation, Part 37.9 Standards for Accessible Transportation Facilities, Appendix A, Section 4.29.2 Detectable Warnings on Walking Surfaces.
- B. Applicable provisions of California Building Code.

PART 2 - PRODUCTS

2.1 TACTILE WARNING TILE

- A. Acceptable Manufacturers: "In-line" pattern, ADA/CBC compliant detectable warning mat and accessories from one manufacturer. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following;
 - 1. Ada Solutions, Inc., (800) 372-0519.
 - 2. Engineered Plastics Inc., (800) 682-2525.
 - 3. Advantage Tactile Systems Inc., (800) 679-4022.
 - 4. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.
- B. Color: Yellow conforming to Federal Color No. 1 33538.
- C. Accessories:
 - 1. Adhesive: Manufacturer's recommended adhesive.
 - 2. Anchors: Color matched, corrosion-resistant, flat-head drive anchor; 1/4" diameter by 1-1/2" long provided by manufacturer.
 - 3. Sealant: Manufacturer's recommended sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install tactile warning surfaces, adhesive, anchors, and sealant in accordance with the manufacturer's written installation instructions.
- B. Set tactile warning surfaces true and square to the curb ramp area.

END OF SECTION 32 1725

SECTION 32 3111 - GATE OPERATOR AND CONTROLS

PART 1 – GENERAL

1.1. SECTION INCLUDES

- A. Slide gate operators.

1.2. RELATED REQUIREMENTS

- A. Section 03 3000 – Cast-in-Place Concrete: Concrete pads for gate operators.
- B. Section 26 6000 – General Conditions for Electrical Work: AC electrical power for gate operators.
- C. Section 32 3125–Decorative Metal Fences and Gates

1.3. REFERENCE STANDARDS

- A. UL (www.ul.com):
 - 1. UL 325 – Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.4. SUBMITTALS

- A. Comply with Division 01.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details.
 - 1. Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
 - 2. Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Manufacturer's Project References: Submit manufacturer's list of 10 successfully completed gate operator projects of similar size and scope to this Project, including project name and location, name of architect, and type and quantity of gate operators furnished.
- F. Installer's Project References: Submit installer's list of 5 successfully completed gate operator projects of similar size and scope to this Project, including project name and location, name of architect, and type and quantity of gate operators installed.

- G. Operation and Maintenance Data:
 - 1. Submit manufacturer's operation and maintenance manual, including the following:
 - a. Operation, maintenance, adjustment, and cleaning instructions.
 - b. Safety information.
 - c. Troubleshooting guide.
 - d. Parts list.
 - e. Electrical wiring diagrams.
 - 2. Provide detailed information required for Owner to properly operate and maintain gate operators.
- H. Warranty Documentation: Submit manufacturer's standard warranty.

1.5. QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Manufacturer regularly engaged in the manufacturing of gate operators of similar type to that specified for a minimum of 5 years.
- B. Installer's Qualifications:
 - 1. Installer regularly engaged in installation of gate operators of similar type to that specified for a minimum of 5 years.
 - 2. Use persons trained for installation of gate operators.
 - 3. Approved by manufacturer.

1.6. DELIVERY, STORAGE, AND HANDLING

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Do not store materials directly on floor.
 - 5. Keep materials from freezing.
 - 6. Protect materials and finish during storage, handling, and installation to prevent damage.

1.7. WARRANTY

- A. Warranty Period:
 - 1. All Components: 5 years.
 - 2. Battery: 1 year.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Maximum Controls LLC, 10530 Lawson River Avenue, Fountain Valley, California 92708.
Phone 949-699-0220. www.max.us.com. maxsales.us@gmail.com.
- B. Substitutions: Comply with Division 01 2500
- C. Single Source: Provide materials from single manufacturer.

2.2 DESIGN CRITERIA

- A. Gate Operator Safety Entrapment Protection Devices, UL 325:
 - 1. Two independent safety entrapment protection devices shall be installed on gate operators (inherent reversing system in gate operators count as 1 device).
 - 2. Devices such as a monitored photo eye or a monitored edge sensor shall be installed with gate operators or a primary/secondary pair of gate operators.
 - 3. Any 12 V DC, normally closed UL 325 approved safety device (wired or wireless photo eyes or edge sensors) shall function with gate operators.

2.3 SLIDE GATE OPERATOR

- A. High-Traffic, Commercial, Brushless, 24 V DC, Slide Gate Operators: "Max 1700 FS".
 - 1. Mechanical:
 - a. Dimensions:
Width: 14.5 inches.
Depth: 19.0 inches.
Height: 29.0 inches.
Chain Height: 7.5 inches.
 - b. Shipping Weight: 158 lbs.
 - c. Gear Box: Heavy-duty, direct-drive gear box, 20:1, Size 60 push-backable.
 - d. Gate Capacity: 1,700 lbs/50-foot long gate.
 - e. Gate Speed: 12 inches per second, adjustable.
 - f. Drive: Direct gear, synthetic oil bath, 1-inch hardened output shaft.
 - g. Jog switch/emergency release.
 - h. Chain: 25-foot #40 nickel-plated chain.
 - i. Lockable chain-release mechanism.
 - j. Corrosion Protection: Gold-zinc plated and powder coated.
 - k. Frame: 1/4-inch cold-rolled steel, fully welded, gold-zinc plated and powder coated.
 - l. Cover: Polymeric polyethylene, thickness 0.25 inches, flammability rating HB, RTI:50, unbreakable, dark gray.
 - m. Cover Door: Polymeric, thickness 0.187 inches, flammability rating HB, RTI:50, black with keylock.
 - n. Duty: Continuous cycle at extreme temperature.
 - o. Gate Motion Control: Intelligent ramp-up and ramp-down, microprocessor controlled.
 - p. Sequenced Access Management: Capable of sequentially controlling operator in tandem with barrier gate.
 - q. Quiet operation.
 - 2. Electrical:
 - a. Motor: Brushless DC motor, equivalent to 1-1/4 HP AC motor.

- b. Gate Speed Controls: Programmable, 16 selectable speeds.
 - c. Automatic gate position reset system.
 - d. Gate Sync: Automatic gate movement synchronization.
 - e. Modular system design.
 - f. Voltage Selection: Switchable 115/230 V AC.
 - g. Adaptive DSP control for advanced brushless DC motion control.
 - h. Real-time performance analyzer and event log (OBD PORT and Black Box).
 - i. Low-voltage wiring capabilities for remote power up to 500 feet (no battery needed).
 - j. Power Management: Energy saving intelligent power management system.
 - k. Outputs: 12 V DC and 24 V DC at 250 mA.
 - l. Connections: Gold contact input connections and automobile-grade connectors.
 - m. Selectable Open Timer: 0.5 to 60 seconds with timer-off option.
 - n. Operational Temperature Range: Minus 4 to 165 degrees F (minus 20 to 74 degrees C), including battery performance without heater.
 - o. Lightning Protection: Up to 20 K volts and 10 K amps on inputs and outputs (44 channels), including loop detector input connections.
 - p. Safety Obstruction Sensor: Tunable, 16 position; auto adaptable to gate weight and size.
 - q. Downhill Gate Motion: Controlled by auto-dynamic cruise control.
 - r. Dual motor overcurrent safety shut off.
 - s. Battery Backup Module: "Max BC-7"; minimum of 100 cycles in case of power failure.
 - t. Battery Backup Functions: 3 modes, open once, leave open, leave closed, selectable.
 - u. State machine electronics.
 - v. On-board 3-button station.
 - w. Plug-in loop detector rack.
 - x. Primary/Secondary Sync: RS 485 3-wire communication.
3. Security:
- a. Loop-Management System: High traffic, intuitive.
 - b. Alarms: Audible and remote.
 - c. Magnetic lock control relay outputs with selectable delay times.
 - d. Tamper-alert relay output triggers "on" if gate is forced open.
 - e. Audible alarm if gate is tampered with or ERD is triggered.
 - f. Gate Partial Open Recorder: Programmable, allows partial open cycles for high-traffic gates, while providing complete open cycles for emergency vehicles.
 - g. Cover: Lockable with key-lock release.
 - h. Gate Disable Feature: Disables inputs with exception of fire department input.
 - i. Transaction buffer.
 - j. Gate Status Outputs: For gate monitoring.
 - k. Direct motor control of jog OPEN/CLOSE for manually moving gate in case of emergency.
 - l. Quick close anti-tailgate feature.
 - m. Magnetic Lock: No need for magnetic lock with direct drive and dynamic magnetic brake system.
 - n. Chain-Drop Sensor: Detects unauthorized chain drops.
 - o. Gate Push-Back: 20:1 gear reducer allows emergency opening via latching key switch or gate disable switch.
 - p. Anti Push-Back: While in normal operation mode, machine fights back when unauthorized opening attempt or tampering is detected, prohibiting unwanted access.
4. Safety:
- a. Compliance:
UL 325, Class I, II, III, and IV.
 - b. Approval: CSA.
 - c. ETL Listed.
 - d. Adaptive Obstruction Sensor: 16 selectable sensitivity settings.

- e. Dynamic Magnetic Brake System: Stops gate immediately to prevent damage to obstructions.
- f. Entrapment protection and alarm output.
- g. Selectable gate-in-motion alarm.
- h. 12 V DC, Normally Closed UL 325 protocol.
- i. Three combinations of monitored photo eyes and edge sensors.
- j. Secondary entrapment reverses and resets.
- k. UL reset button.
- l. Gate Disable: When chain is disconnected in gate closed position, machine defaults to shut-down mode.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and gates to receive gate operators.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Verify gates are installed as specified in Section 32 31 25 and as indicated on the Drawings.
- B. Verify gates are properly installed and move freely in both directions.
- C. Verify gates are plumb, level, square, and without sag or damage.

3.3 INSTALLATION

- A. Install gate operators in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install gate operators in accordance with UL 325.
- C. Install gate operators plumb, level, square, and secure on concrete pads.
- D. Concrete Pads: Install concrete pads as specified in Section 03 30 00.
- E. Electrical: Install AC electrical power to gates operators as specified in Section 26 05 00.
- F. Install gate operators to function properly.
- G. Install gate operators to be weathertight.

3.4 ADJUSTING

- A. Adjust gate operators for proper operation in accordance with manufacturer's instructions.
- B. Adjust gate operators to operate smoothly and to open and close gates properly.
- C. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- D. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Architect.

3.5 CLEANING

- A. Clean gate operators promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

3.6 CLOSEOUT ACTIVITIES

- A. Demonstration:
 - 1. Demonstrate to Architect and Owner that gate operators function properly.
 - 2. Demonstrate to Owner proper operation of gate operators.
 - 3. Perform demonstration at final system inspection by factory-trained and certified representative of manufacturer.
- B. Instruction and Training:
 - 1. Provide instruction and training of Owner's personnel in operation and maintenance of gate operators.
 - 2. Provide instruction and training by factory-trained and certified representative of manufacturer.

3.7 PROTECTION

- A. Protect installed gate operators to ensure that, except for normal weathering, gate operators will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 32 3111

SECTION 32 3125 - DECORATIVE METAL FENCES AND GATES (BOLTED)

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide bolted decorative fencing system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 08 7000: Accessible Gate Hardware

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
 - 2. Installation Instructions: Submit manufacturer's recommended installation procedures.
 - 3. Shop Drawings: Submit shop drawings indicating plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Aegis Plus - Majestic design, by Ameristar Fence Products, (800) 321-8724, 3-rail with no pickets above top rail.
 - 1. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 FENCES

- A. Fence System: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and cable of resisting vertical load, horizontal load and infill performance requirements for fence categories defined in ASTM F2408.
- B. Steel Materials: ASTM A653; tensile strength 45,000 psi, minimum; hot-dip galvanized; A 653, G60.
- C. Fasteners: ASTM A276, Type 302 stainless steel; finished to match fence components.
 - 1. Tamper-proof security bolts.
 - 2. Self-drilling hex-head screws.

2.3 MECHANICALLY FASTENED STEEL FENCE

- A. Provide fence meeting requirements for Industrial class as defined by ASTM F2408.
- B. Fence Panels: Mechanically fastened with internal reinforcement and tamperproof fasteners; 7'-0" high by nominal 8'-0" long.

1. Panel Style: Three rail.
 2. Panel Strength: Capable of supporting 400 pound load applied at midspan without deflection.
 3. Attach panels to posts with manufacturer's standard panel brackets.
- C. Posts: Steel tube; size as indicated on the Drawings, with manufacturer's standard cap.
- D. Rails: Manufacturer's standard, double-wall steel channel; 1-1/2" square by 14 gauge with pre-punched picket holes.
1. Picket Retaining Rods: 0.125" galvanized steel.
 2. Picket-to-Rail Intersection Seals: PVC grommets.
- E. Pickets: Steel tube; 3/4" square by 17gauge.
1. Spacing: 4.175" on center.
 2. Style: Flush top rail.
- F. Flexibility: Capable of following variable slope of up to 1:4.
- G. Perforated Metal: McNichols, item number 1431141841 or approved equal. Round Hole, Galvanized G90, 18 Gauge, Mill Finish, 3/16" Holes on 1/4" Centers, Staggered Pattern, 51% Open Area.

2.4 STEEL GATES

- A. Swing Gates:
1. Gate shall be same cross section as the fence rails and pickets.
 2. Gate frames shall be welded with stainless steel rods and capable of proper operation as related to the operable span.
 3. All rail and upright intersections shall be joined by welding.
 4. All picket and rail intersections shall also be joined by welding.
- B. Sliding Gates:
1. Gate shall be same cross section as the fence rails and pickets.
 2. Sliding gates shall be cantilevered aluminum construction capable of proper operation as related to the operable span.
 3. All rail and upright intersections shall be joined by welding.
 4. All picket and rail intersections shall also be joined by welding.
- C. Gate Hardware:
1. Hinges: Roller bearing hinge, 4", item #KIHDSSH3B by Kodiak Iron.
 2. Latches:
 - a. At single leaf gates provide 13 gauge welded lock box with integral strike to accept a double keyed deadbolt (2-3/4" backset), LH275 by Jansen Ornamental Supply Co., 800-423-4494. Finish lock box to match fencing. Weld lock box to gate leaf; provide fabricated hole in gate post for dead bolt strike plate.
 - b. At double leaf gates provide 48" long heavy-duty drop rods on each gate leaf, with strong arm gate latch (pad lockable) on one leaf.
 3. Accessible Gates: Comply with CBC 11B-404.2.10.
 - a. Kick Plates: 10" high x 3/16" thick steel plate x full width kick plate, secure to the gate panel on both sides of accessible gates.
 - b. Hinges: Locinox Mammoth 180-Silver hydraulic gate closer and hinge or equivalent equal.

- c. Lever Hardware (lever both sides) Comply with CBC Section 11B-309.4. Provide keying to match the site keying scheme:

1	EA	CLSRM SEC LOCK	LV9071T 06A	626	Schlage
2	EA	CORE ONLY	23-030	626	Schlage
1	EA	LOCK BOX	K-BXMOR1-10G		Keedex
1	EA	STRIKE BOX	K-BXSTR		Keedex

4. Required Exit Gates: Comply with CBC 1010.1 and 11B-404.2.10.

- a. Panic Hardware and Trim. Provide keying to match the site keying scheme:

1	EA	PANIC HARDWARE	AX98L-2 996L-WH-PA x 1609	626	Von Duprin
2	EA	RIM CYLINDER	20-057-ICX (SPECIFY A, B OR C)	626	Schlage
2	EA	CORE ONLY	23-030	626	Schlage

Note: Device length shall be determined by gate size.

2.5 FABRICATION

- A. Except as otherwise shown on the Drawings or the approved Shop Drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.
- B. Fabricate with accurate angles and surfaces which are true to the required lines and levels, forming exposed connections with hairline joints, and using concealed fasteners wherever possible.
- C. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- D. Insert retaining rods into each rail so that they pass through the pre-drilled holes in each picket, thus completing the panel assembly.
- E. All corner joints shall be miter cut, welded and ground smooth. Where two dissimilar sizes join, all exposed ends of tube or pipe steel shall have caps provided of same thickness steel plate, weld and grind smooth.
- F. Gates:
1. Provide frames of sufficient size and thickness to provide adequate support without sag.
 2. Frames larger than 8'-0" in length shall include an additional bottom rail support at mid-span capable of accepting a wall support mounted as a foot and bolted to a concrete mowstrip similar to pilaster anchorage.
 3. Pickets shall be of the same size and style as those in the fence panels.

2.6 FINISHES

- A. Electro-Deposition Coating: Multi-stage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
1. Total Coating Thickness: 2 mils, minimum.
 2. Color: As selected by Architect from manufacturer's standard range.
 3. Coating Performance: Comply with general requirements of ASTM F2408.
 - a. Adhesion: ASTM D3359 (Method B); Class 3B with 90 percent or more of coating remaining in tested area.
 - b. Corrosion Resistance: ASTM B117, D714 and D1654; 1/8 inch coating loss or medium No.8 blisters after 1,500 hours.
 - c. Impact Resistance: ASTM D2794; 60 inch pounds.
 - d. Weathering Resistance: ASTM D523, D822/D822M and D2244; less than 60 percent loss of gloss.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.3 INSTALLATION

- A. General:
 - 1. Set work accurately into position, plumb, level, true, and free from rack.
 - 2. Anchor firmly into position.
- B. Gates:
 - 1. Install plumb and level.
 - 2. Lubricate all hinges, rollers, and other gate hardware after installation.
 - 3. Adjust accessible gates to open with not more than 5.0 lbs. pressure, as allowed per California Building Code, Section 11B-404.2.9.
- C. Touch up scratched surfaces using materials recommended by manufacturer. Match touchup paint color to fence finish.

END OF SECTION 32 3125

SECTION 32 84 00 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide all materials, labor, equipment, and services necessary to furnish, install and maintain the Irrigation System, accessories, and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.
- B. Related Work Specified Elsewhere
 - 1. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to work of this section.
 - 2. Section 32 90 00 – Landscape Planting

1.2 CODES AND REGULATIONS

- A. All work and materials shall be in full accordance with the following codes adopted and amended by the authority having jurisdiction. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. The work described in these specifications shall govern in the event that the drawings or specifications call for material or methods of construction of higher quality or standard than required by these codes.
 - 1. California Plumbing Code
 - 2. California Administrative Codes:
 - a. Title 8, Industrial Relations
 - b. Title 19, Public Safety
 - 3. California Electrical Code
 - 4. California Green Building Standards Code, Section 5.304.
 - 5. California Department of Water Resources, Model Water Efficient Landscape Ordinance (MWELO)
 - 6. Standards and Regulations of other agencies, water utility provider, or organizations as listed in this specification relating to products or procedures, e.g. American Society for Testing and Materials.

1.3 DEFINITIONS

- A. Piping: All pipe fittings, valves, and accessories as required for a complete piping system.
- B. PVC: Polyvinyl Chloride.
- C. Agencies and Organizations:
 - 1. ASTM- American Society for Testing and Materials
 - 2. AWWA- American Water Works Association
 - 3. IAPMO- International Association of Plumbing and Mechanical Officials
 - 4. NEC - National Electrical Code.
 - 5. UL - Underwriter's Laboratories
 - 6. SSPWC – Standard Specifications for Public Works Construction, by the American Public Works Assoc./Associated General Contractors of California.
- D. Owner: An authorized representative of the Owner or the Owner's authorized consultant.

1.4 QUALITY ASSURANCE

- A. The work of this section shall be performed by a single firm experienced in irrigation work and holding a current California Contractor's A or C27 License.
- B. Qualifications of Workers
 - 1. The Contractor shall employ skilled workers who are thoroughly trained and experienced in irrigation system installation and who are completely familiar with the specified requirements and methods needed for proper performance of this work.
 - 2. The Contractor shall provide adequate supervision by a qualified foreman fluent in English that will be continuously onsite during the performance of this work.

1.5 SUBMITTALS

- A. An operational assessment report of any existing irrigation system in the area of work shall be submitted prior to the start of the project's work, including demolition and clearing. See Subsection 1.07.
- B. The Contractor shall submit complete lists of proposed materials and equipment per the Division 01 Submittal Section, including manufacturer's name and model numbers. Only provide additional product data and/or catalog cut sheets if a substitute material or equipment is proposed. No substitution will be allowed without prior written approval.
- C. Shop drawings shall be provided for the layout and description of all equipment assemblies, including dimensions, capacities, and other characteristics as listed in product specifications. Shop drawings for booster pump assemblies shall clearly and neatly indicate the layout of the assemblies and proposed piping in the pump yard, and shall show adjacent equipment, required clearances, walls, fences, piping and other existing permanent improvements affecting the layout. Materials and equipment shall not be ordered until given written acceptance. Equipment or materials installed or furnished without prior approval or acceptance may be rejected and the Contractor shall be required to remove such materials from the site at his own expense.
- D. When specific name brands of equipment and materials are used, they are intended as preferred standards only. This does not imply any right upon the part of the Contractor to furnish other materials unless specifically approved in writing as equal in quality and performance by the Owner. Decisions by the Architect/Engineer shall govern as to what name brands of equipment and materials are equal to those specified on the plans and his decisions shall be final. It shall be the responsibility of the Contractor to furnish proof as to equality of any proposed equipment or material.
- E. Approval of any item, alternate or substitute indicates only that the products apparently meet the requirements of the drawings and specifications on the basis of the information or samples submitted. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.
- F. Acceptance of any submittals, deliverables, or other work product of the Contractor shall not be construed as assent that the Contractor has complied with, nor in any way relieved the Contractor of compliance with (i) the applicable standard of care, and/or (ii) applicable statutes, regulations, rules, guidelines, and contract requirements.
- G. Irrigation Equipment: When the Contractor desires to transfer salvaged irrigation equipment and/or new spare equipment and/or parts to the Owner, he must submit along with the equipment an itemized list. The Contractor is solely responsible to obtain a written confirmation by the Owner that all materials received by the Owner matches his material list. The transfer of materials will not be considered executed without written confirmation of same.

- H. Submit any required or requested testing data and/or Certificates, including but not limited to the backflow prevention assembly testing Certificate after the assembly is installed prior to regular system operation.

1.6 EXPLANATION OF DRAWINGS

- A. The intent of the drawings and specifications is to indicate and specify a complete and efficient sprinkler irrigation system ready for use in accordance with the manufacturer's recommendations, and all applicable local codes and ordinances. Interpretation of irrigation plans and specifications shall be the responsibility of the Landscape Architect or Owner.
- B. All existing systems and improvements are shown in their approximate locations. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and shall report any variations to the Owner.
- C. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all his work, and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between sprinkler systems, planting, utilities, and architectural features will be avoided. Locate pipe, valves and other equipment in planting areas unless specifically noted otherwise.
- D. All work called for on the drawings by notes shall be furnished and installed whether or not specifically mentioned in the specifications.

1.7 EXISTING CONDITIONS

- A. The Contractor shall not install the irrigation system and equipment as shown on the Drawings when it is obvious in the field that obstructions or differences in existing conditions and/or systems are present. Such obstructions or differences should be immediately brought to the attention of the Owner. Failure to provide notification prior to the start of this work shall make the Contractor liable for any and all repairs and/or corrections necessary for proper functioning and coverage of the system without any additional cost to the Owner.
- B. The Contractor shall examine carefully the site of work contemplated and the proposal, plans, specifications, and all other contract documents. By submitting a bid, the Contractor attests that he has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and quantity of work to be performed and materials to be furnished, and the requirements of the specifications. The Contractor shall take necessary precautions to protect existing site conditions that are to remain. Should damage be incurred, the Contractor shall make the necessary repair or replacement to bring it back to its original condition at his own expense.
- C. Prior to cutting into the soil, the Contractor shall coordinate with the Owner to locate all cables, conduits, sewers, septic tanks, and other such underground utilities as are commonly encountered and he shall take proper precaution not to damage or disturb such improvements. If a conflict exists between such obstacles, notify the Owner who will consider realignment of the proposed work. The Contractor will proceed in the same manner if a rock layer or any other condition encountered underground makes change advisable. Should utilities not shown on the plans be found during excavations, Contractor shall promptly notify the Owner for instructions as to further action. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown in plans.
- D. The Contractor shall verify the correctness of all finish grades within the work area in order to insure the proper soil coverage (as specified) of the sprinkler system pipes. The Contractor shall verify and be familiar

with location and size of the proposed water supply (P.O.C.). He shall make approved type connection and install new work.

- E. The Contractor shall be responsible for notifying the Owner prior to installation that equipment or methods indicated on the drawings or in the specifications conflict with local codes, are incompatible or an error is apparent. In the event the Contractor neglects to do this, he will accept full responsibility for any revisions necessary.

1.8 PERMITS

- A. The Contractor shall obtain and pay required fees to any governmental or public agency. Any permits for the installation or construction of any of the work included under this contract, which are required by any of the legally constituted authorities having jurisdiction, shall be obtained and paid for by the Contractor, each at the proper time. He shall also arrange for and pay all costs in connection with any inspections and examination required by these authorities.

1.9 TESTING

- A. General: Unless otherwise directed, tests shall be witnessed by the Owner. Work to be concealed shall not be covered until prescribed tests are made. Should any work be covered before such tests, the Contractor shall, at his expense, uncover, test and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and entire work re-tested. Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the test.
- B. Main Line Piping: Maintain 125 psi water or air pressure in new main line piping for a duration of twenty-four (24) hours. There shall be no drop in pressure during test except that due to ambient temperature changes (+/- 5psi).
- C. After being installed at the project site, any newly installed Backflow Prevention unit must be tested and approved as functioning properly per the local water agency requirements. Approval of the backflow prevention unit must precede any final inspection of the irrigation system. All costs for testing shall be the responsibility of the Contractor.

1.10 OBSERVATION

- A. General:
 - 1. Installation and operations must be approved by the Owner.
 - 2. In no event shall the Contractor cover up or otherwise remove from view any work under this contract without prior approval of the Owner. Any work covered prior to inspection shall be opened to view by the Contractor at his expense.
 - 3. In all cases, where inspection of the irrigation system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Owner's Representative, the Contractor shall notify the Owner's Representative at least 48 hours in advance of the time when such inspection and/or direction is required. Any necessary re-excavation or alterations to the system needed because of failure of the Contractor to have the required inspection, shall be performed at the Contractor's own expense.
- B. Periodic observations shall be required for basic operations and installations during progression of the project. The Owner's Representative, Owner or Landscape Architect shall perform the observations and shall record the observation on the Irrigation System Observation Log form on the As Built Record Drawings. Such observations will include but not necessarily be limited to the following items as included in the scope of work:
 - 1. Layout and flagging of sprinkler heads.
 - 2. Trenching.

3. Main line installation.
4. Main line sustained pressure check.
5. Wire placement.
6. Partial fill compaction of trenches.
7. Control valve installation.
8. Drip line installation prior to backfilling.
9. Irrigation controller installation and operation.
10. Sprinkler/emitter coverage prior to the start of planting operations.
11. Overall system operation and primary/secondary communication.

C. Coverage & Operations Review:

1. When the irrigation system is operational and prior to soil conditioning operations, the Contractor in the presence of the Owner shall perform a coverage test of the irrigation system. The Contractor shall furnish all materials and labor required to perform the coverage test and to correct any minor inadequacies of coverage disclosed. The Contractor shall inform the Owner of any deviation from the plan required due to wind, planting, soil, or site conditions that bear on proper coverage. If such notification of necessary corrections or additions to the irrigation system is not provided prior to or during the coverage test, the Contractor shall make all subsequent adjustments and corrections needed for proper coverage without any extra cost to the Owner.
2. Prior to the start of the maintenance period, the irrigation system shall be reviewed by the Owner for proper operations, and a review of and training on equipment and associated controls performed. Any corrections and/or adjustment shall be made as a condition for the start of the maintenance period and subsequent Final Acceptance.
3. Submit a Pump Start-up and Training Report after start-up. Include a copy in the O&M manual.

- D. Final Acceptance: The work will be accepted in writing when the entire project improvements have been completed to the satisfaction of the Owner. In judging the work, no allowance for deviation from the original plans and specifications will be made unless already approved in writing at proper time. Should it become necessary for the Owner to occupy any portion of the work area before the contract is fully completed, such occupancy shall not constitute acceptance. The Contractor will not be responsible for any damage caused by the Owner's separate work forces.

1.11 REJECTION OF NON-CONFORMING MATERIAL OR WORK

- A. The Owner reserves the right to reject any material or work which does not conform to the contract documents. The rejected material or work shall be removed or corrected by the Contractor at no additional cost to the Owner.

1.12 OPERATIONS AND MAINTENANCE INSTRUCTIONS & RECORD DOCUMENTS

- A. The Contractor shall prepare and deliver to the Owner's Representative within ten (10) calendar days prior to completion of the maintenance period, all required and necessary descriptive material in complete detail and sufficient quantity, properly prepared in two individually bound sets of Operating and Maintenance Manuals. These manuals shall describe the material installed and shall be in sufficient depth to permit operating personnel to understand, operate and maintain all equipment. Spare part lists and related manufacturer identification shall be included for each installed equipment item. Each complete, bound manual shall contain the following information:
1. Cover sheet stating Contractor's address and telephone number, duration of guarantee period, and a list of equipment, with names and addresses of local manufacturer representatives and warranty periods.
 2. The Contractor to issue a "CERTIFICATE OF CONSTRUCTION COMPLIANCE" which indicates that all work done, materials and equipment used and installed are in compliance with the approved plans, specifications and all authorized revisions and that the system functions properly.
 3. Complete operating and maintenance instructions and warranties on all major equipment.

4. Complete set of manufacturer's literature and specifications of material installed, including parts list.
 5. A list of the controller station number for each control valve if different than the control valve number shown on the drawings.
 6. Initial electrical data on each control valve:
 - a. Ohms reading for each valve taken at the controller (circuit is OFF).
 - b. Voltage reading for each valve taken both at the controller and at the valve (circuit is ON).
- B. The contractor shall furnish one set of As-Built full-scale drawings on bond, and two compact disks with complete sets of digital PDF files of all close-out documents after the As-Built Record Drawings have been reviewed and accepted by the Landscape Architect.
1. Label first page of each document, or set of documents, "AS-BUILT PROJECT RECORD" in neat large printed letters on lower right hand corner. Record information concurrently with construction progress. Prints for this purpose may be obtained from the Owner. This set of drawings shall be kept on the site and shall be used only as a record set. Do not conceal any work until required information is recorded. These drawings shall also serve as work in progress sheets, and the Contractor shall make neat and legible annotations thereon daily as the work progresses, showing the work as actually installed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the Owner.
 2. Drawings: Legibly mark to record actual construction:
 - a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Give sufficient horizontal and vertical dimensions to accurately trace route and depth of each concealed line or item. Accurately locate each capped, plugged or stubbed line.
 - b. Field changes of dimension and detail.
 - c. Changes made by Field Order, Addenda, or other change document.
 - d. Show the final controller station number for each control valve if different than the control valve number shown on the drawings.
 3. Deliver all Close-out Documents (As-Built) to the Owner. Accompany submittal with transmittal letter in duplicate, containing:
 - a. Date.
 - b. Project title.
 - c. Contractor's name and address.
 - d. Title and number of each Record Document (As-Built).
 - e. Signature of Contractor or his authorized representative.
- C. The Contractor shall provide controller chart(s) as follows:
1. The Contractor shall provide two controller charts for each controller's area of work.
 2. The chart shall show the area of work controlled by the automatic controller and shall be the maximum size that the controller door will allow.
 3. Show the controller station number for each control valve if different than the control valve number shown on the drawings.
 4. The chart may be a reduced drawing of the actual as-built system. However, in the event the valve numbering is not legible when the drawing is reduced, it shall be enlarged to a size that will be readable when reduced.
 5. The chart shall be colored with a different permanent color for each station.
 6. The chart shall be enclosed in a waterproof envelope or laminated.
- D. Per MWEL Section 492.9, upon completion of the landscape planting and irrigation system, and as a condition of Final Acceptance and/or the issuance of a Certificate of Occupancy, the licensed landscape contractor shall submit to the approving agency and/or Owner, the following items in a form acceptable to the approving agency and/or Owner:
1. Project information and contact information for the Owner and Applicant (Contractor).
 2. Certification that the installation complies with the approved Landscape Documentation Package.

3. Irrigation scheduling parameters used in programming the controller during the establishment and maintenance periods.
4. A Schedule of Irrigation System Maintenance.
5. A Landscape Irrigation Audit Report per MWELO Section 492.12. Provide the Audit Report unless the report is not required by the approving agency or Owner.

1.13 SPARE PARTS AND EQUIPMENT

- A. Prior to the conclusion of the maintenance period, furnish the Owner with the following spare parts and equipment:
 1. One quick coupler key with attached hose swivel for each set of four quick coupler valves installed.
 2. Ten spare nozzles for each different sprinkler head arc and/or radius nozzle installed.
 3. One valve key for the 2" operating nut and/or hand wheel isolation valve.
 4. One hundred feet of in-line emitter tubing with ten straight and ten ninety degree compression fittings.
 5. One functional Universal controller remote programmed to operate the system controllers.

1.14 WORK AREA AND SAFETY

- A. The Contractor shall furnish, erect, and maintain all temporary facilities; perform all temporary work during the period of construction, including those herein specified. All facilities shall be maintained in proper and safe operating and sanitary conditions at all times.
- B. The Contractor shall comply with the provisions of the Construction Safety Orders, and General Safety Orders issued by the State Division of Industrial Safety, as well as all other applicable laws, ordinances and regulations.
- C. The project site shall be maintained in a neat and safe condition at all times. Cleanup shall be accomplished as the work progresses and upon completion of the work. The Contractor shall provide adequate safety measures to protect workers and the public from injury.

1.15 GUARANTEE

- A. Irrigation system consisting of materials, equipment and workmanship shall be guaranteed for proper operation a minimum of one year from date of Final Acceptance of the Work or the Notice of Substantial Completion of the Project, whichever is later. Manufacturer's warranty periods may be longer, and shall be noted in the close-out documents.
- B. The Contractor shall be held responsible for repair and/or replacement of damages to new or existing improvements resulting from the defects of materials, equipment or workmanship one year from the date of Final Acceptance of the Work or the Notice of Substantial Completion of the Project, whichever is later.
- C. The Owner reserves the right to make temporary repairs as necessary to keep the irrigation system equipment in operating condition. The exercise of this right by the Owner shall not relieve the Contractor of his responsibilities under the terms of the Guarantee as herein specified.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. Schedule rated white rigid PVC Pipe shall be made from NSF approved Type 1, Grade I, PVC compound conforming to ASTM D-1785.

- B. Class rated (Standard Dimension Ratio) white rigid PVC Pipe shall be made from NSF approved Type 1, Grade I, PVC compound conforming to ASTM D-1784.
- C. PVC pipe shall be of the Class or Schedule as follows:
 - 1. PVC pipe shall meet ASTM D-2241 for solvent weld, plain end, ASTM D-2672 for solvent weld, bell end, and ASTM D-3139 for gasketed bell end. Pipe shall be of the Schedule and/or Class as indicated herein.
 - 2. Pipe sleeves under paving shall be PVC Schedule 40 for 3-inch and smaller or SDR 35 for 4-inch and larger pipes.
 - 3. Riser and/or manifold pipe connecting valves to main line fittings shall be Schedule 80 PVC.
 - 4. Pressurized main line pipe shall be Schedule 40, belled end with solvent welds for pipe sizes less than 2 inches. Pipe sized 2 inches and greater shall be Class 200, SDR 21, with gasketed bell ends.
 - 5. Non-pressurized lateral line pipe shall be Schedule 40, belled end with solvent welds.
- D. All pipes shall be continuously and permanently marked and conform with the following information: manufacturer's name or trademark, nominal pipe size, Schedule or Class of pipe, pressure rating in PSI, ASTM designation and (NSF) seal of approval.
- E. Rigid polyvinyl chloride (PVC) Fittings:
 - 1. White Schedule 40 type I and II grade 1, solvent weld socket fittings ASTM D-2466 for all lateral lines 2-1/2 inches and smaller.
 - 2. Gray Schedule 80 type I and II grade 1 solvent weld socket fittings ASTM D-2464 for all main line less than 2 inches diameter, and lateral lines 3 inches and larger.
 - 3. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable (IPS) schedule, and (NSF) seal of approval.
 - 4. All plastic fittings and connectors shall be injection molded of an improved polyvinyl chloride compound featuring high tensile strength, high chemical resistance and high impact strength in terms of current ASTM standards for such fittings. Where threads are required in plastic fittings, these shall be injection molded also.
- F. PVC Solvent Weld Adhesive: All socket and bell type connections shall be joined with primer and PVC solvent cement which shall meet the requirements of ASTM F656 for primer and ASTM D2564, "Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings." Solvent cement joints for plastic pipe and fittings will be made as prescribed by manufacturer. The high chemical resistance of the pipe and fitting compounds specified in the foregoing sections makes it mandatory that an aggressive colored primer, which is a true solvent for PVC be used in conjunction with a solvent cement designed for the fit of pipe and fittings specified. A heavy bodied, medium set solvent cement, e.g. Weld-On 711 gray, shall be used for all classes and schedules of pipe and fittings.
- G. PVC Pipe Thread Sealant: A non-hardening all purpose sealant and lubricant similar to Permatex #51 or Lasco blue pipe thread sealant which is certified by the manufacturer to be harmless to PVC pipe and fittings. Apply sealant to clean male threads, brushing into grooves and to the first three threads of the female threads. A good quality grade of teflon tape recommended by the manufacturer for use with plastics may be used in lieu of sealant. Minimum width of tape to be used is 3/4". A minimum of two wraps and a maximum of three wraps shall be used.
- H. PVC Swing Joints: Connections to sprinkler heads from lateral lines shall be made with swing joints as detailed. Pre-assembled swing joints from Hunter, King Brothers or Spears are acceptable.
 - 1. Use 6" length nipples for 1/2 inch inlet heads.
 - 2. Use 12" length nipples for 3/4 or 1 inch inlet heads.
- I. Coated Ductile Iron pipe and fittings:

1. Ductile Iron pipe shall be centrifugally cast pipe conforming to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, thickness Class 50, with cement - mortar lining and seal coating per ANSI/AWWA C104/A21.4.
 2. Ductile Iron flanged pipe shall conform to ANSI/AWWA C115/21.15.
 3. Ductile Iron flanged fitting to PVC pipe shall use a 'Megalug' mechanical joint restraint Series 2000PV by EBAA Iron per either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, or equal.
 4. Joints shall comply with the following standards:
 - a. Rubber gasketed/mechanical joints: ANSI/AWWA C111/A21.11.
 - b. Flanged joints: ANSI/AWWA C110/A21.10, B16.1, B16.2.
- J. Coated ductile iron push-on fittings meeting ANSI/AWWA C110 or C153/A21.10 shall be used for:
1. Main line connections for pipe 2 inches and greater in diameter.
 2. New main line service tee at valve connections where a service saddle is not acceptable.
 3. Self-restrained fittings or joint restraints (Leemco LH or equal) shall be used for all elbows, tees, bends, etc fittings.
- K. Coated ductile iron service saddles with stainless steel double straps, Smith-Blair 317, Romac Industries 202NS, or equal, shall be used for remote control/quick coupler valve service connections on main lines 1.25 inch or greater, and where the available outlet size can match the largest lateral line size downstream of the remote control valve.
- L. Galvanized pipe and fittings:
1. Galvanized Pipe shall be hot dip galvanized continuous welded, seamless steel SCH 40 pipe conforming to current ASTM A53 standards.
 2. Galvanized Fittings shall be galvanized, threaded malleable iron SCH 40 conforming to current ASTM A865 standards.

2.2 VALVES

- A. Electric Control Valves:
1. Globe valves operated by low-power solenoid, normally closed, manual flow adjustment. Sizes and types as shown on drawings.
 2. Provide a pressure regulating module on all control valves, or other pressure regulating components as part of the operating spray head or low volume head zones when the dynamic system pressure is, or may be greater than 45 psi.
- B. Control Valve Marking: Christy's valve identification tag (or equal), yellow color (purple color for recycled water) with text designating controller and valve station number, e.g. "A12", or equivalent.
- C. Isolation Valves:
1. Cast bronze, coated ductile iron or coated cast iron gate valve with resilient wedge, non-rising stem and two inch operating nut for main line 2 inch size or greater. Match size of mainline.
 2. Cast bronze threaded gate valve with bronze cross handle for main line less than 2 inch size.
- D. Quick Coupling Valve: Two piece quick coupling valve as shown on the Drawings.

2.3 VALVE BOXES

- A. Control Valve/Master Valve/Flow Sensor boxes:
1. Shrub/Ground Cover areas: Carson 1419 body with lockable tan plastic cover, or equivalent. Drip Valve Kits shall use a Jumbo body with lockable tan plastic cover.
 2. Turfgrass areas: Carson 1419 body with lockable green plastic cover, or equivalent.

3. Hardscape areas: Christy B16 concrete box (11.75" x 22.25") with N16R composite solid flush lid, or equivalent.
- B. Quick Coupler Valve boxes:
1. Shrub/Ground Cover areas: Carson 910 body with lockable tan plastic cover, or equivalent.
 2. Turfgrass area: Carson 910 body with lockable green plastic cover, or equivalent.
 3. Skinned ballfield areas: Christy F08 round concrete valve box (8" ID) with F08R concrete lid, or equivalent. Boxes in a sports venue's field of play that are noted to be installed below grade shall use a metal lid with a non-woven geotextile of a minimum 0.5 lb./sq. yd. covering the lid and box frame.
- C. Isolation Valve boxes:
1. Gate Valve box in hardscape: Christy G05 round concrete valve box (10.375" ID) with cast iron G05C lid, or equivalent.
 2. Gate Valve box in planting areas: Christy F08 round concrete valve box (8" ID) with F08R concrete lid, or equivalent. Use F14 ADS adapter and extension for sizes 2.5 inches and larger.
 3. Ball Valve box: Same as 2.04, A.
- D. Control Valve box marking: Plastic lids shall have branded markings, and concrete lids shall have painted markings on the top of lid with minimum 2 inch high stenciled letters showing controller letter and station number.

2.4 CONTROLLER

- A. The irrigation Controller is existing and shall remain in place. Verify open stations and spare wire, if any in the area of work.

2.5 CONTROL AND TRACER WIRE, COMMUNICATION CABLE

- A. Connections between the automatic controllers and the electric control valves, and tracer wire shall be made with direct burial AWG – UF 600 volt copper wire manufactured for irrigation system use.
- B. Hot control wires for the first controller shall be red. If multiple controllers are installed, the hot wire color shall be orange, yellow, purple in order for each controller. Common ground wire shall be white, with a color stripe corresponding to the hot control wire color when multiple controllers are installed. Spare control wires shall be black and spare common wire blue. Tracer wire shall be green.
- C. Install in accordance with valve manufacturer's specifications and wire chart. In no case shall wire size be less than #14. Common wire shall be a minimum #12 size.
- D. All control wire splices/caps shall be made with direct bury rated, waterproof wire connectors with silicone sealant, Spears DS-500 Dri-Splice, 3M DBR/DBY or approved equal. Use one splice per connector sealing pack.
- E. Apply waterproof numbered wire markers or sleeves at both sides of all splices and at the controller terminal board corresponding to the controller (A, B, etc.) and station number (02, 14, etc.). If multiple valves are connected to one station, add a single digit identifier (1, 2, etc.) to the station number (XX), e.g. A02-1, A02-2, etc.
- F. Communication/flow sensor cable shall be a shielded and jacketed, minimum 16 gauge twisted pair with drain wire, Paige P7162D or equal compliant with the controller manufacturer's specifications.
- G. Below-grade conduit for control wires and/or cables shall be PVC for electrical use with long radius sweeps at direction changes and at valve/splice/pull box terminations.

2.6 IRRIGATION HEADS

- A. Spray/Bubbler Pop-up Head: Molded plastic body with pop-up plastic riser and nozzle. Manufacturer's model numbers are listed with description on the Drawings.
- B. Rotor Pop-up Head: Molded plastic body with plastic riser and nozzle. Gear driven rotation with memory arc, balanced nozzle sets. Manufacturer's model numbers are listed with description on the Drawings.

2.7 DRIP IRRIGATION EQUIPMENT

- A. Flexible distribution tubing shall be 0.66" – 0.70" OD (17mm nominal) fabricated from virgin polyethylene resin specifically designed for subsurface drip irrigation use and conforming to ASTM D 1248 for Type I, Class C, Category 4 Grade P14, and to ASTM D-3350 for PE 122111C. Provide all fittings, connectors and accessories compliant with the tubing for a complete, properly functioning system.
- B. Pressure rating of tubing shall be as defined in Standard ASAE S435. Burst strength shall be minimum 50 psi at 176 degrees F for 4,200 hours.
- C. In-line wye filters shall be type as noted on the Drawings. Filter element shall be molded polyester screen cylinder with minimum 150 mesh screen (blue).
- D. Preset pressure regulators shall be type as noted on the Drawings for above or below ground application.
- E. In-line emitter tubing shall be a below grade product with self-cleaning emitters. Manufacturer as noted on the Drawings.
- F. Flush valve as noted on the Drawings.
- G. Operation indicator shall be a 6 inch pop-up sprinkler body with built-in check valve. Install a bubbler or variable arc nozzle that can be adjusted to a no-flow condition, Hunter ECO-INDICATOR, or equal.

2.8 CONCRETE

- A. Cast-in-place Portland cement concrete used for pipe encasement, cover, thrust blocks, pipe support or other below-grade use shall at minimum comply with 2,800 psi 28 day strength.

2.9 OTHER MATERIALS

- A. Materials not specifically indicated but necessary for the proper execution of this work shall be of first quality as selected by the Contractor subject to the acceptance of the Owner.
- B. All materials appearing in the legend and details of the irrigation drawings are to be furnished and installed by the Contractor unless specifically noted to the contrary. Contractor is responsible for installation according to plans and details. The system shall efficiently and uniformly irrigate all areas and perform as required by these plans and specifications.
- C. Granular bedding material shall be clean natural occurring sand, free from clay, salt, sea shells or organic material, suitable for the purpose intended, and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No. 200 sieve.

PART 3 - EXECUTION

3.1 SYSTEM DESIGN AND VERIFICATION

IRRIGATION SYSTEM

- A. Contractor shall verify existing pressure and any existing irrigation equipment, and shall inform the Owner of any discrepancies between the existing systems' make and model of equipment, such as sprinkler heads, control valves, etc., and those indicated in the Drawings in writing prior to the start of irrigation system installation. Failure to inform the Owner of any discrepancy within seven working days prior to beginning of system installation will place the responsibility of any and all corrective action on the Contractor at no expense to the Owner.

3.2 PIPING INSTALLATION

- A. General:
1. Any equipment installed by the Contractor and deemed to be for the use of the Owner in various situations (i.e., control valves, control panels, etc.) shall be so installed to be readily accessible and quickly operable. Equipment deemed by the Owner to be inoperable for its intended purpose shall be reinstalled by the Contractor in an operable position before approval will be given. Any changes made by the Contractor shall be done without any additional cost to the Owner.
 2. The Contractor shall be responsible for layout of proposed facilities and any minor adjustments required due to differences between existing conditions and the Drawings. Any such deviations in layout shall be within the intent of the original drawings, and without additional costs to the Owner. The Owner will indicate the proposed precise location of the control panels. Head spacing on drawings is diagrammatic. Head spacing and patterns shall be adjusted to provide complete and adequate coverage with a minimum spray on non-planted areas. Where head spacing is not specifically noted, Contractor shall install sprinkler heads evenly along the irrigation area's perimeter. Flush all lines prior to installation of heads.
 3. Support piping without strain on joints or fittings and allow for piping expansion and contraction. "Snake" pipe into trench in accordance to manufacturer's recommendations to allow for expansion. Lay on solid bedding, at uniform depth.
- B. The Contractor shall examine all other portions of working drawings and plan trenching and pipe layout so that no conflict will arise between irrigation and any other work. Any corrective action will be the Contractors responsibility at no further expense to the Owner.
- C. Excavations:
1. Excavations shall be open vertical construction, sufficiently wide to provide clear working space around the work installed and to provide ample space for backfilling and tamping.
 2. The use of a vibratory plow or methods other than open vertical trenching will not be allowed without the written approval of the Owner. To obtain such approval, a field test must be performed, at the proposed site, with the equipment to be used in the presence of the Owner and Owner. The field test is to indicate if the proposed site is favorable to the plowing method. Approval for plowing at one location does not allow the use of plowing at another location. Approval for plowing must be obtained for each location where the use of plowing is proposed. If, at previously approved plowing locations, conditions for plowing become unfavorable as determined by the Owner, plowing shall be terminated.
 3. Trenches for pipe and equipment shall be cut to required grade lines, and compacted to provide an accurate grade and uniform bearing for the full length of the line.
 4. Unless written approval for using native soils as bedding material is given by the Owner, main line pipe shall be placed on a minimum 6 inch depth of granular bedding material.
 5. Excess trench soil with rocks greater than ½ inch diameter shall be removed from the planted area and spread as directed by the Owner.
 6. When two pipes/conduit are to be placed in the same trench, it is required to maintain a minimum six inch (6") horizontal separation between pipes/conduit.
 7. Depth of trenches shall be sufficient to provide a minimum cover above the top of the pipe as follows:
 - a. 24-inch minimum over main lines and wire conduit.
 - b. 18-inch minimum over non-pressure (rotary pop-up) lateral lines.
 - c. 12-inch minimum over non-pressure (pop-up spray head) lateral lines.
 - d. 24-inch minimum from subgrade over any lines located in a paved vehicle area.

- e. Maximum cover above the top of the pipe shall not exceed twelve inches (12") greater than the required minimum cover.
 - f. 12-inch minimum cover over drip line non-pressure lateral and manifold pipe, and main distribution tubing.
- D. Assemblies:
- 1. Routing of pressure supply lines as indicated on drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform with details on plans.
 - 2. Install all assemblies specified herein according to the respective detail drawings or specifications pertaining to specific items required to complete the work. Perform work according to best standard practice.
 - 3. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.
 - 4. All threaded pipe and fittings shall be assembled using an approved teflon tape, or equivalent, applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved teflon tape will be required.
 - 5. No main line elbows, branch tees or isolation valves are to be located closer than five (5) feet to each other without prior approval of the Owner.
- E. Line Clearance: All lines shall have a minimum clearance of four inches (4") from each other, and six inches (6") from lines of other trades. Parallel lines shall not be installed directly over one another.
- F. Plastic to Steel Connections:
- 1. At all plastic (PVC) pipe connections, the Contractor shall work the steel connections first. Connections shall always be plastic into steel, never steel into plastic. An approved teflon tape shall be used on all threaded (PVC) to steel, never steel into plastic. An approved teflon tape shall be used on all thread (PVC) to steel pipe joints applied to the male threads only, and light wrench pressure is to be applied. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved 3/4" wide teflon tape will be required.
 - 2. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of teflon tape. Apply sealant to clean male threads brushing into grooves and to the first three threads of the female threads.
- G. Plastic Pipe:
- 1. The Contractor shall exercise care in handling, loading, unloading, and storing plastic pipe and fittings. All plastic pipe and fittings shall be stored under a weatherproof roofed structure before using and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lie flat so as not to be subject to undue bending or concentrated external load at any point.
 - a. All lumber, rubbish, rubble, concrete and rocks shall be removed from the trenches by the Contractor. Pipe shall have a firm uniform bearing for the entire length of each pipe line to prevent uneven settlement. Wedging or blocking under riser tees shall be done only if specified on the plans. Pad trenches with soil as necessary to provide uniform bearing surfaces.
 - b. Where extensive lengths of pipe are installed, snake pipe in trench from side to side to allow for expansion and contraction. One additional foot per one hundred (100) feet of pipe is the minimum allowance for snaking. Never lay pipe when there is water in the trench or when the temperature is 32 degrees F or below.
 - c. All changes in direction of pipe shall be made with fittings, not by bending. No main line fittings for changes in direction shall be greater than 45 degrees. Provide a minimum five (5) feet between changes in direction fittings.
 - d. Safely handle primers and cements per ASTM F-402. Make solvent weld joints per ASTM D-2855 with a non-synthetic bristle brush in the following sequence:
 - 1) Make sure pipe is cut square and all rough edges and burrs are removed. All connecting surfaces are properly cleaned and dry prior to application of pipe primer.
 - 2) Apply an even coat of colored primer to pipe and fitting prior to application of solvent.

- 3) Apply an even coat of solvent to the outside of the pipe, making sure that the coated area is equal to the depth of the fitting socket.
- 4) Apply an even light coat of solvent to the inside of the fitting.
- 5) Apply a second coat of solvent to the pipe.
- 6) Insert the pipe quickly into the fitting and turn pipe approximately one-eighth to one-quarter turn to distribute the solvent and remove air bubbles. Hold the joint for approximately fifteen seconds so the fittings do not push off the pipe.
- 7) Using a clean rag, make sure to wipe off all excess solvent to prevent weakening at joint.
- 8) Exercise care in going to the next joint so that pipe is not twisted, thereby disturbing the last completed joint.
- 9) Allow at least fifteen minutes setup time for each welded joint before moving.
- 10) Repairing plastic pipe when damaged shall be done by replacing the damaged portion of pipe.

- H. Concrete Thrust Blocks: Concrete anchors or thrust blocks shall be provided on pressure main pipelines 2 inches or greater in diameter at abrupt changes in pipeline grade, changes in horizontal alignment (bends, tees and crosses), reduction in pipe size (reducers, reducing tees or crosses), end-line caps or plugs, and/or in-line isolation valve to absorb any axial thrust of the pipeline. The pipe manufacturer's recommendation for thrust control shall be followed. Thrust blocks must be formed against solid unexcavated earth (undisturbed). Do not enclose entire joint in concrete. Provide a minimum of three cubic feet of concrete for each thrust block.
- I. Concrete thrust blocks may be eliminated if the main line piping system uses self-restrained fittings and bell joint restraints per manufacture's specifications throughout.

3.3 PIPE DEPTH AND BACKFILL

- A. Backfill shall not be placed until the installed system has been inspected, pressure tested and approved by the Owner.
- B. Backfill for first 6 inches underneath, and 4 inches around and above main line pipe and control wires shall be granular bedding material, unless the Owner approves in writing that native soil may be used for initial backfill in lieu of granular bedding material. Backfill material for the upper portion of the trench shall be approved soil. Unsuitable material, such as pipe remnants and wire including clods and rocks over two inches (2") in size, shall be removed from the premises and disposed of legally at no cost to the Owner.
- C. Backfilling for all pipe shall be carried out in two basic stages.
1. Stage One Backfilling: This shall be accomplished as soon as possible after the pipe is laid. A bedding of uniform depth with no voids must be provided along the entire length of the pipe. The bedding material should be placed in the trench and tamped into the areas under the pipe, using a suitable tool. Joints should be left exposed until hydrostatic tests are completed. Cover only those portions of the pipe necessary to prevent movement or damage.
 2. Stage Two Backfilling: This shall be completed after all hydrostatic tests are completed and the piping system has been thoroughly checked for leaks or other defects. Continue to add backfill material in four inch (4") layers and hand tamp to achieve density similar to adjacent soil. After twelve inches (12") in main line trenches and eight inches (8") in lateral line trenches of hand tamped soil is in place over the pipe and fittings, backfilling can be continued, using light machinery to place dirt in the trenches in six inch (6") layers and to compact the dirt to conform to adjacent soil. Extreme care should be taken to avoid damage to the pipe from machinery that is too heavy. All trenches shall then be water jetted to assure uniform settling and compaction. Backfilling operations will not be considered complete until the top surface has been graded to conform to the adjacent soil. All rocks uncovered and not used as backfill must be collected and removed from the site.
- D. All backfilling shall be done carefully and shall be properly tamped. All soil shall be tamped and puddled to eliminate any voids.

- E. Surplus earth remaining after backfilling shall be disposed of as directed by the Owner.
- F. PVC piping and fittings shall not be backfilled during periods of extreme heat or when a sudden lowering of temperature of the pipe may cause separation of joints or fittings.
- G. Contractor shall fill with properly amended topsoil any irrigation trench that subsides during the warranty period. Contractor shall assume all cost associated with the trench repair, including but not limited to plant replacement of a size of plant disturbed at the time of the repair.

3.4 BACKFLOW PREVENTION ASSEMBLY

- A. Check the existing backflow assembly for leaks or any improper condition. Notify the Owner as such if found.

3.5 CONTROL AND TRACER WIRE, AND COMMUNICATION CABLE

- A. Install control wires alongside of main line piping. Do not tape wires together when encased in sleeve or conduit. Minimum cover shall be 24 inches. Crimp wires together at valve manifold with Scotchlok connector. Conventional valve wire splices shall use a 3M DBY splice kit. Tag all control wire at splices with approved control wire markers.
- B. Wire size shall be determined by the number of valves operating on a given wire and the distance from the controller to the farthest valve, as specified by the charts furnished by the remote control valve manufacturer. Splices are only allowed when rerouting or repairing existing wire. All splice connections must be provided in a valve box.
- C. Communication/sensor cable shall be installed in electrical conduit with long radius sweeps at direction changes and at valve/splice/pull boxes. Maintain a minimum six inch clearance to adjacent pipe. Minimum cover shall be 24 inches.
- D. Install tracer wire along the top of pipe at the following locations:
 - 1. All pipe sleeves.
 - 2. Main line pipe without adjacent control wire.

3.6 VALVES

- A. The Contractor shall make all necessary connections for operation, and shall be connected and aligned to provide the most efficient flow of water to the irrigation heads. Where pressure regulating electric control valves are specified, the Contractor shall adjust the valve so a uniform distribution of water is applied by the heads, and that the most remote heads operate at the pressure recommended by the head manufacturer.
- B. Each valve is to be enclosed in a separate valve box. The valve box shall be secured on firm soil clear of valves and wiring connections. Valve boxes and lids shall be set to finished grade or as indicated on the Drawings. Use valve box extensions of the same material as the box to the proper depth below the pipeline. Valve boxes shall be supported by common bricks at each corner and at the long side of the box. Use a minimum of six bricks to support rectangular boxes and four bricks to support round boxes. Backfill carefully and properly compact in order to prevent settlement and subsequent damage.
- C. Install a concrete collar around valve boxes when located in asphaltic concrete pavement or in turfgrass areas.
- D. When existing valve and/or splice boxes are within the area of work, replace in kind any damaged boxes and/or lids, unless noted otherwise. Adjust the elevation of all existing boxes within the area of work to final grade per the drawings.

- E. Locate valve boxes in ground cover/shrub planting areas instead of turfgrass areas whenever possible. Locate valve boxes 18" from and perpendicular to adjacent paving. When grouped together, provide equal spacing of at least 36" between boxes.
- F. Permanently attach the plastic valve identification tag to the remote control valve body and locate so it's clearly visible in an open valve box.
- G. Permanently secure the control valve identification label to the top of concrete valve box lids with non-corrosive connectors.

3.7 SPRINKLER HEAD INSTALLATION

- A. Head spacing on drawings is diagrammatic. Head spacing and patterns shall be adjusted to provide complete and adequate coverage with a minimum spray on non-planted areas. Flush all lines prior to installation of heads.
- B. Overhead distribution sprinkler heads shall be installed as detailed, set adjacent to the edge of hardscape elements (2 - 4 inches for spray heads, 6 - 8 inches for rotary heads) and perpendicular to the finish grade. Sprinkler spray heads directed toward a building shall be a minimum 7 feet from building walls, and a minimum 2 feet when directed away from the building. Sprinkler heads in turfgrass areas shall have a minimum 10 foot radius except for corners.
- C. The top of the nozzle in pop-up bodies shall be flush to the finish grade in areas to receive turfgrass seed/stolons, and in ballfield skinned infields. The top of the nozzle shall be one-half inch (1/2") above the finish subgrade in areas to receive standard cut turfgrass sod.
- D. High speed or other sprinkler heads in dust control zones at ballfield skinned infields shall be installed in turfgrass areas where directly adjacent to the skinned infield.
- E. Where individual shrub bubblers are installed, each plant shall have a bubbler within 10 - 14 inches of the shrub center.
- F. Upon completion of the installation, the Contractor shall adjust or change sprinkler head nozzles to uniformly distribute water without overspray and shall place entire irrigation system in first-class operating condition without any additional cost to the Owner.
- G. Sprinkler heads shall be adjusted in order by fully opening the sprinkler furthest from the control valve and working back toward the control valve. Adjust sprinkler heads which spray toward buildings or adjacent hardscape so that water spray does not contact the side of buildings or significantly over-spray onto hardscape.

3.8 DRIP IRRIGATION SYSTEM

- A. Install control valves, wye strainer, pressure regulator and rigid PVC lateral distribution lines or manifolds prior to planting soil conditioning operations.
- B. Install in-line emitter tubing as follows:
 - 1. After planting soil has been amended, tilled and rough graded, remove and stockpile the planting soil to the required depth of the in-line tubing, and install and stake drip tubing taking into account adjustments needed in the tubing location based on the planting layout. Stake in-line tubing at every-other emitter. Install flush and air relief valves, and operation indicator. Install the operation indicator on the supply manifold with a swing joint in a location easily visible by maintenance personnel.

2. After system flushing, verification of proper operation and inspection, reinstall the stockpiled planting soil and finish grade to final elevation.
- C. Operate the system to moisten the planting soils to a minimum 8 inch depth prior to planting operations.
- D. Program the controller to operate the drip system using the controller's "cycle and soak" feature in order to apply the required daily watering amount in three equal cycles with a one hour delay between cycles.

3.9 CONCRETE

- A. Concrete shall be installed in accordance with the relevant portions of the Site Concrete specification section.

3.10 COMPLETION AND MAINTENANCE

- A. After the system has been completed but prior to the start of maintenance, the Contractor shall operate the automated system with the Owner, shall instruct the Owner in the operations and maintenance of the system and controls, and shall program the controller for each station.
- B. If site satellite controller(s) for a central control system is installed, an authorized central control distributor/installer shall program the central base station to communicate with the site satellite controller(s), and shall verify that proper communication protocols are operational.
- C. The irrigation system shall be maintained and adjusted as required to provide proper coverage throughout the maintenance period or until Final Acceptance of the project, whichever is greater. Irrigation system maintenance shall commence upon an acceptable review following the completion of irrigation installation, planting operations and general clean-up.
- D. The maintenance period shall not terminate until the close-out documents and as-builts record drawings have been submitted and accepted.

3.11 REPAIR AND CLEAN-UP

- A. All areas shall be maintained in a neat and orderly condition at all times. All reasonable precautions shall be taken to avoid damage to new planting and improvements. Disturbed and/or damaged areas shall be restored to their original condition to the satisfaction of the Owner.
- B. Where trenching or other work disturbs existing and/or newly planted turfgrass and/or planting, the Contractor shall reinstall the existing sod if viable, or install a full width of new turfgrass sod or new planting to match the existing turfgrass/planting species, variety and size, after first conditioning the top 6 inches of soil per the Landscape Planting specification. Adjust finish grades to account for the new turfgrass sod's soil mat so that the new sod is flush to the adjacent turfgrass.
- C. After the irrigation operations are completed, the Contractor shall remove all trash, excess materials, empty containers or any other debris accumulated by the work from the site. All damage caused by the work shall be repaired or material replaced at the Contractor's expense. The site shall be left in a neat and orderly condition to the satisfaction of the Owner.

END OF SECTION

SECTION 32 90 00 - LANDSCAPE PLANTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The Contractor shall furnish all material, labor and equipment necessary to install all landscape work as indicated in the plans and specifications.
- B. The landscape work includes but is not necessarily limited to the following:
 - 1. Soil preparation including cross ripping of all planting soil.
 - 2. Weed control including an application of a pre-emergent herbicide.
 - 3. Providing import planting topsoil at raised grade planters and/or at planting areas needing fill.
 - 4. Fine grading, conditioning and amending planting topsoil.
 - 5. Installation of turfgrass sod.
 - 6. Planting new trees, plants and ground covers.
 - 7. Tree drainage sump boring and testing.
 - 8. Root Barriers.
 - 9. Installation of mulch.
 - 10. Sixty (60) day maintenance.
- C. Related Work Specified Elsewhere
 - 1. Contract Drawings, Addenda, general provisions of the Contract, including General and Supplemental Conditions, and Division 1 Sections apply to work of this section.
 - 2. Section 32 01 90 – Existing Landscape Protection.
 - 3. Section 32 84 00 - Irrigation System

1.2 DEFINITIONS

- A. Unless noted otherwise, the term "approved" shall mean by the Owner in writing.
- B. Agencies and Organizations:
 - 1. ASTM- American Society for Testing and Materials
 - 2. ANSI – American National Standards Institute
 - 3. ISA – International Society of Arborists
 - 4. SSPWC – Standard Specifications for Public Works Construction, by the American Public Works Assoc./Associated General Contractors of California.
 - 5. TPI – Turfgrass Producers International
- C. Owner: The Owner's authorized representative or authorized consultant.

1.3 QUALITY ASSURANCE

- A. The work of this Section shall be performed by a single firm experienced in landscape planting and holding a current California Contractor's A or C27 License.
- B. Tree and plant quality and sizes shall conform to the current edition of "American Standard for Nursery Stock" for Number One nursery stock as adopted by the American Nursery & Landscape Association (ANSI Z60.1). Plants shall be of uniform, standard size for their listed container size, neither overgrown and root bound or encircling, nor so recently transplanted that the root system is not thoroughly well established throughout the container. Roots should reach the sides of the container and maintain a firm root ball. Pruning shall not be done prior to delivery except by prior approval.

- C. Trees shall also comply with quality characteristics described in "Guideline Specifications for Nursery Tree Quality" current edition, published by the Urban Tree Foundation. Trees not in compliance with any of the following characteristics may be subject to removal and replacement, whether planted or still in their containers.
 - 1. Acceptable caliper and height ranges for the Type, Form and Size of tree.
 - 2. An intact central leader, or after heading of an old leader, the new leader diameter is greater than one-half the diameter of the old leader. Co-dominant leaders are not acceptable.
 - 3. Scaffold branch diameters are less than two-thirds the diameter of the trunk, and without included bark at the attachment.
 - 4. Scaffold branches shall be balanced, well spaced vertically, and with a radially blank section no greater than one-third of the canopy circumference.
 - 5. Temporary branches on the lower trunk shall be less than three-eighths inch diameter, and the clear trunk height shall be no more than forty (40) percent of the overall tree height.
 - 6. The root collar and rootball shall be free of defects, including circling, kinked and girdling roots. Roots at the edge and bottom of the container shall be less than one-quarter inch diameter, and uniformly distributed throughout the container.
 - 7. The tree canopy width shall be a minimum of twenty-five percent of the standard form tree height, except for naturally columnar forms.
- D. Botanical names shall take precedence over common names. Provide plants that are true to name. Tag one representative plant of each species and size with the botanical name and size.
- E. Inspection:
 - 1. All landscape work and materials shall comply with applicable Federal, State, County and City regulations.
 - 2. All plant material shall be reviewed onsite or by providing photo submittals by the Owner's Representative and/or Landscape Architect prior to positioning and planting. The lack of a review shall not limit the right of rejection during any stage of the work until Final Acceptance for any reason including condition of the foliage or root ball, size, variety, form, appearance, latent defects or injuries or location errors. Rejected or wrongly located plants shall be removed/relocated from/on the site and replaced/replanted immediately by the Contractor as directed at no additional cost to the Owner.
- F. Qualifications of Workers
 - 1. Employ skilled workers who are thoroughly trained experienced in landscape planting and who are completely familiar with specified requirements and methods needed for proper performance of the work in this section.
 - 2. Provide adequate supervision by a qualified foreman fluent in English that will be continuously onsite during the performance of this work.
 - 3. Weed control pesticides shall only be applied by an individual holding a valid Qualified Applicator Certificate (Category A) issued by the Department of Pesticides Regulation. Submit a copy of the Certificate.
- G. Any pruning of existing trees specified as part of this Work shall be performed under the direct supervision of an ISA Certified Arborist and in compliance with ANSI A300-Part 1 Standard Practices (Pruning).

1.4 SUBMITTALS

- A. In accordance with the Submittal section, submit:
 - 1. A complete materials list of all items proposed to be furnished including estimated quantities.
 - 2. Laboratory analyses of soil conditioning materials shall have been performed within three months of the submittal date.
 - 3. Quality Certificates and/or Certificates of Inspection required by government agencies (providing duplicate copies for the Owner's Representative).

4. Qualified Applicator Certificate, and DPR Registration Certificates and Material Safety Data Sheets for all pesticides/herbicides proposed for use.
 5. Submit photos with a scale marker of all boxed trees, and a representative photo of each species/variety of ground plane plants proposed for use from the nursery source. Photos shall clearly show the individual tree or plant form without background greenery.
- B. Soil amendments: Submit one (1) pint sample and an analysis of organic compost and mulch.
- C. Other Samples: When requested by the Landscape Architect and/or Owner's Representative.
- D. Soil Fertility Analysis and Recommendations:
1. The Contractor shall provide and pay for a fertility analysis of the existing topsoil and any proposed import planting topsoil. After mass grading operations are completed, native soil samples shall be collected for the fertility analysis by collecting a minimum of 5 representative samples of the soil per acre throughout the area of work. Separate samples shall be produced for cut and fill areas, and for any other area composed of soils not similar to the existing soils. Each sample shall be a minimum of one pint each, and shall be thoroughly mixed together to prepare a homogenous sample. A one quart representative sample for cut, fill and any other special conditions shall be submitted to the soil testing laboratory as a representative sample for fertility analysis. The fertility analysis shall at a minimum provide the following data:
 - a. soil texture class and percent sands, silts and clays per ASTM D422
 - b. estimated soil infiltration and percolation rates
 - c. pH
 - d. organic matter (%)
 - e. total soluble salts (ECe)
 - f. Cation Exchange Capacity (CEC) and Percent Cation Saturation for K, Mg, Ca and Na
 - g. major and minor nutrients (ppm).
 2. Recommendations for improvement of the soil conditions for optimum plant growth shall be made by the testing laboratory, and at a minimum shall include the following:
 - a. A fertilizer and amendment application program (including macro and micro nutrients) for both pre-planting and maintenance fertility applications for broad area tillage and for planting pit backfill (pre-plant only).
 - b. Treatments to neutralize soil pH and to correct any adverse conditions as warranted.
 - c. Recommendations shall address soil conditioning for both planting area tillage and tree/plant planting pit backfill.
 3. The soil analysis and recommendations shall be performed by one of the following laboratories capable of providing the above analyses by a licensed soil scientist:
 - a. D&D Agricultural Laboratory. Contact Darrin Peters at 559-348-1818.
 - b. Wilber-Ellis Company. Contact Michael Cline at 209-442-1220.
 4. The Contractor shall submit the results of the soil testing investigations and shall receive written direction from the Landscape Architect before proceeding with any soil conditioning activities such as fertilizing and/or tillage of amendments.
- E. Within seven days from the start of the maintenance period, submit a calendar of maintenance activities, including scheduled dates for mowing, fertilizing, weed control and all other activities. Provide the quantities of maintenance fertilizer and any other materials scheduled to be used in each application during the maintenance period.
- F. Submit invoices and/or delivery tags from material suppliers for all amendments, fertilizer, seed, plants, mulch and any other materials provided for the landscape planting installation and applied during the maintenance period. Submit tags from seed packaging indicating seed varieties, percent purity and percent germination minimums. The invoices and/or delivery tags shall be provided directly to the Owner's

Representative/Inspector of Record within 24 hours of delivery to the site, as well as to the normal submittal recipients per the Contract Documents.

- G. Close-out Documents: Submit prior to the end of the maintenance period. Acceptance of the Close-out documents in a condition for scheduling a Final Acceptance review. Provide two bound copies of the following:
1. Cover sheet stating Contractor's address and telephone number, duration of guarantee period, and a list of plant nurseries, materials and equipment vendors with names and addresses of the vendor/manufacturer representatives and warranty periods.
 2. A "CERTIFICATE OF CONSTRUCTION COMPLIANCE" which indicates that all work done, materials and equipment used and installed are in compliance with the approved plans, specifications and all authorized revisions.
 3. Maintenance Manuals and Instructions: Submit a monthly schedule of procedures to be established by Owner for maintenance of landscapes (trees, mixed planting and turfgrass) for one full year and shall include recommendations for fertilizing, pest and disease control, weeding, mowing, aeration and top dressing.
 4. Soil Amendment and/or Seed/Stolon confirmation form noting the installed quantities of materials, tags or invoices from Subsection F. above, and the person who confirmed the delivery and installation of the materials.
 5. Operations and Maintenance Manuals and Warranty certificates for any maintenance equipment turned over to the Owner.
 6. As-built Record Drawings with all modifications to the Drawings noted in red ink, and the Landscape Planting Observation Log completed.

1.5 AVAILABILITY

- A. The Contractor shall confirm availability of plants, supplies, and materials prior to submitting his landscape bid. Plant variety substitutions are not desired.
- B. If a plant is found not to be suitable or available, the Contractor is to notify Landscape Architect before bidding. The Landscape Architect is then required to select a reasonable alternate and to inform all those bidding of the availability of the original plant. If a substitute is selected it must be of the same size, value and quality as the original plant. Failure to inform the Landscape Architect of unavailable plants prior to bidding will require that all plants specified shall be provided by the Contractor at time of installation.
- C. Plant container size listed on construction documents are minimum acceptable size. If plant material specified is not substituted prior to award of the contract the minimum container size specified shall be provided by the Contractor. If the Contractor can not provide the minimum specified size plant material at the time of installation, the Contractor shall be required to install a larger size container of the plant specified at no additional cost to the Owner.

1.6 EXISTING CONDITIONS

- A. The Contractor is to visit the job site to verify existing conditions including soils, vegetative growth, subsurface conditions, existing grade and drainage, irrigation system etc. making allowances in his bid for any required work to provide the landscape installation as specified in the construction documents.
- B. The Contractor shall notify the Owner to locate underground lines prior to hole boring or trenching. Do not permit heavy equipment such as trucks, rollers, or tractors to damage utilities. Hand excavate as required to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned. Prevent damage to temporary risers of underground irrigation system and similar obstructing work located in the landscape areas.

- C. If there is a conflict with existing utilities, improvements and/or planting and the proposed planting, Contractor shall promptly notify the Owner's Representative for instructions as to further action. Failure to do so will make Contractor liable for any and all damage or corrective actions arising from his operations.
- D. Prior to the start of this work, the Contractor and the Owner's Representative shall verify the operational condition of that portion of the existing irrigation system pertaining to the proposed planting area. The Contractor shall notify the Owner's Representative of any repairs and/or corrections necessary for proper functioning and coverage. The repairs and/or corrections shall be completed before any plant material is planted. Failure to perform system verification and provide notification prior to the start of this work will make the Contractor liable for any and all repairs and/or corrections necessary for proper functioning and coverage, as well as any required plant replacement, without any additional cost to the Owner.
- E. No plants shall be planted in situations that show poor drainage infiltration or low areas that result in standing water. Such situations shall be corrected by the Contractor as directed by the Landscape Architect or Civil Engineer. Failure by the Contractor to notify the Owner of poor drainage conditions prior to proceeding with the conditioning or planting operations shall place the responsibility for any plant removals, additional soil conditioning and replanting on the Contractor without any additional cost to the Owner. Any corrections of finish grading not in compliance with the Contract Documents including plant removal, soil conditioning and replanting shall be performed by the Contractor at no additional cost to the Owner.

1.7 PROTECTION

- A. The Contractor shall guarantee repair of damage to any part of the premises resulting from but not limited to leaks, defects in materials or workmanship, operation of equipment, storage of materials and/or equipment, installation of underground or overhead utilities. The Contractor shall be liable for any and all accidents resulting from his work, including open holes and trenches during construction.
- B. Protect new and existing landscape areas in the area of work from theft, loss, damage and deterioration during storage, installation and maintenance. Protect from unauthorized persons (trespassers) as well as from operations by other contractors and tradesmen, and landscape operations. Protect all planted turf and shrub areas from persons as well as operations of other contractors and the Owner. Cost of protection shall be born by the Contractor with means of protection such as temporary fencing as approved by Owner. Cost for protection shall be included in the Contractor's bid for the work.
- C. Contractor shall repair or replace damaged work and/or damage to existing improvements/landscape as identified by the Owner's Representative to a condition acceptable to the Owner's Representative. No additional payment will be made to the Contractor for repair or replacement of damaged work and/or damage to existing improvements/landscape.

1.8 OBSERVATIONS

- A. The Owner's Representative, Project Inspector or Landscape Architect shall perform periodic observations and shall record the observation on the Landscape Planting Observation Log form on the As Built Record Drawings. Such observations shall include but are not necessarily be limited to:
 - 1. Weed control operations prior to other portions of work.
 - 2. Ripping and soil conditioning of the planting area.
 - 3. Layout of the plant material and trees at the site prior to planting in order to avoid conflicts and to meet the design intent.
 - 4. Condition and quality of plant material prior to planting.
 - 5. Auguring, digging and preparation of plant pits and drainage sumps for trees and shrubs.
 - 6. Planting and staking of trees.
 - 7. Planting of shrubs, ground cover and turfgrass.

- B. Any corrective action called for shall be immediately performed by the Contractor.
- C. Failure by the Contractor to obtain the above observations shall place the responsibility on the Contractor for any relocation and/or replacement of planted trees or shrubs.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Plant label shall identify each species and variety. A label shall be attached to each individual plant or block of identical plants grouped together.
- B. Adequately protect plants from sun and wind prior to planting. Do not allow stored plant material to dry out at any time.
- C. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at the site. Store materials and equipment in a location as directed by the Owner's Representative.

1.10 PESTICIDE NOTIFICATION

- A. A written notification of any and all pesticide/herbicide products scheduled for use by the Contractor or their representative on the Owner's property must be submitted to the Owner's Representative at least seven days prior to the scheduled application. Notification shall include the product name, manufacturer's name, the pesticide active ingredient, the U.S. EPA and CalDPR registration numbers, the scheduled date and application areas, and the reason (target species) for the application.

1.11 REPAIR OF DAMAGED EXISTING PLANTING AREAS

- A. The Contractor shall be responsible to repair all damage and/or distress to existing planting areas including turfgrass, shrubs, ground covers, perennials, etc., whether specifically shown on the Contract Documents or not, as a result of construction operations, material and/or equipment storage, site access, site offices, utility and/or irrigation line installations or other actions.
- B. Replacement shrubs shall be 15 gallon size, replacement ground cover and perennial plants shall be 5 gallon size, and turfgrass shall be full width sod. Damaged areas shall be amended and finish graded per the Contract Documents prior to planting. Non-turfgrass planting areas shall also receive wood mulch as specified herein. The limits of repair shall be determined by the Owner.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil used in planting areas shall be a clean, friable soil with no noxious weeds, clods or stones larger than 0.5 inch in diameter, subsoil, hardpan, wood, debris, fine organic material greater than 5%, undesirable insects, plant disease or any other natural or extraneous objects detrimental to normal plant growth to a minimum depth of 18 inches from finish grade.
- B. The Contractor shall provide a particle size analysis, fertility testing and amendment recommendations of proposed native and/or import topsoil, and the Landscape Architect reserves the right to reject topsoil not conforming to the minimum specifications. Stockpiled onsite topsoil may be used if analysis and testing determines compliance with these requirements prior to placement. Failure to meet minimum specifications shall result in the removal of any unauthorized placed topsoil at the Contractors expense.
- C. Particle size distribution for topsoil shall meet the following per ASTM D422:

1. 100% passing a 12.2 mm (1/2") screen.
2. Minimum 95% passing a 9.5 mm (3/8") screen.
3. Minimum 75% passing a 2.36 mm (No. 8) screen.
4. Maximum 45% passing a No. 200 screen.
5. Silt content shall be a maximum 35%.
6. Clay content shall be a maximum 25%.
7. Silt to Clay ratio shall be less than 2 and greater than 0.5.

D. Other characteristics shall conform to the following:

1. Permeability rate shall be not less than one (1.0) inch per hour or not more than 20 inches per hour.
2. The sodium absorption ratio (SAR) shall not exceed 3.0 and the electrical conductivity (ECe) shall not exceed 2.5 milliohms per centimeter at 25 degrees centigrade.
3. Soluble boron shall be no greater than 1.0 part per million (mg/l).
4. Soil pH range shall be 6.5 – 7.9.
5. Maximum concentration of soluble chloride shall be 150 parts per million.
6. Maximum concentration of heavy metals shall not exceed the following when the pH is between 6 and 7:
 - a. Arsenic: 0.5 ppm
 - b. Cadmium: 0.5 ppm
 - c. Chromium: 5 ppm
 - d. Cobalt: 1 ppm
 - e. Lead: 15 ppm
 - f. Mercury: 0.5 ppm
 - g. Nickel: 2.5 ppm
 - h. Selenium: 1.5 ppm
 - i. Silver: 0.25 ppm
 - j. Vanadium: 1.5 ppm
7. Petroleum hydrocarbons shall not exceed 100 mg/kg dry soil.
8. Aromatic volatile organic hydrocarbons shall not exceed 2 mg/kg dry soil.

2.2 SOIL AMENDMENTS

- A. Organic Compost: "Harvest Premium" as supplied by Harvest Power (559) 435-1114; "WonderGrow Compost" by Grover, Inc. (866) 764-5765, or "Allgro Compost" by Synagro (559) 341-5158, and conforming to the following minimums per the US Composting Council 'Compost Technical Data Sheet' report dated within three months of the submittal date:
 1. Certified as "Mature" or better
 2. Pass EPA Class A standards for pathogens and heavy metals.
 3. Particle size: 1/8" maximum
 4. pH: 6.5-8.5.
 5. Macro-nutrients: Minimum of 1.0% Nitrogen, 0.5% Phosphorus, 0.5% Potassium.
 6. AgIndex ratio (Nutrients/Salts) 10 or more.
 7. Organic matter content greater than 25% dry weight.
 8. Carbon/Nitrogen ratio: less than or equal to 25.
 9. Salinity (ECe): less than 5.0 dS/m.
 10. Odor shall be soil-like (musty, earthy) without any sour, ammonia-like or putrid smell.
- B. Gypsum shall be mined agricultural grade gypsum composed of no less than 95% CaSO₄-2H₂O hydrated calcium sulfate in a pelletized form. Elemental Sulfur shall be a minimum 95% pure agricultural grade.
- C. Dry Humate organic soil conditioner comprised of a minimum 40% humic acid from Leonardite.
- D. Endo 120 Mycorrhizae containing a minimum 60,000 living propagules per pound.

- E. The polymeric soil conditioner shall be a 25% anionic charged, linear polyacrylamide dry, water soluble powder with 15 to 20 million molecular weight. Soilfloc 100D by Hydrosorb, Inc. (714) 771-6040, or equivalent. Note: material cost per 55 pound bag is \$100 or more (varies with quantity) without tax or shipping costs.
- F. Amendment material types and application rates may be subject to change based on the findings and recommendations of the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

2.3 FERTILIZER

- A. Trees and Shrubs: Fertilizer for all trees and shrubs to be BEST PAKS (20-10-5) controlled release fertilizer in a biodegradable 10 gram packet. The BEST PAKS shall be applied at the following rates:
 - 1. 1 Gallon Can: 1 Best-Pak
 - 2. 2 Gallon Can: 2 Best-Paks
 - 3. 5 Gallon Can: 5 Best-Paks
 - 4. 15 Gallon Can: 10 Best-Paks
 - 5. 24" Box: 16 Best-Paks
 - 6. 36" Box: 24 Best-Paks
- B. The pre-plant fertilizer shall be a commercial homogeneous, granular pellet:
 - 1. Pre-plant fertilizer for turfgrass shall be:
 - a. BEST 6-24-24-5S XB+ with Avail
 - 2. Pre-plant fertilizer for mixed plantings shall be:
 - a. BEST Landscape Color 14-14-14 (14-6-11.6-3S and micronutrients) with 9.9% slow release N, or equal.
- C. The maintenance fertilizer shall be a commercial homogeneous, granular pellet:
 - 1. Maintenance fertilizer for turfgrass shall be one or more of the following:
 - a. Urea 46-0-0
 - b. BEST Ammonia Sulfate 21-0-0-24S, standard grade, or equal
 - c. BEST Nitra King 21-2-4-14S-2Fe, or equal.
 - d. BEST Nitex 20-2-3-12S-5Fe, or equal.
 - e. BEST Polyon 43 (43-0-0) slow release N, or equal.
 - f. Wil-Gro Pro Choice Plus, 31-3-7-6S-3Fe with 9.3% slow release N, or equal.
 - g. Best Landscape Color 14-14-14 (14-6-11.6-3S and micronutrients) with 9.9% slow release N, or equal.
 - 2. Maintenance fertilizer for mixed plantings shall be the pre-planting fertilizer.
- D. Fertilizer material types and analysis may be subject to change based on the findings and recommendations from the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

2.4 MULCH

- A. Mulch for on-grade or raised native soil planters shall be a walk-on type of chipped and aged greenwaste woody material without leaves, green wood, sticks, dirt, stones, dust and other non-organic debris as accepted by the Landscape Architect. Particle size 1/2" to 3" in general size.

2.5 STAKING & GUYING MATERIALS

- A. Stakes: 2" Diameter lodgepole pine, pressure treated and pointed one end.
- B. Ties: V.I.T. Cinch Tie, 32 inches long, V.I.T. Products, Inc. (619) 673-1760, or equivalent.

- C. Add guys and deadman anchors for trees over 24" box size.

2.6 PLANTS

- A. Plants shall be typical of their species and variety, shall have normal growth habits, well developed branches and be densely foliated, and shall have fibrous root systems. No substitutions will be allowed unless approved in writing by the Landscape Architect.
- B. Plants shall be free from defects and injuries including disease, insects, insect eggs and larvae and girdled or matted roots.
- C. Quality and size of plants shall be in accordance with ANSI Z60.1-2004, "American Standard for Nursery Stock", and as described in Quality Assurance.
- D. Plants shall not be pruned before planting.
- E. Plant material must be selected from nurseries that have been inspected by State or Federal Agencies.
- F. Plants shall be nursery grown and shall have been transplanted or root pruned at least once in the past three (3) years. Plants shall have been grown under climatic conditions similar to those in the locality of the project.
- G. Each bundle of plants shall be properly identified by weatherproof labels securely attached thereto before delivery to the project site. Label shall identify plant by name.
- H. Nomenclature shall be in accordance with Sunset Western Garden Book, current edition.
- I. No plants shall be removed from their container until a review has been made in the field or at the nursery, or except when specifically authorized in writing by the Owner.
- J. Collected plant material may be used only when approved. Approval shall not limit the right of rejection during work progress for conditions of the root ball, latent defects or injuries.
- K. Where shown a "MULTI" provide trees with a minimum of three trunks.
- L. Plant sizes listed on the planting plan are minimum acceptable sizes. The quantities listed are the Landscape Architect's estimate only. The Contractor is responsible for the quantities of plant symbols shown on the plan, and/or the quantities in hatched planting areas at the specified triangular spacing.

2.7 TURFGRASS SOD

- A. Sod shall be produced from certified or approved seed/stolons, fresh and labeled in accordance with U. S. Department of Agriculture Rules and Regulations. Sod quality shall be Premium or Standard Grade per TPI specifications. Harvested sod shall be big roll size.
- B. Sod shall be neatly mowed and be mature enough that when grasped at one end it can be picked up and handled without damage, delivered to the project site, adequately protected and installation commenced within 24 hours of harvesting.
- C. Turfgrass shall be a species and variety as specified in the Contract Drawings. If a warm-season grass is specified and the installation is to be performed between the months of October and April, a species with an established perennial ryegrass overseeding shall be installed. Submit the overseeded product information for approval prior to the installation.

2.8 ROOT BARRIER

- A. A ribbed polyethylene panel of minimum 0.080" thickness equal to Deep Root Partners #UB 24-2 PANEL, (800) 458-7668.

2.9 TREE TRUNK PROTECTOR

- A. ArborGard+ polyethylene tree guard by Dimex (800) 334-3776, or equal.

2.10 HERBICIDES

- A. Herbicide products for removal of unwanted grass and broad-leafed weeds shall be registered and approved for use by the U.S. EPA and CalDPR, and shall comply with the Owner's Standards and with the "Healthy Schools Act" with current amendments.
- B. Provide pre-emergent and post-emergent, selective herbicide formulations for use on turfgrass areas and/or ornamental shrub/ground cover areas that are not injurious to the proposed plantings and turfgrasses.
- C. Provide a non-selective contact herbicide formulation for use on existing established weeds. The herbicide shall be certified for organic use, broad-spectrum with systemic function, 'Weed Slayer' by Agro Research International, or equal.

2.11 OTHER MATERIALS

- A. Materials not specifically indicated, but necessary for proper execution of the work, shall be of first quality as selected by the Contractor subject to approval of the Landscape Architect.

PART 3 - EXECUTION

3.1 EXAMINATION & PREPARATION

- A. General: Verify that existing site conditions are as specified and indicated before beginning this work.
- B. Damaged Earth: Verify that earth rendered unfit to receive planting due to concrete water, mortar, limewater, hydrocarbons or any other contaminant dumped on it has been removed and replaced with clean earth from a source approved by the Owner's Representative.
- C. Examine the area and conditions under which the work in this section is to be performed. Verify that any existing irrigation system within the limit of work is in proper working order with full coverage. Correct conditions detrimental to the timely and proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of the work signifies acceptance of the existing conditions.
- D. Protection:
 - 1. Locate sewer, water, irrigation, gas, electric, phone and other pipelines or conduits and equipment within the area of work prior to commencing work.
 - 2. Mark existing irrigation heads, valves, valve boxes and other below grade equipment or components that are scheduled to remain. Protect in place.
- E. Runoff and Erosion Control: Furnish equipment, materials and labor necessary to control the flow, drainage, and accumulation of excess water running off the work area and prevent soil erosion, blowing soil and accumulation of wind-deposited material on the site per the approved SWPPP.

3.2 ROUGH GRADING, SOIL PREPARATION, PLANTER BACKFILL

- A. Rough grading shall be performed by other subcontractors to the extent of establishing rough pads, slopes and drainage patterns. The Contractor is responsible for placement of topsoil and grading required to ensure positive drainage in all turfgrass and planting areas. All planting areas shall have a minimum topsoil depth of 18 inches from on-site native and/or approved import sources. Rough grading shall be completed prior to weed control, cross ripping or rock removal operations.
- B. After the completion and acceptance of the weed control operations outlined below, and unless directed otherwise by the Landscape Architect or noted on the Drawings, and except for the area under the canopy of existing trees, the Contractor shall cross rip and till (break up large clumps and clods in excess of 2 inch diameter) the existing soil within all planting areas outside the canopy drip line of existing trees until the soil is loose and friable. Ripping shall be to a minimum depth of twelve inches (12") in turfgrass areas and eighteen inches (18") in shrub/ground cover areas, with ripping tines a maximum 18" apart performed in a minimum of two passes total in different perpendicular directions. The Contractor shall review the completed ripping operation with the Owner's Representative and Landscape Architect to determine compliance. The first 6 inches of any new topsoil fill shall be tilled into the existing soil to a minimum depth of 6 inches prior to placing any further topsoil fill. The Contractor shall provide any additional work as directed by the Owner's Representative after the review to obtain compliance. Do not proceed with the addition of topsoil and/or amendments, or commence rock picking or fine grading until the completed ripping operation is accepted in writing by the Owner's Representative.
- C. Planting area soil under the canopy drip line of existing trees, or in planting beds not accessible by motorized equipment, shall be ripped to a minimum depth of 12 inches using manual spading shovels, forks and/or broadforks and working around major tree roots and/or utilities. In areas receiving new mulch, rip to a minimum depth of 4 inches while protecting any existing plants and their root system. Break up and/or remove rocks and clods as indicated below.
- D. Do not work soil when moisture content is so great that excessive compaction will occur, or when it is so dry that dust will form in air or clods will not break up readily, or when a full ripping depth cannot be achieved. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and dust control. Maintain within 2 percent above or below optimum moisture content for the existing soil type at all times during the work.
- E. After soil ripping and preliminary finish grading is completed, the topsoil shall be cleared of all concrete, wire, sticks, roots, debris and foreign materials. Remove native stones and clods as follows:
 - 1. In shrub/ground cover areas, remove stones and clods greater than one (1.0) inches in diameter from the top 3 inches of finish grade.
 - 2. In general, non-traffic turfgrass areas, remove stones and clods greater than three-quarter (0.75) inch in diameter from the top 2 inches of finish grade.
- F. Add clean planting topsoil where needed to bring grade to elevation to promote positive drainage. Spread approved planting topsoil over ripped subgrade prior to incorporating amendments.
- G. Backfill all raised grade planters with a minimum depth of 18 inches of imported clean sandy loam planting topsoil conforming to Subsection 2.02 and approved prior to import and/or placement. Failure to obtain import approval prior to backfilling raised grade planters shall result in the removal of any planting and non-approved backfill, and the reinstallation of the work with approved materials.

3.3 WEED CONTROL

- A. Weed control pesticides shall only be applied by an individual holding a valid Qualified Applicator Certificate (Category A) issued by the Department of Pesticides Regulation.

- B. The Contractor shall treat any weeds in proposed new turfgrass and planting areas with a non-selective contact weed killer at the manufacturer's approved rates and procedures prior to any commencement of work at the site including any irrigation work, ripping of soils or fine grading. Areas planned for turfgrass seed/stolon planting shall in addition receive "grow and kill" weed removal as outlined below.
- C. Weed eradication shall be ongoing throughout the course of the landscape installation. The Contractor shall apply a pre-emergent herbicide after shrub/ground cover planting and prior to mulch installation. Manually remove weed seed heads. At no time will weeds be allowed to become established. Contractor shall provide all weed control operations as directed by the Owner's Representative.
- D. All weed control operations using pesticides/herbicides shall comply with the CalDPR and Owner Standards as well as AB2260 "Healthy Schools Act". The Contractor shall comply with the notification and posting requirements of the "Healthy Schools Act".
 - 1. The Contractor shall notify the Owner per Subsection 1.11, A.
 - 2. The Contractor shall post highly visible signs around the treatment area in conformance with the "Healthy Schools Act" warning of a scheduled pesticide/herbicide application a minimum of 24 hours before to 72 hours after a pesticide application.
- E. A non-selective contact herbicide for grassy weeds, '20% Vinegar Weed Slayer' by Good Natured, CA DPR Reg# 85208-1-AA-42177, shall be applied directly to the weed foliage. Only apply to dry surfaces, and a minimum of 8 hours before a rain event. Allow a minimum of 14 days from herbicide application to commence any planting.
- F. After the shrub/ground cover planting is complete and prior to mulch installation, apply an approved pre-emergent herbicide per the manufacturer's recommended rates.

3.4 SOIL CONDITIONING

- A. Before commencement of any soil conditioning, weed and rock removal shall be completed as outlined above.
- B. Uniformly amend the entire area of topsoil in turfgrass and mixed planting areas per the following bid rates and per the approved modifications as a result of the soils analysis recommendations:
 - 1. Turf and Non-Sloped (less than 4h:1v) Planting Area Soil Conditioning (per 1,000 square feet).
 - a. Compost at a rate of six (6.0) cubic yards (a 2.0 inch thick layer).
 - b. Gypsum at a rate of 100 pounds, or Sulfur at 19 pounds, or an equivalent combination.
 - c. Humate soil conditioner at a rate of thirty (30) pounds.
 - d. A pre-planting fertilizer to turfgrass areas at a rate of 1.25 pounds of actual P and K.
 - e. A pre-planting fertilizer to mixed planting areas at a rate of 1 pound of actual N.
 - f. Mycorrhizae per Subsection 3.06, Mycorrhizae Application.
- C. Till soil amendments into the entire planting area soil to a minimum depth of six (6) inches. Perform the cultivation in at least two passes, one in each perpendicular directions to the first, so that the amendments are homogeneously incorporated into the topsoil. All cultivation inside the dripline of existing trees shall be preformed manually with minimal disturbance to the root system.
- D. Planting backfill for trees and shrubs shall be a mix of three parts native soil and one part Compost by volume. Add Humate at 2.0 pounds, and Mycorrhizae at 0.5 pounds per cubic yard of backfill.
- E. Amendment material types and application rates may be subject to change based on the findings and recommendations of the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

3.5 FINE GRADING

- A. Upon completion of soil preparation, fine grade all planting and turfgrass areas to a smooth and even slope conforming to and establishing drainage patterns per the approved Grading Plan. Grading shall eliminate all humps and hollows and promote positive drainage in all planting and turfgrass areas.
- B. Where hardscape is installed in existing planting areas, a minimum transition grade width of 2 feet adjacent to the edge of hardscape shall be constructed unless noted otherwise. The maximum slope of any transition grade shall be 20 percent. The area of transition grading shall be planted or repaired as specified herein.
- C. Tolerance of grade differential for planting and general turfgrass areas shall be plus or minus 0.04 foot. If requested, the Contractor shall water test all turf and planting areas after the grading operations are completed in the presence of the Owner's Representative and Landscape Architect. The water test shall consist of applying water to the turf and planting areas to the point where water begins to run over the soil to show the drainage pattern. Make all corrections to the finish grading as required by the Owner's Representative to re-established positive drainage patterns. Acceptance of the finish grading shall be obtained in writing from the Owner's Representative and Landscape Architect prior to proceeding with soil conditioning and planting operations.
- D. After the finish grading process, relative compaction of the soil in turf and planting areas shall range between 82% and 85% relative density. Compaction/moisture levels are generally acceptable if an Oakfield probe is able to penetrate a minimum of six inches into the cultivated planting topsoil with moderate pressure. The Owner reserves the right to require the Contractor to test for over compaction. If the compaction is within the acceptable range, the test will be paid for by the Owner. All testing due to non-compliance will be paid for by the Contractor.
- E. Remove all rocks produced as a result of the soil conditioning and finish grading operations per the requirements of Subsection 3.02.
- F. Finish grades shall be one-half inch (1/2") to three-quarter inch (3/4") for turfgrass sod areas, flush (0.0") for turfgrass seed/stolon areas and two inches (2") for shrub/ground cover planting areas below the finish surface of all adjacent walks, curbs, mowstrips and utility/valve boxes or collars. Transition any grade modification in existing planted areas at a maximum 12h:1v slope to existing grade, unless shown otherwise on the grading plan.

3.6 MYCORRHIZAE APPLICATION

- A. In turfgrass planting areas, after fine grading is completed broadcast Mycorrhizae at a rate of one and one half (1.5) pounds per 1,000 square feet (65 lbs. per acre). Lightly rake into the top one inch (1") of topsoil immediately prior to turfgrass installation.
- B. In shrub and/or ground cover planting areas, the Mycorrhizae inoculant shall be incorporated into the soil with the other soil amendments at five (5.0) pounds per 1,000 square feet (218 lbs. per acre) per Subsection 3.04, Soil Conditioning. Inoculant shall also be incorporated into the planting backfill per Subsection 3.04, E.

3.7 PLANTING

- A. General Requirements
 - 1. Obtain written approval from the Landscape Architect or Owner's Representative to begin planting operations. The irrigation system shall be fully automated and operational, all weeding, soil conditioning and finish grading completed, and the tree and plant layout approved.
 - 2. Planting shall be performed by workmen familiar with planting procedures and under the supervision of a qualified foreman. The planting foreman shall be on the job site at all times when planting is in progress.
 - 3. Planting operations shall not occur under unfavorable weather conditions.

4. Boxed trees shall be planted first. Shrub planting shall be completed before groundcover is planted.
5. Proceed and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of planting required.
6. Cooperate with other contractors and trades working in and adjacent to the planting work areas. Examine drawings which show the development of the entire site and become familiar with the scope of other work required.

B. Planting Preparation and Operations

1. Planting material shall be provided with adequate protection of root system and balls from drying winds and sun. Do not bend or bind trees or shrubs in such a manner as to damage bark, break or destroy natural shape. Provide protective covering during delivery.
2. Deliver trees and shrubs after preparations for planting have been completed, and plant immediately. If planting is delayed more than six (6) hours after deliver, set trees and shrubs in shade, protect from weather and mechanical damage and keep roots moist. Do not remove container grown stock from containers until planting time.
3. All planting areas shall be smooth and even. Finish grades shall be done prior to any placement of plants.
4. Place all trees and shrubs in locations shown on the planting plan and obtain written field approval of the Landscape Architect before planting or digging planting pits. Inform the Landscape Architect seven (7) days prior to placing the plants. Maintain a minimum 15 foot clearance from trees to any light pole, unless specifically noted otherwise.
5. Carefully remove all canned stock from containers with tin snips or approved cutter. Cut away and remove any girdled or matted roots.
6. Excavate holes of circular outline with vertical sides for all plants 15 gallon or less. Boxed trees shall have square planting holes. The vertical sides and bottom of the holes shall be thoroughly scarified to promote union of backfill with existing soils. All trees shall have two drainage sump holes drilled with a twelve inch (12") diameter auger penetrating hardpan layers to a minimum one (1) foot into a sand/gravel layer or to a minimum depth of ten (10) feet below the planting pit bottom. Precautions shall be exercised to avoid smooth sides on the holes. Offset augured holes a minimum of eighteen inches (18") from planned tree location to avoid settling of tree after planting.
7. After cleaning out the sump holes, the Contractor shall test the sumps for drainage by flooding with water. If the water does not drain out within twenty-four (24) hours, auger down as required to achieve such drainage by breaking through the hardpan layer, or by extending the drainage sumps to a minimum depth of 15 feet below the bottom of the planting pit. After obtaining approval of the sump holes, fill the augured drainage sump holes with coarse concrete sand.
8. Tree and shrub planting pits shall be at least two and one half (2.5) times the width of the plant container, but a minimum of 36" wide for trees and 18" wide for container shrubs. Planting pits shall be as deep as the soil depth in the container or box, less the additional height of the crown above the finish grade.
9. Set each plant in the center of the pit, plumb and straight. Set the crown of the plant at one inch (1") for shrubs, two inches (2") for trees above finish grade. When 1/2 of the backfill mix has been placed, tamp-in, insert fertilizer (BEST PAKS as per Section 2.1B1) and allow no air pockets as remainder of backfill is added.
10. Compact soil around the rootball of all plants and thoroughly water in the entire backfill depth.
11. Excess soil from plant holes shall be cultivated and raked to a smooth outline.
12. Shrubs and groundcovers shall be installed in relation to walks and paving to allow for future growth without obstructing traffic with clearance as shown on the drawings.
13. All plants shall be set in watering basin which shall be as wide as the planting pit, but at least four feet (4') in diameter and four inches (4") deep for trees and two feet (2') in diameter and three inches (3") deep for shrubs and vines.
14. Ground cover plants shall be planted at the spacing noted on the drawings. Not more than fifteen minutes shall elapse from the time any groundcover plant is planted until it is watered.

- C. Pruning: Prune plants in accordance with established horticultural practice. Shearing of any plants will not be acceptable. Tree pruning shall only be performed with the written approval of the Landscape Architect and under the direction of a certified arborist, and shall comply with ISA Pruning Standards (ANSI 300).

3.8 MULCH

- A. Prior to any mulch application, perform weed control operations as specified herein.
- B. Where mulch is to be installed in an existing planting area, breakup/till the existing soil in open areas around existing plantings to a minimum 4" depth per section 3.02, and adjust finish grade adjacent to hardscape elements per section 3.05 where not prohibited by existing plantings.
- C. Install a minimum 3" layer of mulch in all non-turf planting areas, except for slopes greater than 3h:1v and seeded areas. Install a minimum 2" layer of mulch in all areas receiving flatted plants.
- D. Install a minimum 3" layer of wood mulch at a minimum 3' radius from the tree trunk of all trees located in turfgrass areas. Provide a smooth finish grade transition to a 2 inch depth where the mulch meets the turfgrass, so that the top elevation of the mulch is flush to the turfgrass soil. Keep mulch off the trunk. For new trees in turfgrass areas, remove the watering berm just prior to the turfgrass planting but maintain the mulched area within the planting pit.

3.9 STAKING & GUYING

- A. Trees shall be supported by two (2) tree stakes as shown on the drawings. Cut off the top of stakes damaged by installation or where the stake conflicts with canopy branches.
- B. Stakes shall be set firmly in the ground outside the rootball and where possible set stakes perpendicular to the prevailing northwest wind.
- C. Trees shall be tied to upright stakes loosely with tree ties (see planting detail). Remove the nursery stake.
- D. Multi-trunked trees shall be guyed, or individual branches may be staked and loosely tied as shown on the Drawings.

3.10 ROOT BARRIER

- A. Install root barrier along hardscape edges whenever the distance from the center of the trunk to the hardscape edge is less than eight (8) feet. Install per the planting details and manufacturers recommendations.

3.11 ARBOR GUARD

- A. Install ArborGard+ on all newly planted tree trunks in turfgrass areas per manufacturer's recommendations.

3.12 TURFGRASS SOD

- A. The area to be planted shall be finish graded to present a smooth and even surface free of humps and hollows and conforming to the finish grading plans. Where new sod is abutting existing turfgrass, fine grade to allow for the thickness of the new sod soil so that the new and existing sod grades are flush. Immediately prior to planting, the surface of the area to be planted shall be sufficiently loose and friable, with adequate moisture to receive the sod. Avoid laying sod on hot or dry soil.

- B. Lay first strip of sod slabs along a straight line (use a string in irregular areas). Butt joints tightly. Do not overlap edges. On second strip, stagger head joints (similar to a running bond brick pattern). Use a sharp knife to cut sod in order to fit curves, edges, and sprinkler heads.
- C. Install with turf-tired machinery full width sections big roll sod as delivered and flush to adjacent surfaces. Terminating sod edges shall be straight and at right angles to hardscape elements whenever possible.
- D. As the sod is being installed, water the sod lightly to prevent drying out. Continue to lay sod and lightly water until installation is complete.
- E. After laying sod, roll to eliminate irregularities and to form good contact between sod and soil. Avoid a too heavy roller or excessive initial watering which may cause roller marks.
- F. Water the completed lawn surface thoroughly. Topsoil should be constantly moist for a minimum two inches deep. Repeat irrigating at regular intervals to keep sod moist until rooted. The areas shall not be watered to the extent of saturating the soil and causing "flotation" or "flowing" of the top surface of the soil. After water has once been applied, no portion of the planted areas shall be allowed to dry out during the entire maintenance period. After sod roots are established, decrease frequency and increase amount of water per application as necessary to maintain good soil moisture to a minimum 6" depth without standing water or excess runoff. The Contractor shall be responsible to monitor the site and alter the watering times and frequencies to meet site and climatic conditions.
- G. Prior to the start of the maintenance period, fill all seam joint gaps greater than 1/8 inch and less than 0.5 inch with washed concrete sand. Fill any joint gaps of 0.5 inch or greater width with a minimum two foot long replacement sod section in order to achieve a tight joint.
- H. Replace dead or distressed sod with equivalent material as directed by the Landscape Architect.
- I. Do not install turfgrass inside the watering basin of new trees planted in turf areas, or within a 3' radius of existing tree trunks located in turf areas.

3.13 CLEAN-UP AND REPAIR

- A. All areas shall be maintained in a neat and orderly condition at all times. All reasonable precautions shall be taken to avoid damage to existing planting and structures. Disturbed and/or damaged areas, whether a part of this work or from the work of other trades, shall be restored to their original condition.
- B. Plants and/or turfgrass shown to remain and damaged or removed by construction operations and/or utility/electrical/drainage lines shall be replaced with plants that match as closely as possible to the existing plant species, variety and size. The replacement turfgrass sod variety shall be the same as shown in the Planting Legend if for new work, or shall match the existing turfgrass variety where the turfgrass is existing. Adjust the finish grade so that the new turfgrass sod abuts flush to the existing turfgrass or to hardscape. The replacement plants and/or turfgrass sod shall be maintained as part of the original scope of work.
- C. After the planting operations are completed, the Contractor shall remove all trash, excess soil, empty containers or any other debris accumulated by the work from the site. All damage caused by the work shall be repaired at the Contractor's expense and the site shall be left in a neat and orderly condition to the satisfaction of the Owner.

3.14 PRE-MAINTENANCE REVIEW

- A. A general review will be held prior to the start of the maintenance period upon conclusion of the planting operations, irrigation system installation and after clean-up has occurred. The Owner's Representative shall be informed in writing a minimum of seven (7) working days prior to the time the work is ready for review in order to arrange a suitable time and date for such review.
- B. At the time of review, Contractor shall have all planting areas free of weeds and neatly cultivated and fine graded. All plant basins shall be in good repair. All trees shall be properly staked and tied. All planting areas shall be clear of weeds.
- C. The establishment of turfgrass is herein defined as being all work necessary to grow a full, healthy, uniform stand of smooth and even texture and grade with clean straight edges without weeds, distressed areas or bare spots, and has been mowed at least twice per the specifications. The establishment of turfgrass is further defined as being all work necessary to develop a minimum rooting depth of 2 inches into site soil.
- D. Work requiring corrective action or replacement in the judgment of the Owner's Representative shall be performed within five (5) days after the inspection. Corrective work and materials replacement shall be in accordance with the drawings and specifications and shall be made by the Contractor at no cost to the Owner. A subsequent review shall then be arranged.
- E. If after the review, the Landscape Architect is of the opinion that all the work has been performed as per the Contract Documents, and a uniform stand of healthy dense turfgrass has been established without weeds or bare spots, the Contractor will be given written notice that the maintenance period may begin.

3.15 MAINTENANCE - GENERAL

- A. After all work indicated on the drawings or herein specified has been completed, reviewed, and approved, and the turfgrass has been successfully established per the requirements below, the Contractor shall commence a sixty (60) calendar day maintenance period in which the Contractor shall continuously maintain all areas included in the contract during the progress of the work and throughout the maintenance period, or until Final Acceptance of the project, whichever is greater.
- B. Establishment and maintenance work includes monitoring the site to control all watering, replanting, fertilizing, mulching, weeding, cultivating and mowing necessary to bring the planted areas to a healthy and vigorous growing condition, and any additional work needed to keep the areas neat, edged, weed and trash free, and attractive.
- C. All trees, shrubs, ground cover shall be kept at optimum growing condition by watering weeding, replanting, fertilizing, cultivating, tree stake repair, spraying for diseases and insects, replace dead or dying materials, pruning as directed, maintaining proper grades of plants, and providing any other reasonable operations of maintenance and protection required for successful completion of the project.
- D. Any date when the Contractor fails to adequately water, replace unsuitable planted areas and other work determined to be necessary by the Owner, will **NOT** be credited as part of the establishment/maintenance period.
- E. No additional payment will be made for additional time necessary for turfgrass establishment. The maintenance period shall not start until all contract work has been completed and all close-out documents and materials have been submitted. Turfgrass will be considered weed-free if there is a maximum of one percent undesirable turfgrass species, and nine weeds or less per 50 square yards (one per 50 square feet).
- F. During the progress of the maintenance period, the Contractor and the Owner's Representative shall conduct reviews at no less than 21 day intervals to determine that ongoing maintenance activities have been

conducted by the Contractor. If in the opinion of the Owner, ongoing maintenance has not been conducted by the Contractor in a satisfactory manner the maintenance period shall be suspended. The Contractor shall provide remedial work as directed by the Owner's Representative to correct the found deficiencies and schedule another review. If after the subsequent review the work is deemed acceptable, the maintenance period shall resume.

3.16 MAINTENANCE – MOWING AND DRESSING

- A. For new sod, mow when 1.4 inch tall and cut down to 1.0 inch.
- B. Turfgrass areas shall be mowed during the growing season a minimum of twice a week for warm-season varieties and a minimum of once a week for cool-season varieties, or at any time the grass reaches 1.4 times its mowing height. Turfgrass shall be edged weekly. The Contractor shall coordinate his watering and weed control schedules to accommodate his mowing schedule. If the Contractor is unable to mow the turf areas on the required day, he has until 5:00 pm of the next day to do the work. After that time, the Owner reserves the right to secure the services of an alternate mowing entity to perform the work. The cost for the alternate mowing will be deducted from monies owed to the Contractor. The Contractor will remain responsible to perform all scheduled mowings and maintenance of the site. The turfgrass shall be mowed and edged, and all trash and debris removed prior to Final Acceptance.

3.17 MAINTENANCE - FERTILIZATION

- A. The Contractor shall fertilize the warm-season turfgrass (Bermudagrass) at the start of the maintenance period and every twenty-eight (28) days with the turfgrass maintenance fertilizer at a rate of 0.75 lb. of actual N /1,000 s.f. and as modified by the soil fertility recommendations and as directed by the Landscape Architect. The Contractor shall continue the fertilizer applications until the established turf is accepted.
- B. The Contractor shall fertilize the non-turf planted areas during the last week of the maintenance period with the mixed pre-planting fertilizer (14-6-11.6) at a rate of six (6.0) lbs./1,000 s.f. and as modified by the soil fertility recommendations and approved by the Landscape Architect.

3.18 MAINTENANCE – REPAIR AND WEEDING

- A. Between the twenty-first (21) day and the twenty-eighth (28) day after turfgrass planting, the Contractor shall perform the following: replant all spots or areas where normal germination or growth is not evident; remove all rocks or other debris that would constitute a hindrance to mowing or cultivating; repair all damage done by his operations. Where poorly compacted trench backfill shows settlement, remove turfgrass or plants, fill all depressions and eroded channels with sufficient conditioned topsoil to raise to proper grade, compact lightly and replant the filled areas. Roll all planted or replanted turfgrass areas with a lightly weighted turf roller in order to provide a smooth and even mowing surface.
- B. Visible weeds shall be removed at least weekly during the maintenance period. At the end of the maintenance period, all planting areas shall be without weeds. If weeds are present, the Contractor shall manually remove the weeds and shall then apply a granular, selective pre-emergent herbicide at manufacturer's approved rates. Coordinate application with the Owner's Representative and provide certificates of application to Owner's Representative. The turfgrass will be considered weed-free if there are 9 weeds or less per 50 square yards (one per 50 square feet).

3.19 FINAL REVIEW

- A. A Final Review will not be scheduled until all Close-out Documents and materials have been submitted and accepted.
- B. A Final Review will be performed before the end of the Maintenance Period or upon the pending Final Acceptance of the work, whichever is earlier, provided all deficiencies revealed during the maintenance period have been corrected. If deficiencies have not been corrected by the end of the stated maintenance period, the Contractor shall continue to fully maintain the project at his own expense. After all deficiencies have been corrected, a Final Review will be held with the Landscape Architect, Owner's Representative, and Contractor.
- C. Final Acceptance of turfgrass is contingent on a weed free, healthy uniform stand without dead, bare or distressed areas with a minimum rooting depth of five (5) inches into site soil.
- D. If after the Final Review, the Landscape Architect and Owner's Representative are of the opinion that the work is acceptable and complete, the Contractor's maintenance responsibility shall terminate on an agreed upon date.

3.20 WARRANTY AND REPLACEMENT

- A. All trees and plants provided under this Contract shall be guaranteed to be in good, healthy, disease/pest free and in a flourishing condition one growing year from the date of Final Acceptance of the work, provided the Owner maintains the plants properly and in accordance with accepted horticultural practices. Species and size of any tree and/or plant replacements, either prior to or after Final Acceptance, shall be equal to that of the same adjacent trees and/or plants at the time of replacement as determined by the Landscape Architect.
- B. The Contractor shall be responsible to replace all lost plants due to theft, vandalism or any other preventable causes till Final Acceptance of the work by the Owner. Replacement trees and plants shall be planted as originally specified and detailed. Replacement trees and plants shall be guaranteed as specified above from the date of replacement. The maintenance period may be extended for a duration of not more than the original maintenance period duration for the establishment of replacement plants.
- C. The Contractor shall be held responsible for repair and/or replacement of damages to new or existing improvements resulting from the defects or actions of trees, plants, materials, equipment or workmanship one year from the date of Final Acceptance or the Notice of Completion, whichever is later.

END OF SECTION

SECTION 33 4000 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide storm sewage system where shown on the drawings, including pipe, manholes, cleanout and inlet structures, placing and compacting pipe bedding, final backfilling, compaction and grading. as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
 - 2. Section 01 5000: Temporary Facilities and Controls.
 - 3. Section 01 5725: Storm Water Pollution Protection Plan.
 - 4. Section 01 7330: Cutting and Patching.
 - 5. Section 31 2000: Earthwork.
 - 6. Section 32 1210: Asphaltic Concrete Paving.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 3300.
 - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements. Provide Certificates of compliance for material.
 - 2. Installation Procedures: Submit manufacturer's recommended installation procedures.
 - 3. Manufacturer's Installation Instructions: Indicate special procedures required to install products supplied.

1.3 QUALITY ASSURANCE

- A. All improvements within property owned by a City, County or State Entity shall be in accordance with the Standard Specifications of the authority having jurisdiction.

1.4 COORDINATION

- A. Verify that the location of existing utilities have been indicated at work site by utility authorities and the Owner.

1.5 EXISTING UTILITIES

- A. The Engineer has made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- B. Service laterals and appurtenances have also been shown where information was available as to their location. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.
- C. At new work locations, expose by hand methods all existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be

used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated at the work site by District personnel.

- D. Maintain all existing utility mains and service lines in constant service during construction of the Work.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Storm drain piping shall be reinforced concrete pipe (RCP), polyvinyl chloride pipe (PVC), or high density polyethylene pipe (HDPE), unless a piping material is specifically designated on the Drawings.

2.2 REINFORCED CONCRETE PIPE MATERIALS

- A. Reinforced Concrete Pipe (RCP): ASTM C76; bell-and-spigot ends and gasketed joints with ASTM C443 rubber gaskets; appropriate pipe class shall be determined by the depth of cover listed below unless noted otherwise on the Drawings.
1. Class III, Wall B minimum for cover depths from 2 feet to 3 feet.
 2. Class II, Wall B minimum for cover depths greater than 3 feet up to 9 feet.
 3. Class III, Wall B minimum for cover depths of greater than 9 feet up to 14 feet.
 4. Class IV, Wall B minimum for cover depths of greater than 14 feet up to 20 feet.
 5. Class V, Wall B minimum for cover depths greater than 20 feet up to 30 feet.
- B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.
- C. Flexible Watertight Joints: Rubber compression gasket joints, ASTM C443.

2.3 POLYVINYL CHLORIDE PIPE MATERIALS

- A. Polyvinyl Chloride Pipe: ASTM D3034, SDR 35, Type PSM; bell and spigot style joint end.
- B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.
- C. Flexible Watertight Joints: Provide rubber type gaskets for PVC pipe; ASTM 3212.

2.4 HIGH DENSITY POLYETHYLENE (HDPE) PIPE MATERIALS

- A. High Density Polyethylene Pipe (HDPE): Corrugated exterior, smooth interior pipe; ASTM D1248, Type III, Category 4, Grade P33, Class C; or ASTM D3350 cell classification 324420C.
1. 4" to 10" diameter pipe shall meet the requirements of AASHTO M252.
 2. 12" to 36" diameter pipe shall meet the requirements of AASHTO M294, Type S.
 3. 42" and 48" diameter pipe shall have a minimum pipe stiffness of 19 PSI and 17 PIS respectively, at 5% deflection in addition to the requirements of AASHTO M294.
 4. A rubber or neoprene gasket shall be installed at all joints.
- B. Fittings:
1. Shall not reduce or impair the overall integrity of the pipe.
 2. May be either molded or fabricated.

3. Couplings shall have sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint.
4. Only fittings supplied or recommended by the pipe manufacturer shall be used.
5. A rubber or neoprene gasket shall be installed at all joints.

2.5 DRAINAGE STRUCTURES

- A. General: Construct manholes, inlets, and junction structures of reinforced concrete or precast reinforced concrete, complete with metal frames and covers or gratings, and with fixed ladder rungs, and mortared joints where indicated on the Drawings.
- B. Concrete: 2500 psi reinforced concrete as specified in Section 03 3000, unless otherwise noted on the Drawings.
- C. Mortar for pipe joints and connections to other drainage structures, and manhole construction:
 1. ASTM C270, type M, except the maximum placement time shall be one hour.
 2. Hydrated lime complying with ASTM C141, type B, may be added to the mixture of sand and cement in an amount equal to 25% of the volume of cement used.
 3. Provide a quantity of water in the mixture sufficient to produce a stiff workable mortar, which shall be clean and free from harmful acids, alkalis, and organic impurities. Use the mortar within 30 minutes after water is added to the mix.
- D. Frames, Covers, and Gratings: Cast iron; ASTM A48, Class 25.:
 1. Provide all gratings or covers from the same manufacturer.
 2. Provide ADA compliant grates where located in walking surfaces; with spaces no greater than 1/2" wide in one direction. Orient elongated openings perpendicular to dominant direction of travel.
- E. Precast Reinforced Concrete Manhole Sections: ASTM C478; resilient connectors, ASTM C 923; elliptical single line reinforcement is not allowed unless shown on detail drawing.

2.6 TRENCH BEDDING MATERIAL

- A. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Identify location of proposed storm drainage facilities to be constructed. Expose connection points to existing system. Locate, identify, and protect existing above and below grade utilities from damage. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- C. Employ equipment and methods appropriate to the work site. Protect excavated areas from drainage inflow, and provide drainage to all excavated areas. Dewater existing drainage basins and existing drainage pipeline systems as necessary to accomplish the work. Remove all interfering surface and subsurface improvements authorized for removal.

- D. **PROVIDE WATER AND WATER TRUCK OR OTHER METHODS OF MITIGATING EXCESSIVE DUST ON THE SITE. KEEP SITE DAMP ENOUGH TO MINIMIZE POWDERING DIRT AND AIRBORNE DUST.**

- E. Comply with Public Works Standards of the governing jurisdiction or these specifications, whichever is more stringent.

3.2 EXCAVATING, TRENCHING, AND BEDDING

- A. Excavate, trench, and bed for site drains in accordance with pertinent provisions of Section 31 2000.

3.3 PIPE INSTALLATION

A. General:

1. Carefully examine each pipe prior to placing.
 - a. Promptly set aside defective pipe and damaged pipe.
 - b. Clearly identify defects.
 - c. Do not install defective pipe or damaged pipe.
 - d. Install the pipe and fittings to the lines and grades shown on the construction plans.
2. Place pipe to the grades and alignment indicated, with a tolerance of one in 1000 vertical and one in 500 horizontal, unless otherwise directed by the Architect.
3. Provide adequate facilities for lowering pipe safely into the trenches.

B. Install pipe and fittings in accordance with the manufacturer's recommendations, and these specifications.

1. Unless otherwise approved by the Engineer, lay all pipe upgrade from structure to structure, with bell or socket ends of pipe upgrade.
2. Excavate suitable bell (or socket) holes in the bedding material, so that the bells do not bear on the subgrade or bedding. Provide uniform bearing of pipe barrel on bedding material.
3. Ensure that all joints are properly "homed" and are watertight.
4. Bed concrete pipe in sand envelope, and compact. Place and compact the bedding material under, around and over the pipe, filling the trench cavity and extending from the bottom of the trench (6" below the outside bottom of the pipe barrel) to a level 12" above the outside top of the pipe barrel.
5. Do not place pipe in water, nor place pipe when trench or weather is unsuitable for such work.

C. High Density Polyethylene Pipe Installation: Installation shall be in accordance with ASTM 2321-89.

D. Utility Identification Tape:

1. Provide metallic plastic caution ribbon in trench approximately 12" above the top of the pipe indicating "CAUTION STORM SEWER".
2. Run ribbon continuous from inlet or manhole to each vertical structure.

3.4 DRAINAGE STRUCTURE INSTALLATION

- A. Install drainage structures in accordance with the Drawings and with the manufacturer's written installation instructions.
- B. Form bottom of excavation clean and smooth to correct elevation.
- C. Level top surface of base pad; sleeve concrete shaft sections to receive pipe sections.
- D. Establish elevations and pipe inverts for inlets and outlets as indicated.
- E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.5 MANHOLE INSTALLATION

- A. Place concrete base pad, trowel top surface level.
- B. Place pre-fabricated manhole sections plumb and level, trim to correct elevations, anchor to base pad.
- C. Form and place cast-in-place manhole cylinder plumb and level, to correct dimensions and elevations. As work progresses, build in fabricated metal items.
- D. Cut and fit for pipe.
- E. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required.
- F. Set cover frames and covers level without tipping, to correct elevations.
- G. Coordinate with other sections of work to provide correct size, shape, and location.

3.6 BACKFILLING

- A. Backfill and compact in accordance with pertinent provisions of Section 31 2000.

3.8 TESTING AND INSPECTING

- A. Provide personnel and equipment necessary, and perform tests required to demonstrate that the work of this Section has been completed in accordance with the specified requirements.
- B. Hydrostatic Test on Watertight Joints:
 - 1. Test joints within the building area and outside the building area but within ten feet of exterior walls or faces of the buildings.
 - 2. Make a hydrostatic test on each watertight joint. Test one sample of each type watertight joint used. If one sample fails because of faulty workmanship, test an additional joint.
 - 3. Demonstrate that joints in reinforced and unreinforced concrete pipe comply with ASTM C443-01.
 - 4. Comply with ASTM C425 for tests of joints in clay pipe.
 - 5. Make tests in concrete pipe at an internal hydrostatic pressure of 10 psi for 24 hours.
 - 6. Replace or repair joints found to be faulty. Repeat the test and repair cycle until joints are demonstrated to meet the specified requirements.

END OF SECTION 33 4000