IMPERIAL COMMUNITY COLLEGE DISTRICT

SPECIFICATIONS

FOR

SPORTS FIELD RESTROOM AND CONCESSION, WESTSIDE LIGHTING AND BORDER LINK ANTENNA

Prepared By:

Sanders, Inc. Architecture/Engineering

Reviewed By:

ICCD Facilities, Planning, and Construction Division

October 14, 2022

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00 11 16 – NOTICE INVITING BIDS

1.1 Submittal of Bids.

A. Imperial Community College District ("District") will receive sealed bids received at the **Administrative Services Office, 380 E. Aten Road, Imperial, CA 92251, Building 10, Room 16** for the Sports Field Restroom and Concession, Westside Lighting and Border Link Antenna project, no later than 2:00 P.M. on November 17, 2022, at which time or thereafter bids will be opened and read aloud. Bids shall remain valid for 60 Days after the bid opening date.

1.2 Pre-Bid Conference

A. A Mandatory Pre-Bid Conference and Site Walk will be held at 380 E. Aten Road, Building 2000, Imperial, CA 92251 on the following date and time: Wednesday, October 26, 2022 at 2:00 P.M.

B. District's Representative will be present to discuss the Project. Bidders are required to attend and participate in the conference. Any Addenda issued by District in response to questions arising at the conference will be issued through Request for Information (RFI). Oral statements may not be relied upon and will not be binding or legally effective.

1.3 Bid Opening.

A. Bids will be opened in public and read aloud at the closing time and place set forth above, as adjusted by District.

B. Bids shall be valid for sixty (60) Days after the bid opening date.

1.4 Bid Documents.

A. Bids must be submitted on District's Bid Forms.

B. Bidders may obtain a copies of the Contract Documents at https://www.imperial.edu/about/request-for-proposals/. To the extent required by section 20103.7 of the Public Contract Code, upon request from a contractor plan room service, District shall provide an electronic copy of the Contract Documents at no charge to the contractor plan room service.

C. It is the responsibility of each prospective bidder to download and print all Bid Documents for review and to verify the completeness of Bid Documents before submitting a bid. Any Addenda will be posted at https://www.imperial.edu/about/request-for-proposals/. It is the responsibility of each prospective bidder to check the website on a daily basis through the close of bids for any applicable addenda or updates. District does not assume any liability or responsibility based on any defective or incomplete copying, excerpting, scanning, faxing, downloading or printing of the Bid Documents. Information on the bid documents may change without notice to prospective bidders. Please submit all

questions and comments electronically to the District by email to: construction-facilities@imperial.edu, including the Project name in the subject of the email.

1.5 Bid Security.

A. Each Bid must be accompanied by cash, a certified or cashier's check, or a Bid Bond in favor of District in an amount not less than ten percent (10%) of the Total Bid Price. The Bid Security must be submitted in hard copy directly to District prior to the specified date and time for bid opening as set forth in the Instructions to and Information for Bidders.

1.6 Bonds.

A. The successful bidder will be required to furnish District with Payment and Performance Bonds equal to 100% of the Contract Price. Bonds shall be on the forms included in the Contract Documents; District will not accept bonds on any other form.

1.7 Retention.

A. District will withhold retention in the amount of 5% of each progress payment.

B. Pursuant to Public Contract Code section 22300, the successful bidder may substitute certain securities for funds withheld by District to ensure his performance under the Contract.

1.8 Labor and Personnel.

A. Pursuant to section 1770, et seq. of the California Labor Code, the Contractor and all Subcontractors shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations and comply with all applicable Labor Code provisions, which include, but are not limited to the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

B. Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted, nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. If awarded a Contract, the Bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project.

C. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. In bidding on this project, it shall be the Bidder's sole responsibility to evaluate and include the cost of complying with all labor compliance requirements under this contract and applicable law in its bid.

1.9 Licensing of Contractor.

A. Unless otherwise provided in the Contract Documents, Contractor shall possess, at the time its Bid is submitted, at the time the Contract is awarded, and at all times when Work is performed, a valid license in accordance with the provisions of the Contractor's State License Law (Bus. & Prof. Code § 7000 et seq.) with the following California license classification: B - General Building Contractors' License.

1.10 Insurance for Acts of God

A. The successful bidder shall provide Installation Floater/Builders Risk insurance including Acts of God for the total replacement cost of the Project, as described in Section 5 of the General Conditions.

1.11 Award of Contract.

A. A Contract will be awarded to the responsible Bidder submitting the lowest responsive Bid. District reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding process.

B. If alternate bid items are called for in the Contract Documents, the lowest bid will be determined on the basis of the base bid and all alternates.

IMPERIAL COMMUNITY COLLEGE DISTRICT

Dated: October 14, 2022

By:_____

Javier Luna
Director of Facilities, Planning, and Construction

END OF NOTICE INVITING BIDS

IMPERIAL COMMUNITY COLLEGE DISTRICT

00 21 13 - INSTRUCTIONS TO AND INFORMATION FOR BIDDERS

1.1 Preparation and Submission of Bid.

A. Bids shall be submitted at the Administrative Services Office, 380 E. Aten Road, Imperial, CA 92251, Building 10, Room 16. No other method of submitting bids will be accepted. Bidders may not submit bids by fax, email, telephone, or other means.

B. Bid shall be submitted on the Bid Forms provided with the Contract Documents and available at https://www.imperial.edu/about/request-for-proposals/. Bid shall be properly executed, all blank spaces shall be filled in, and any interlineations, alterations, or erasures shall be formally explained and initialed by the Bidder. Failure to comply with this requirement may be cause for rejection of Bid.

C. Partial or incomplete Bids will not be considered. Bids shall be in strict conformity with the Contract Documents and any addenda thereto.

D. It is the responsibility solely of Bidder to see that its Bid is properly submitted to Administrative Services Office in proper form and prior to the stated closing time.

E. Bid shall show the full legal name and business address and California license number of Bidder, including its street address if different from its mailing address, shall be signed with the usual signature of the person or persons authorized to bind Bidder, and shall be dated. Bid by a partnership or joint venture shall list the full names and addresses of all partners or joint venturers. The State of Incorporation shall be stated and the corporate seal shall be affixed to any Bid to which a corporation is a party as a Bidder. The name of each signatory shall be typed or otherwise clearly imprinted below each signature. When requested by District, satisfactory evidence of the authority of any signatory on behalf of Bidder shall be furnished.

F. The preparation of Bid shall be by and at the expense of Bidder.

G. Bid shall be submitted in accordance with the directions set forth in the Notice Inviting Bids.

H. Bids shall be firm for sixty (60) days from and after the stated closing time, or until a Contract is fully executed by District and Bidder, whichever is earlier.

1.2 Qualification of Bidder.

A. If so indicated in the Notice Inviting Bids, only bids from pre-qualified bidders will be accepted.

B. Bidder shall submit with its Bid an Experience Statement, substantially in the form set forth in the Bid Forms provided with the Contract Documents.

C. District expressly reserves the right to reject any or all Bids.

1.3 Contractor's Performance.

A. Bidder must self-perform a minimum of twenty percent (20%) of the work on the Project.

1.4 Examination of Contract Documents and Explanation to Bidder.

A. Any Bidder planning to submit a Bid is responsible for examining with care the complete Contract Documents and all addenda and is also responsible for informing itself with respect to all conditions which might in any way affect the cost of performance of any Work. Failure to do so will be at the sole risk of Bidder, and no relief will be given for errors or omissions by Bidder.

B. All questions relative to the Contract Documents shall be emailed electronically to the District by email at: construction-facilities@imperial.edu. Questions sent directly to District Staff will not be addressed and you will be directed to submit your questions online.

C. Should Bidder find discrepancies in or omissions from the Contract Documents or should the intent or meaning of the Contract Documents appear unclear or ambiguous to Bidder, Bidder shall notify the District of such finding, by submission of request for an interpretation or correction to District. Any such submission must be sent to construction-facilities@imperial.edu. Questions sent directly to District Staff will not be addressed and you will be directed to submit your questions online. Such a finding must be submitted no later than the time specified in Section 00 21 13 Item 1.19 B. Replies to such notices may be made in the form of addenda duly issued and posted at https://www.imperial.edu/about/request-for-proposals/.

D. Any interpretation of the Bid or Contract Documents will be made only by written addenda from District duly issued and posted at https://www.imperial.edu/about/request-for-proposals/. District will not be responsible for any explanations or interpretations provided in any other manner. No person is authorized to make any oral interpretation of any provision in the Bid or Contract Documents to any bidder, and no Bidder should rely on any such oral interpretation.

1.5 Site Inspection and Conditions, Surface and Subsurface Exploration Data.

A. In addition to examination of the Contract Documents, Bidder shall become fully informed regarding all existing and expected conditions and matters which could affect any work or performance of any work in any way, and especially the cost of performing any work. Arrangements may be made for visiting the Site by contacting District's Representative.

B. Any failure to fully investigate the Site or the foregoing conditions shall not relieve Bidder from responsibility for estimating the difficulty or cost of successfully performing any work. Neither District nor any of its representatives or agents assume any responsibility for any understanding or representation not in the Contract Documents with respect to the Site, surface and subsurface conditions made by District or any of its representatives or agents prior to the execution of a Contract pursuant to the Contract Documents.

C. If available, limited data on surface and subsurface exploration may be reviewed without charge at District's office, during normal business hours. Whether or not such data are available will be indicated in the Special Conditions.

D. Such surface and subsurface exploration data are not intended as representations or warranties of actual conditions to be encountered, but are furnished for information only. It is expressly understood that a Bidder using any data furnished to it, or made available to it for inspection, shall make its own interpretation of any and all such data and District will not be responsible for the accuracy or completeness of such data or interpretations.

1.6 District's Modification of the Contract Documents (Addenda).

A. District reserves the right to revise the Bid and Contract Documents prior to the bid opening date. Revisions, if any, shall be made by written addenda. All addenda issued by District shall be made part of the Contract Documents. Addenda will be issued by District at https://www.imperial.edu/about/request-for-proposals/. Bidders are responsible for ensuring that they have received any and all addenda. Addenda shall also be acknowledged on the Bid Forms.

1.7 Alternate Bids.

A. If alternate bid items are called for in the Contract Documents, the lowest bid will be determined on the basis of the base bid and all add alternates unless otherwise specified in the Notice Inviting Bids. The time required for completion of the alternate bid items has been factored into the Contract Time and no additional time will be allowed for performing any of the alternate bid items. Regardless of whether the alternates bid items will be considered in determining the low bid, District may elect to include one or more of the alternate bid items, or to otherwise remove certain work from the scope of Work. Accordingly, each Bidder must ensure that each bid item contains a proportionate share of profit, overhead and other costs or expenses which will be incurred by the Bidder.

1.8 Bidder's Modification and Withdrawal of Bid.

A. Bidder may, without prejudice to itself, electronically modify or withdraw its Bid prior to the stated bid closing time. Following withdrawal of its Bid, Bidder may submit a new Bid, provided that such new Bid is received prior to the stated closing time.

B. Any request to withdraw a bid after bid opening must be made in accordance with Public Contract Code section 5100 et seq. and must be submitted in writing within five (5) working days, excluding Saturdays, Sundays and State holidays, specifying in detail how the mistake was made.

1.9 Bid Forms.

A. Schedule of Pay Items.

1. The Schedule of Pay Items will be incorporated into the Contract Documents.

2. Failure to submit the Schedule of Pay Items will render a bid nonresponsive.

3. Bidders must provide pricing for every bid item. The costs of any Work shown or required in the Plans and Specifications, but not specifically identified as a Pay Item are to be included in related Pay Items and no additional compensation shall be due Contractor by virtue of Contractor's compliance with the Plans and Specifications.

4. The estimated quantities for unit price items are for purposes of comparing bids only and District makes no representation that the actual quantities of work performed will not vary from the estimates.

B. Bid Security.

1. No Bid will be considered unless it is accompanied by a Bid Security of not less than ten percent (10%) of the Total for Comparison of Bids, as set forth in the Schedule of Pay Items. The Bid Security shall be in the form of (a) cash, (b) a cashier's check made payable to District, (c) a certified check made payable to District, or (d) a Bid Bond, in the form set forth in Section 00 41 43, Article 1.8 (with notary acknowledgement), executed by an admitted surety insurer, as defined in Code of Civil Procedure section 995.120, in favor of District.

2. The Bid Security must be submitted with the Bid Proposal.

3. Within a reasonable period of time after execution of a Contract pursuant to the Contract Documents, and in any event not later than sixty (60) days from the time the Contract is awarded, District will return to each Bidder the Bid Security which accompanied its Bid, except such Bid Security as may have been forfeited in accordance with the provisions of the Contract Documents.

C. All Other Bid Forms.

1. The following Bid Forms shall be completed by the Bidder:

a. Bidder shall sign and submit the Bid Acknowledgment on the form provided in Section 00 41 43, Article 1.1.

b. Bidder shall sign and submit a Noncollusion Declaration (with notary acknowledgement) on the form provided in Section 00 41 43, Article 1.3.

c. Bidder shall sign and submit a Designation of Subcontractors on the form provided in Section 00 41 43, Article 1.4.

d. Bidder shall sign and submit the Information Required of Bidders on the form provided in Section 00 41 43, Article 1.5.

e. Bidder shall sign and submit the Drug-Free Workplace Certification on the form provided in Section 00 41 43, Article 1.6.

f. Bidder shall sign and submit the Public Works Contractor Registration Certification on the form provided in Section 00 41 43, Article 1.7.

2. Failure to submit any of the forms listed above may render the Bid non-responsive.

1.10 Bonds; Certificates of Insurance and Endorsement Forms; Escrow Agreement; Taxpayer Identification Number.

A. Successful Bidder shall furnish to District a Performance Bond and a Payment Bond on the forms provided in Section 00 61 13, Articles 1.1 and 1.2. The entire cost of these bonds shall be borne by successful Bidder.

B. Successful Bidder shall furnish to District Certificates of Insurance and Endorsement Forms satisfactory to District attesting to the fact that the policies of insurance provided for in Article 5 of the General Conditions have been obtained.

C. Successful Bidder may substitute securities in place of any funds withheld by District provided successful Bidder furnishes to District the Escrow Agreement on the form provided in the Contract Documents, as provided for in Public Contract Code section 22300. The entire cost of this Escrow Account shall be borne by successful Bidder.

D. Successful Bidder shall furnish to District the Taxpayer Identification Number on the form provided in Section 00 61 13, Article 1.5, certifying the facts contained therein.

1.11 Bid Opening and Award of Contract.

A. Bids will be kept unopened until the time stated for opening of Bids. At such time, the contents of Bid will be made public. No responsibility shall attach to District or any of its officers, employees or representatives for the premature opening of a Bid. All Bidders or their authorized representatives are invited to be present at Bid opening.

B. The Contract will be awarded as a whole, as soon as practicable to lowest responsible Bidder submitting a responsive Bid, price and other factors considered, provided its Bid is reasonable and is in the best interest of District to accept.

C. District expressly reserves the right to reject any or all Bids and to waive any minor irregularity in Bids received.

D. Any Bid which, as determined by District, is so unbalanced among the various items in the Schedule of Pay Items, as to be detrimental to the interest of District may be rejected as non-responsive.

E. The low Bidder shall execute the Contract and deliver it to District within 48 hours of receipt of District staff's notification of its intent to recommend award of the Contract.

F. Successful Bidder will be notified in writing by District of the award of contract within sixty (60) days after opening of Bids. The successful Bidder will be required to submit to District properly executed Performance Bond, Payment Bond, Certificates of Insurance and Endorsement Forms, and Taxpayer Identification Number within ten (10) days after date of receipt of such Notice of Award. District will promptly determine whether such Bonds and Certificates of Insurance and Endorsement Forms are as required by the Contract Documents, and upon such determination will forward a fully signed copy of the Contract to successful Bidder.

G. The successful Bidder's failure to submit the required documents within the stated time may result in loss of the Contract and forfeiture of its bid security. The 10-day period shall be considered part of the Contract Time.

1.12 Licensing of Contractor.

A. Contractor shall possess, at the time its Bid is submitted, at the time the Contract is awarded, and at all times when Work is performed, a valid license in accordance with the provisions of the Contractor's State License Law (Bus. & Prof. Code § 7000 et seq.) with the license classification specified in Section 00 11 16, Article 1.9.

1.13 Retention and Substitution of Security

A. District will make monthly progress payments based upon work performed in accordance with the Contract Documents. Unless otherwise specified in the Notice Inviting Bids, District will retain five percent (5%) of each progress payment as provided by the Contract Documents. At the request and expense of the successful Bidder, the Contractor may substitute securities for the amount so retained in accordance with Public Contract Code section 22300. The escrow agreement in regard to Public Contract Code section 22300 is set forth in the Contract Documents.

1.14 Prevailing Wages.

A. District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract. These rates are on file and available at District or may be obtained online at http://www.dir.ca.gov/dlsr. Bidders are advised that a copy of these rates must be posted by the successful Bidder at the job site(s).

1.15 Debarment of Contractors and Subcontractors.

A. In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to section 1777.1 or section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor shall be returned to District. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor used on the Work.

1.16 Concerning Subcontractors, Suppliers, and Others.

A. **Contractor shall self-perform at least twenty percent (20%) of the Work.**

B. Bidder's attention is directed to Public Contract Code section 4100 et seq. for requirements and provisions relative to Subcontractors.

C. Pursuant to Public Contract Code section 4100 et seq., Bidder shall set forth in its Bid the name, contractor's license number, and the location of the place of business of each Subcontractor who will perform work or labor or render service to Bidder in or about the construction of the work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the Bidder, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and Contract Documents, in an amount in excess of one-half of 1 percent of the Bidder's total Bid, as well as the portion of the work which will be done by each Subcontractor. Bidder shall list only one Subcontractor for each portion as is defined by Bidder in its Bid. Bidder shall furnish information regarding its Subcontractors in substantially the form set forth in Section 00 41 43, Article 1.4. If no Subcontractors are to be used, other than within the limit set forth in this section, Bidder shall so state.

D. Each Subcontractor shall possess at all times when it is performing Work, a valid license in accordance with the provisions of the Contractor's State License Law (Bus. & Prof. Code § 7000 et seq.) for the appropriate classification necessary to perform all Work to be performed by that Subcontractor.

E. Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. Bidder shall furnish evidence of registration by listing each listed subcontractor's DIR registration number in the form set forth in Section 00 41 43, Article 1.4.

1.17 Utilities.

A. Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown, Bidder, for the purpose of preparing its Bid, shall assume that every property parcel will be served by a service connection for each type of utility. All Work associated with the protection, removal, and/or replacement of such service laterals shall be deemed included in Schedule A of the Schedule of Pay Items, and Bidder shall not be compensated for such Work under Schedule B of the Schedule of Pay Items.

1.18 Bid Requirements and Understanding.

A. Bids are to be submitted for the entire Work. All Bid items must be filled out, and extensions carried out as appropriate. A blank space will be considered nonresponsive. If zero is intended then a "0" must be entered for both unit price and amount.

B. Bidder further agrees to accept as full payment for the Work specified herein, the amounts contained in the Schedule of Pay Items, based on the lump sum and unit price amounts, it being expressly understood that the unit prices are independent of the exact quantities involved. Bidder agrees that the lump sum amounts and unit price amounts represent a true measure of the labor, material, and equipment required to perform the Work, including all allowances for overhead and profit. If so requested by District, Bidder shall substantiate any price or prices with additional detailed price breakdown.

C. Quantities for lump sum items are shown as "LS" under the unit column and shown as one (1), however all required Work for that item is inclusive. For example, a lump sum

item for potholing may involve several potholes in order to perform the required Work, and the price of that lump sum item shall remain unchanged for the duration of this Contract.

1.19 Pre-Bid Conference.

A. A pre-Bid conference, if any, will be held as set forth in Section 00 11 16, Article 1.2. District's Representative will transmit to all prospective Bidders of record such Addenda as District's Representative considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

B. Bidders must submit any questions or requests for clarification electronically to the District by email to: construction-facilities@imperial.edu no later than 5:00 p.m. on November 2, 2022.

1.20 Bid Protest Procedure.

A. Any bid protest relating to the form or content of the Bid or Contract Documents must be submitted in writing to District's Representative at least ten (10) business days before the original date set for the bid opening. Any bidder who submits a bid without making a protest shall be deemed to have waived any objection to the form or content of the Bid or Contract Documents not previously stated in writing.

B. Submitted bids will be timely made available for review upon written request of any bidder. Bidders may file a "protest" of a Bid with District's Representative.

C. The protest must:

1. Be filed in writing within five (5) business days after the bid opening date;

2. Clearly identify the alleged irregularity or other basis for the protest;

3. Specify, in detail, the factual and legal grounds for the protest; and

4. Include all relevant, supporting documentation with the protest at time of filing.

D. If the protest does not meet all of these requirements, District may reject it without further review.

E. If the protest is timely and complies with all of the above requirements, District's Representative, or other designated District staff member, shall review the protest, any response from the challenged bidder, and all relevant information. District will provide a written response to the protestor.

F. The procedure and time limits set forth in this paragraph are mandatory and are the sole and exclusive remedy in the event of a bid protest. Failure to comply with these procedures shall constitute a failure to exhaust administrative remedies and a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

END OF INSTRUCTIONS TO AND INFORMATION FOR BIDDERS

IMPERIAL COMMUNITY COLLEGE DISTRICT

00 41 43 - BID FORMS

1.1 Bid Acknowledgement.

FOR: Sports Field Restroom and Concession, Westside Lighting and Border Link Antenna

BIDDER: _____

A. In response to the Notice Inviting Bids dated October 14, 2022 and in accordance with the accompanying Instructions to and Information for Bidders, the undersigned hereby proposes to District to furnish all plant, labor, technical and professional services, supervision, materials and equipment, other than materials and equipment specified as furnished by District, and to perform all operations necessary and required to construct the Project in accordance with the provisions of the Contract Documents and any addenda thereto, and at the prices stated opposite the respective items set forth in the Schedule of Pay Items.

B. This Bid constitutes a firm offer to District which cannot be withdrawn for 60 days after the date set for opening of Bids, or until a Contract is executed by District and a third party, whichever is earlier.

C. The undersigned certifies that it has examined and is fully familiar with all of the provisions of the Contract Documents and any addenda thereto; that it has carefully checked all of the words and figures shown in its Schedule of Pay Items; that it has carefully reviewed the accuracy of all statements in this Bid and attachments hereto; and that it understands and agrees that District will not be responsible for any errors or omissions on the part of the undersigned in preparing this Bid; and that it shall self-perform at least twenty percent (20%) of the Work.

D. The undersigned has by careful examination of the Specification and any addenda thereto, and by examination of the actual Site conditions, satisfied itself as to the nature and location of all Work, the general and local conditions to be encountered in the performance of any Work, the requirements of the Contract and all other matters which can in any way affect the Work or the cost thereof.

E. The low Bidder shall execute the Contract and deliver it to District within 48 hours of receipt of District staff's notification of its intent to recommend award of the Contract. If awarded a Contract, the undersigned agrees to execute and deliver to District within ten (10) days after date of receipt of Notice of Award, the necessary Performance Bond, Payment Bond, Certificates of Insurance and Endorsements, Escrow Agreement (if used) and Tax Identification Number. This 10-day period shall be considered part of the Contract Time.

F. The following forms from the Specification, which have been completed and executed by undersigned Bidder, are incorporated by this reference and made a part of this Bid:

SCHEDULE OF PAY ITEMS
NONCOLLUSION DECLARATION

DESIGNATION OF SUBCONTRACTORS
INFORMATION REQUIRED OF BIDDERS
DRUG-FREE WORKPLACE CERTIFICATION
PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION
BID SECURITY

G. Undersigned also acknowledges receipt, understanding, and full consideration of the following addenda to the Specification in preparing its bid:

Addenda Nos. _____

H. The undersigned is hereby representing that it is and will be properly licensed both at the time that it submits a Bid as well as at the time the Contract is awarded, if the Contract is awarded to the undersigned.

1. Individual Contractor. Undersigned certifies that it is now licensed in accordance with the provisions of the Contractor's License Law of the State of California.

   License number _____

   Expiration date _____

   License classification _____

2. Joint Venture. Undersigned certifies that the individual members of the joint venture are now licensed in accordance with the provisions of the Contractor's License Law of the State of California.

   Member No. 1

   Name _____

   License number _____

   Expiration date _____

   License classification _____

   Member No. 2

   Name _____

   License number _____

   Expiration date _____

   License classification _____

   (If there are more than two members of the joint venture, attach a page for the additional member(s) with the above information.)

I. The undersigned acknowledges that the representations made herein are made under penalty of perjury under the laws of the State of California.

BIDDER:

_____
(Company Name)

Bidder's Business Address:

_____
_____
_____
_____

By _____
(Signature)

_____
(Type or print name)

_____
(Title)

_____
(Where signed) (City, State)

(corporate seal)

Dated:_____, 20_____
State of Incorporation:_____

Names and addresses of all partners or joint venturers:

_____

_____

_____

_____

Statement of the authority of signatory to bind Bidder:

_____

_____

_____

_____

1.2 Schedule of Pay Items.

IMPORTANT:

FAILURE TO COMPLETE THE SCHEDULE OF PAY ITEMS WILL RESULT IN AN INCOMPLETE AND NON-RESPONSIVE BID.

A. Bid Items Identified on the Contract Drawings.

The undersigned Bidder proposes and agrees to furnish and install the Work including, without limitation, providing and furnishing any and all labor, materials, tools, equipment and services necessary to complete, in a workmanlike manner in accordance with the Contract Documents for the sum of _____ Dollars ($). The Bid Proposal Amount includes all Allowances set forth in Paragraph b. The Bidder confirms that it has checked all of the above figures and understands that neither the District nor any of its agents, employees or representatives shall be responsible for any assumptions, errors or omissions on the part of the undersigned Bidder in preparing and submitting this Bid Proposal.

Pay Items in Schedule A of the Bid Proposal are described in the Specifications and are identified on the Contract Drawings as to location.

In the case of unit price items, District reserves the right to increase or decrease the quantities up to twenty-five percent (25%) using the bid unit price (unless otherwise stated in the Contract Documents) to accommodate conditions encountered on the Project. These adjustments are considered to be within the original Contract scope and as such will not be considered as a basis for a change in the bid unit price or Contract Times.

If the actual quantities of a Pay Item exceeds twenty-five percent (25%), District and the Contractor will negotiate an equitable increase or decrease in the bid unit price in accordance with the Contract Documents.

B. Anticipated Scope Not Identified on the Contract Drawings.

The Bidder and District acknowledge that the Bid Proposal Price set forth above includes an Allowance Amount in the aggregate amount of Two Hundred Ten Thousand Dollars ($210,000.00) for unforeseen conditions, as shown in Section 01 21 00 – Allowances of the Technical Conditions.

Although included in the Bid Proposal Price, Allowances belong solely to the District and shall be expended only upon written direction by the District, to be granted or denied in its sole discretion. Any Allowance amount not fully consumed shall belong solely to the District and shall be refunded to the District by a deductive change order. By submitting this Bid Proposal, the Bidder confirms that the Bid Price proposed in Paragraph 1.2.A is inclusive of all Allowances.

C. Additive or Deductive Bid Alternate Items.

The Bidder's proposed pricing for each Alternate Bid Item, if any, are set forth in the accompanying form of Alternate Bid Items Proposal, Attachment A. Failure of a Bidder to propose pricing for each Alternate Bid Item set forth in the accompanying Alternate Bid Items Proposal will result in the Bid Proposal being deemed non-responsive and rejected.

These pay items may be added to, or deducted from, the original Contract scope at the sole discretion of District. However, these alternates are considered to be within the original Contract scope and as such will not be considered as a basis for a change in the Contract Times.

ALTERNATE BID ITEMS PROPOSAL

Project: Sports Field Restroom and Concession, Westside Lighting and Border Link Antenna

Bidder Name: _____

Bidders must provide a proposal price for each Alternate Bid Item set forth herein; failure to do so will result in rejection of the Bid Proposal for non-responsiveness. The amount proposed for each Alternate Bid Item by the above-identified Bidder is set forth hereinbelow:

1. Alternate Additive No. 1: Shall include all work shown on contract documents as required for the construction of the Sports Concession. Alternate Add 1 includes but is not limited to the following items:

   A. Provide Concession 1, Storage 2, Supply 3

   B. Provide covered outdoor shade adjacent to Concession

   ☐ Add to Base Bid Proposal Amount
   ☐ Deduct From Base Bid Proposal Amount
   (Check appropriate box indicating additive or deductive cost; failure to do so will result in rejection of Bid Proposal for non-responsiveness)

   _____Dollars ($_____)
   (in words; printed or typed)

2. Alternate Additive No. 2. Shall include all work shown on contract documents as required for the construction of the Sports Concession. Alternate Add 2 includes but is not limited to the following items:

   A. Provide Women's Dressing 4 and Men's Dressing 5

   ☐ Add to Base Bid Proposal Amount
   ☐ Deduct From Base Bid Proposal Amount
   (Check appropriate box indicating additive or deductive cost; failure to do so will result in rejection of Bid Proposal for non-responsiveness)

   _____Dollars ($_____)
   (in words; printed or typed)

Dated _____

By: _____
(Signature of Bidder's Authorized Officer or Representative)

_____
(Typed or Printed Name)

Title: _____

1.3 Non-Collusion Declaration.

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

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

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

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

Signed: _____

Print Name: _____

Notary Acknowledgment

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally

appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

_____

Signature of Notary Public

OPTIONAL

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

CAPACITY CLAIMED BY SIGNER

☐ Individual
☐ Corporate Officer

_____
Title(s)

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

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

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

1.4 Designation of Subcontractors.

In compliance with the Subletting and Subcontracting Fair Practices Act of the Public Contract Code of the State of California, sections 4100 et seq., each bidder shall set forth below: (a) the name and the location of the place of business and (b) the portion of the work which will be done by each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work in an amount in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price. Notwithstanding the foregoing, if the work involves streets and highways, then the Contractor shall list each subcontractor who will perform work or labor or render service to Contractor in or about the work in an amount in excess of one-half of one percent (1/2%) of the Contractor's total Bid Price or $10,000, whichever is greater. No additional time shall be granted to provide the below requested information.

If no subcontractor is specified, for a portion of the work, or if more than one subcontractor is specified for the same portion of Work, then the Contractor shall be deemed to have agreed that it is fully qualified to perform that Work, and that it shall perform that portion itself.

Portion of Work	**Subcontractor Name AND CSLB License Number**	**Location of Business**	**DIR Registration Number**

Portion of Work	Subcontractor Name AND CSLB License Number	Location of Business	DIR Registration Number

Name of Bidder_____

Signature_____

Name and Title_____

Dated_____

1.5 Information Required of Bidders.

A. Information About Bidder.

Failure to complete all information may render your bid non-responsive.
[***Indicate not applicable ("N/A") where appropriate.***]

NOTE: Where Bidder is a joint venture, pages shall be duplicated and information provided for all parties to the joint venture.

1. Name of Bidder: _____

2. Type, if Entity: _____

3. Bidder Address: _____

_____

_____

_____

_____

Facsimile Number Telephone Number E-Mail

4. How many years has Bidder's organization been in business as a Contractor? _____

5. How many years has Bidder's organization been in business under its present name? _____

a. Under what other or former names has Bidder's organization operated?: _____

6. If Bidder's organization is a corporation, answer the following:

a. Date of Incorporation: _____

b. State of Incorporation: _____

c. President's Name: _____

d. Vice-President's Name(s): _____

_____

e. Secretary's Name: _____

f. Treasurer's Name: _____

7. If an individual or a partnership, answer the following:

   a. Date of Organization:_____

   b. Name and address of all partners (state whether general or limited partnership):

   _____

   _____

   _____

8. If other than a corporation or partnership, describe organization and name principals:

   _____

   _____

9. List other states in which Bidder's organization is legally qualified to do business.

   _____

   _____

   _____

10. What type of work does the Bidder normally perform with its own forces?

    _____

    _____

11. Has Bidder ever failed to complete any work awarded to it? If so, note when, where, and why:

    _____

    _____

12. Within the last five years, has any officer or partner of Bidder's organization ever been an officer or partner of another organization when it failed to complete a contract? If so, attach a separate sheet of explanation:

    _____

    _____

13. List Trade References:

_____

_____

_____

_____

14. List Bank References (Bank and Branch Address):

_____

_____

_____

_____

15. Name of Bonding Company and Name and Address of Agent:

_____

_____

_____

B. List of Current Projects.

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

Project	Description of Bidder's Work	Completion Date	Cost of Bidder's Work	Contact Name & Phone

Project	Description of Bidder's Work	Completion Date	Cost of Bidder's Work	Contact Name & Phone

C. List of Completed Projects – Last Three Years.

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

Please include only projects that are similar in size, scope and complexity to the Work to demonstrate Bidder's ability to perform the required Work.

Work Client	Description of Bidder's Work	Period of Performance	Cost of Bidder's Work	Contact Name & Phone

Work Client	Description of Bidder's Work	Period of Performance	Cost of Bidder's Work	Contact Name & Phone

D. Experience and Technical Qualifications Questionnaire.

The Bidder shall identify the key personnel to be assigned to this project in a management, construction supervision or engineering capacity. The Bidder may provide a current resume for each key personnel that is fully responsive to each question below.

1. List each person's job title, name and percent of time to be allocated to this project:

_____

_____

_____

2. Summarize each person's specialized education:

_____

_____

_____

3. List each person's years of construction experience relevant to the project:

_____

_____

_____

4. Summarize such experience:

_____

_____

_____

Bidder agrees that personnel named in this Bid will remain on this project in their designated capacities until completion of all relevant Work, unless replaced by personnel of equivalent experience and qualifications approved in advance by District.

E. Additional Bidder's Statements.

If the Bidder feels that there is additional information which has not been included in the questionnaire above, and which would contribute to the qualification review, it may add that information in a statement here or on an attached sheet, appropriately marked:

_____

_____

_____

_____

_____

_____

F. Verification and Execution.

These Bid Forms shall be executed only by a duly authorized official of the Bidder:

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

Name of Bidder_____

Signature_____

Name and Title_____

Dated_____

1.6 Drug-Free Workplace Certification.

I, _____, am the _____ of
(Print Name) (Title)

_____
(Contractor Name)

I declare, state and certify to all of the following:

1. I am aware of the provisions and requirements of California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990.

2. I am authorized to certify, and do certify, on behalf of Contractor that a drug free workplace will be provided by Contractor by doing all of the following:

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

   B. Establishing a drug-free awareness program to inform employees about all of the following:
      i. The dangers of drug abuse in the workplace;
      ii. Contractor's policy of maintaining a drug-free workplace;
      iii. The availability of drug counseling, rehabilitation and employee-assistance programs; and
      iv. The penalties that may be imposed upon employees for drug abuse violations;

   C. Requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by subdivision (A), above, and that as a condition of employment by Contractor in connection with the Work of the Contract, the employee agrees to abide by the terms of the statement.

   D. Contractor agrees to fulfill and discharge all of Contractor's obligations under the terms and requirements of California Government Code §8355 by, *inter alia*, publishing a statement notifying employees concerning: (i) the prohibition of any controlled substance in the workplace, (ii) establishing a drug-free awareness program, and (iii) requiring that each employee engaged in the performance of the Work of the Contract be given a copy of the statement required by California Government Code §8355(a) and requiring that the employee agree to abide by the terms of that statement.

3. Contractor and I understand that if the District determines that Contractor has either: (i) made a false certification herein, or (ii) violated this certification by failing to carry out and to implement the requirements of California Government Code §§8355, the Contract awarded herein is subject to termination, suspension of payments, or both. Contractor and I further understand that, should Contractor violate the terms of the Drug- Free Workplace Act of 1990, Contractor may be subject to debarment in accordance with the provisions of California Government Code §§8350, *et seq*.

4. Contractor and I acknowledge that Contractor and I are aware of the provisions of California Government Code §§8350, *et seq*. and hereby certify that Contractor and I will adhere to, fulfill, satisfy and discharge all provisions of and obligations under the Drug-Free Workplace

Act of 1990.

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

Executed at_____this_____day of_____, 20____.
(City and State)

_____
(Signature)

_____
(Printed or Typed Name)

1.7 Public Works Contractor Registration Certification

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

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

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

Name of Bidder: _____

DIR Registration Number: _____

Bidder further acknowledges:

1. Bidder shall maintain a current DIR registration for the duration of the project.

2. Bidder shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.

3. Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Signature: _____

Name and Title: _____

Dated: _____

1.8 Bid Bond.

KNOW ALL PERSONS BY THESE PRESENTS that, _____ _____ hereinafter called the Principal, and _____ _____, a corporation duly organized under the laws of the State of _____, having its principal place of business at _____ in the State of _____, and authorized to do business in the State of California, hereinafter call the Surety, are held and firmly bound unto the Imperial Community College District, hereinafter called the Obligee, on order, in the sum of _____ Dollars ($_____) (being at least ten percent (10%) of the total amount of Principal's Bid price) lawful money of the United States, for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these present.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Principal has submitted its Bid for the project entitled _____ _____to the Obligee, the Bid, by reference thereto; being hereby made a part hereof.

NOW, THEREFORE, if Principal's Bid is rejected or, in the alternate, if the Proposal is accepted and the Principal signs and delivers a Contract and furnishes a Performance Bond and Payment Bond, all in the form and within the time required by the Bid and the Contract Documents, then this obligation shall become null and void, otherwise the same shall remain in full force and effect and upon default of the Principal shall be forfeited to the Obligee, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal shall be the amount of this obligation as herein stated, as liquidated damages.

The Surety, for value received, hereby agrees that its obligations and its bond shall not be impaired or affected by any extension of the time within which the Obligee may accept such Proposal, and the Surety hereby waives notice of any such extension.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay, in addition to the sum set forth above, all costs incurred by the Obligee in such suit, including reasonable attorney's fees and expert witness fees, to be fixed by the court, in addition to the penal sum of the Bond.

Signed this _____ day of _____, 20___.

BY: SURETY _____ BY: PRINCIPAL _____

Notary Acknowledgment

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally

appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

_____

Signature of Notary Public

OPTIONAL

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

CAPACITY CLAIMED BY SIGNER

☐ Individual
☐ Corporate Officer

_____
Title(s)

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

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

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

Note: Signature of person executing for Surety must be notarized and evidence of corporate authority attached.

END OF BID FORMS

IMPERIAL COMMUNITY COLLEGE DISTRICT

00 52 13 – CONTRACT

1.1 Contract for Construction.

This Contract is effective as of the _____ day of _____, 20__ , by and between Imperial Community College District, a district organized and existing under the laws of the State of California ("District"), and _____ (Contractor).

The parties agree as follows:

A. Contractor, for and in consideration of the payment to be made to Contractor as hereinafter provided, shall furnish all plant, labor, technical and professional services, supervision, materials and equipment, other than such materials and equipment as may be specified to be furnished by District, and perform all operations necessary to complete the Work in strict conformance with the Contract Documents (defined below) for the public work of improvement titled:

SPORTS FIELD RESTROOM AND CONCESSION, WESTSIDE LIGHTING AND BORDER LINK ANTENNA PROJECT

Contractor is an independent contractor and not an agent of District. The Contractor and its surety shall be liable to District for any damages arising as a result of the Contractor's failure to comply with this obligation.

B. Time is of the essence in the performance of the Work. The Work shall be commenced by the date stated in District's Notice to Proceed. The Contractor shall complete all Work required by the Contract Documents within two hundred seventy (270) calendar days following District's issuance of the Notice of Award, hereafter the Contract Times.

C. Contractor has ten (10) Days following District's issuance of the Notice of Award to provide a properly executed Performance Bond, Payment Bond, Certificates of Insurance and Endorsements, Escrow Agreement (if used), and Taxpayer Identification Number. A Notice to Proceed will not be issued prior to District's receipt of the aforementioned items.

D. District shall pay to the Contractor as full compensation for the performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, and including all applicable taxes and costs, the sum of _____ Dollars ($_____), hereinafter, the Contract Price. Payment shall be made as set forth in the General Conditions. District will pay to Contractor compensation based upon the prices set forth in the Schedule of Pay Items.

E. Contractor shall provide indemnification and defense as set forth in the General Conditions.

F. No oral agreement or conversation with any representative or employee of District, either before or after the execution of the Contract shall affect or modify any of the terms or obligations herein contained. This Contract constitutes the entire agreement

between the parties hereto and no changes, alterations or modifications hereof shall be effective unless in writing and signed by District.

G. The "Contract Documents" include only the following documents, each of which is incorporated into this Contract by reference:

Notice Inviting Bids
Instructions to Bidders
Bid Acknowledgement
Schedule of Pay Items
Bid Security
Designation of Subcontractors
Information Required of Bidders
Non-Collusion Declaration Form
Iran Contracting Act Certification
Public Works Contractor Registration Certification
Performance Bond
Payment (Labor and Materials) Bond
General Conditions
Special Provisions (or Special Conditions)
Technical Specifications prepared by Sanders, Inc.., dated June 2022
Standard Specifications (Excluding sections 1-9 in their entirety)
Addenda
Plans prepared by Sanders, Inc. dated June 2022
Change Orders executed by District

The Contactor shall complete the Work in strict accordance with all of the Contract Documents.

All of the Contract Documents are intended to be complementary. Work required by one of the Contract Documents and not by others shall be done as if required by all. In the event of a conflict, the various Contract Documents will be given effect in the order set forth in the General Conditions.

H. Each and every provision of law required to be included in these Contract Documents shall be deemed to be included in these Contract Documents. The Contractor shall comply with all requirements of applicable federal, state and local laws, rules and regulations, including, but not limited to, the provisions of the California Labor Code and California Public Contract Code which are applicable to this Work.

I. By my signature hereunder, as Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's 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.

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

IMPERIAL COMMUNITY COLLEGE DISTRICT

By: _____

Printed Name: _____

Title: _____

Dated: _____

ATTEST:

_____
Clerk of the Board

CONTRACTOR

By: _____
(Authorized Representative of Contractor)

Printed Name: _____

Title: _____
(Attach Acknowledgment for Authorized Representative of Contractor)

License No. _____

Dated: _____

END OF CONTRACT

00 61 13 - BOND FORMS;
CERTIFICATES OF INSURANCE AND ENDORSEMENT FORMS;
ESCROW AGREEMENT; TAXPAYER IDENTIFICATION NUMBER

1.1 Performance Bond.

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the Imperial Community College District (hereinafter referred to as "District") has awarded to _____, (hereinafter referred to as the "Contractor") an agreement for _____ (hereinafter referred to as the "Project").

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

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

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

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless District, its officers and agents, as stipulated in the Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Project, unless otherwise provided for in the Contract Documents, the guarantee obligation shall hold good for a period of one (1) year after the acceptance of the work by District, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect District from loss or damage resulting from or caused by defective materials or faulty workmanship the above obligation in penal sum thereof shall remain in full force and effect. However, anything in this paragraph to the contrary notwithstanding, the obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

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

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

1. Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or

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

3. Permit District to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by District under the Contract and any modification thereto, less any amount previously paid by District to the Contractor and any other set offs pursuant to the Contract Documents.

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

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

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract to be performed thereunder, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of Contract. including but not limited to the provisions of Sections 2819 and 2845 of the California Civil Code.

[Remainder of Page Left Intentionally Blank.]

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

_____
CONTRACTOR/PRINCIPAL

_____
Name

By_____

SURETY:

By: _____
Attorney-In-Fact

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached.

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

THE FOLLOWING INFORMATION IS MANDATORY

Any claims under this bond may be addressed to:

(Name and Address of Surety) _____

_____

_____

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

_____

_____

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

Notary Acknowledgment

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally

appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

_____
Signature of Notary Public

OPTIONAL

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

CAPACITY CLAIMED BY SIGNER

☐ Individual
☐ Corporate Officer

_____
Title(s)

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

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

_____
_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

END OF PERFORMANCE BOND

1.2 Payment Bond (Labor and Materials).

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the Imperial Community College District (hereinafter referred to as "District") has awarded to _____, (hereinafter referred to as the "Contractor") _____ an agreement for _____ (hereinafter referred to as the "Project").

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

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

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

THE CONDITION OF THIS OBLIGATION IS SUCH that if Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, fail to pay for any materials, provisions or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, all litigation expenses incurred by District in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond shall inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

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

scheme or work of improvement herein above described, nor by any rescission or attempted rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between District and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 9100 of the Civil Code, and has not been paid the full amount of his claim.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract to be performed thereunder, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of Contract. including but not limited to the provisions of Sections 2819 and 2845 of the California Civil Code.

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

(Corporate Seal of Principal,
if corporation)

_____
Principal (Property Name of Contractor)

By _____
(Signature of Contractor)

(Seal of Surety)

_____
Surety

By _____
Attorney in Fact

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached. A Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

Notary Acknowledgment

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

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally

appeared _____, who proved to me on the basis of satisfactory

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

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

WITNESS my hand and official seal.

_____

Signature of Notary Public

OPTIONAL

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

CAPACITY CLAIMED BY SIGNER

☐ Individual
☐ Corporate Officer

_____
Title(s)

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

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

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

END OF PAYMENT (LABOR AND MATERIALS) BOND

1.3 Certificates of Insurance and Endorsement Forms.

Contractor shall furnish to District Certificates of Insurance and Endorsement Forms satisfactory to District attesting to the fact that the policies of insurance provided for in Article 5 of the General Conditions have been obtained.

1.4 Taxpayer Identification Number.

Contractor must complete and submit the Internal Revenue Service Form W-9 on the following page.

Form **W-9**
(Rev. August 2013)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type See **Specific Instructions** on page 2.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification:
☐ Individual/sole proprietor ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____

☐ Other (see instructions) ▶

Exemptions (see instructions):
Exempt payee code (if any) _____
Exemption from FATCA reporting code (if any) _____

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number
			–		–				

Employer identification number
		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below), and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here **Signature of U.S. person** ▶ **Date** ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. The IRS has created a page on IRS.gov for information about Form W-9, at *www.irs.gov/w9*. Information about any future developments affecting Form W-9 (such as legislation enacted after we release it) will be posted on that page.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, payments made to you in settlement of payment card and third party network transactions, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

Cat. No. 10231X Form **W-9** (Rev. 8-2013)

END OF BOND FORMS

IMPERIAL COMMUNITY COLLEGE DISTRICT

00 72 13 – GENERAL CONDITIONS

ARTICLE 1 -DEFINITIONS AND TERMINOLOGY

1.1 Defined Terms.

A. Wherever used in the Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined below, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. Act of God -- Act of God is an earthquake of magnitude 3.5 or higher on the Richter scale or a tidal wave.

2. Addenda -- Written or graphic instruments issued prior to the submission of Bids which clarify, correct, or change the Contract Documents.

3. Additional Work -- New or unforeseen work will be classified as "Additional Work" when District's Representative determines that it is not covered by the Contract.

4. Allowance -- A Bid Item contained in the Schedule of Pay Items contained in Section 00 41 43, for a specific element of the Work which may or may not be required for the completion of the Project. The Bid Item may include a predetermined cost for the specific element of the Work, or may require that Bidder estimate its cost, which District may unilaterally direct the Contractor to perform, or elect not to have performed. The Contractor will not be compensated for any portion of any Allowance not used.

5. Applicable Laws -- The laws, statutes, ordinances, rules, codes, regulations, permits, and licenses of any kind, issued by local, state or federal governmental authorities or private authorities with jurisdiction (including utilities), to the extent they apply to the Work.

6. Application for Payment -- The form acceptable to District's Representative which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

7. Bid -- The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices and other terms for the Work to be performed.

8. Bidder -- The individual or entity who submits a Bid directly to District.

9. Bidding Documents -- The Bidding Requirements and the proposed Contract Documents (including all Addenda).

10. Change Order ("CO") -- A document that authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Contract, in accordance with the Contract Documents and in the form contained in the Contract Documents.

11. Change Order Request ("COR") -- A request made by the Contractor for an adjustment in the Contract Price and/or Contract Times as the result of a Contractor-claimed change to the Work. This term may also be referred to as a Change Order Proposal ("COP"), or Request for Change ("RFC").

12. Claim -- A demand or assertion by District or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

13. Contract -- The entire integrated written agreement between District and Contractor concerning the Work. "Contract" may be used interchangeably with "Agreement" in the Contract Documents. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral, and includes all Contract Documents.

14. Contract Documents -- The documents listed in Section 00 52 13, Article 1.1.F. Some documents provided by District to the Bidders and Contractor, including but not limited to reports and drawings of subsurface and physical conditions are not Contract Documents.

15. Contract Price -- Amount to be paid by District to the Contractor as full compensation for the performance of the Contract and completion of the Work, subject to any additions or deductions as provided in the Contract Documents, and including all applicable taxes and costs.

16. Contract Times -- The number of days or the dates stated in the Contract Documents to: achieve defined Milestones, if any; and to complete the Work so that it is ready for final payment.

17. Contractor -- The individual or entity with which District has contracted for performance of the Work.

18. Contractor's Designated On-Site Representative -- The Contractor's Designated On-Site Representative will be as identified in Section 00 72 13, Article 2.6.B and shall not be changed without prior written consent of District.

19. District's Representative -- The individual or entity as identified in the Special Conditions to act as District's Representative.

20. Daily Rate -- The Daily Rate stipulated in the Contract Documents as full compensation to the Contractor due to District's unreasonable delay to the Project that was not contemplated by the parties.

21. Day -- A calendar day of 24 hours measured from midnight to the next midnight.

22. Defective Work -- Work that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referenced in the Contract Documents.

23. Demobilization -- The complete dismantling and removal by the Contractor of all of the Contractor's temporary facilities, equipment, and personnel at the Site.

24. Drawings -- That part of the Contract Documents prepared by of the Engineer of Record which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

25. Effective Date of the Contract -- The date indicated in the Contract on which it becomes effective, but if no such date is indicated, it means the date on which the Contract is signed and delivered by the last of the two parties to sign and deliver.

26. Engineer of Record -- The individual, partnership, corporation, joint venture, or other legal entity named as such in Section 00 73 13, Article 1.1. or any succeeding entity designated by District.

27. Green Book -- The current edition of the Standard Specifications for Public Works Construction promulgated by the Joint Cooperative Committee of the Southern California Chapter American Public Works Association and the Southern California Districts of the Associated General Contractors of California.

28. Hazardous Environmental Condition -- The presence at the Site of Hazardous Waste.

29. Hazardous Waste -- The term "Hazardous Waste" shall have the meaning provided in Section 104 of the Solid Waste Disposal Act (42 U.S.C. § 6903) as amended from time to time or, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a class I, class II, or class III disposal site in accordance with provisions of existing law, whichever is more restrictive.

30. Holidays -- The Holidays occur on:

    New Year's Day - January 1
    Memorial Day - Last Monday in May
    Independence Day - July 4
    Labor Day - First Monday in September
    Veteran's Day - November 11
    Thanksgiving Day - Fourth Thursday in November
    Friday after Thanksgiving
    Christmas Day - December 25

    If any Holiday listed above falls on a Saturday, Saturday and the preceding Friday are both Holidays. If the Holiday should fall on a Sunday, Sunday and the following Monday are both Holidays.

31. Interfacing Work -- Work which connects to, abuts, or meets with work of another contractor

32. Liens -- Charges, security interests, or encumbrances upon Project funds~~,~~ or personal property, including without limitation Stop Payment Notices.

33. Milestone -- A principal event specified in the Contract Documents associated with a required completion date or time prior to Completion of all the Work. Failure to achieve Milestones may result in Liquidated Damages as described in the Contract Documents.

34. Notice of Award -- The written notice by District to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, District will sign and deliver the Contract.

35. Notice of Completion -- The form which may be executed by District and recorded by the county where the Project is located constituting final acceptance of the Project.

36. Notice to Proceed -- A written notice given by District to Contractor fixing the date on which the Contractor may proceed with the Work and when Contract Times will commence to run.

37. Partial Utilization -- Use by District of a substantially completed part of the Work prior to Completion of all the Work.

38. Project -- The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

39. Project Manual -- The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents. The Project Manual may include documents that are not part of the Contract Documents.

40. Recyclable Waste Materials shall mean materials removed from the Site which are required to be diverted to a recycling center rather than an area landfill. Recyclable Waste Materials include asphalt, concrete, brick, concrete block, and rock.

41. Request for Information (“RFI”) -- A written request made by the Contractor to District when requesting information or clarification related to the Contract Documents or the Work.

42. Request for Proposal (“RFP”) -- A request made by District’s Representative for a proposal from the Contractor for proposed changes in the Work.

43. Samples -- Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

44. Schedule of Pay Items -- The form set forth in Section 00 41 43, Article 1.2.

45. Schedule of Submittals -- A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to facilitate scheduled performance of related construction activities.

46. Shop Drawings -- All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

47. Site -- Lands or areas indicated in the Contract Documents as being furnished by District upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by District which are designated for the use of Contractor.

48. Specifications -- That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

49. Stop Payment Notice -- A written notice as defined in Civil Code section 8044.

50. Subcontractor -- An individual or entity other than a Contractor having a contract with any other entity than District for performance of any portion of the Work at the Site.

51. Submittal -- Written and graphic information and physical samples prepared and supplied by the Contractor demonstrating various portions of the Work.

52. Successful Bidder -- The Bidder submitting a responsive Bid to whom District makes an award.

53. Supplier -- A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment used in the performance of the Work or to be incorporated in the Work.

54. Underground Facilities -- All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

55. Unit Price Work -- Work to be paid for on the basis of unit prices as provided by the Contractor in its bid or as adjusted in accordance with the Contract Documents.

56. Warranty -- A written guarantee provided to District by the Contractor that the Work will remain free of defects and suitable for its intended use for the period required by the Contract Documents or the longest period permitted by the law of this State, whichever is longer.

57. Work -- The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary

to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

1.2 Terminology.

A. The words and terms below are not defined but, when used in the Contract Documents, have the indicated meaning.

B. Furnish, Install, Perform, Provide.

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. Regardless of whether “furnish,” “install,” “perform,” or “provide” is used in connection with services, materials, or equipment, an obligation of Contractor is implied.

C. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 -PRELIMINARY MATTERS

2.1 Delivery of Contract Documents.

A. Within ten (10) days after receipt of the Notice of Award and before District will execute the Contract, the Contractor shall furnish and file with District the necessary Performance Bond, Payment Bond, Certificates of Insurance and Endorsements, Escrow Agreement (if used) and Tax Identification Number, as well as any other documents specified in the Contract Documents. This 10-day period shall be considered part of the Contract Times.

2.2 Bonds.

A. Contractor shall submit the bonds on the forms provided with the Contract Documents, duly executed by a responsible corporate surety admitted to transact surety business in the State of California, as defined in Code of Civil Procedure section 995.120, and listed in the United States Department of the Treasury circular entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," authorized to do business in the State of California and acceptable to District conditioned upon the faithful performance by the Contractor of all requirements of the Contract Documents. Each of the bonds shall be in a sum no less than one hundred percent (100%) of the Contract Price.

2.3 Evidence of Insurance.

A. Contractor shall obtain, at its sole cost and expense, all insurance required by Article 5. Certificates of such insurance and copies of the insurance policies and endorsements shall be delivered to District within ten (10) Days after receipt of the Notice of Award and before execution of the agreement for construction by District.

2.4 Execution of Contract.

A. Upon receipt of the required Contract Documents, District will execute the Contract, establishing the Effective Date of the Contract.

2.5 Contractor's Failure to Perform.

A. Should Contractor fail to comply with timelines provided above, District shall retain the right to enforce and collect on the Contractor's Bid Bond, rescind award to the Contractor and award the Contract to the next lowest responsive, responsible bidder as determined by District.

2.6 Commencement of Contract Times; Notice to Proceed.

A. The Contract Times begin to run on the Day the Notice of Award is issued. District will not issue a Notice to Proceed until after the Effective Date of the Contract upon District's receipt of a properly executed Performance Bond, Payment Bond, Certificates of Insurance and Endorsements, Escrow Agreement (if used), and Taxpayer Identification Number. Work shall commence within fifteen (15) days of this date.

B. No Work shall be done at the Site prior to the date stated in the Notice to Proceed.

2.7 Copies of Documents.

A. District shall furnish to Contractor up to six (6) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.8 Substitution Requests, Preliminary Schedules and Schedule of Submittals.

A. Substitution Requests.

1. Within fifteen (15) Days after Notice of Award (unless otherwise specified in the Contract Documents), Contractor shall provide all Substitution Requests as further described in Section 00 72 13, Article 6.6.

B. Preliminary Schedules and Schedule of Submittals.

1. Within ten (10) Days after the Effective Date of the Contract (unless otherwise specified in the Contract Documents) Contractor shall submit to District's Representative:

a. A preliminary Cost-Loaded CPM Progress Schedule indicating the times (numbers of Days or dates) for starting and completing each of the various stages of the Work, including any Milestones specified in the Contract Documents. Each activity shall be priced and include an appropriate amount of overhead and profit applicable to each item of Work, and represent a discreet element of Work to be performed by no more than one Contractor, Subcontractor or Supplier. Schedule constraints imposed by the Contract are found in the Special Conditions. If Contractor fails to incorporate these constraints into its schedule, Contractor will be solely liable for any delays or impacts resulting from this failure to comply; and

b. A preliminary Schedule of Submittals that conforms with the requirements of Section 00 72 13, Article 6.7.

2.9 Preconstruction Conference; Designation of Authorized Representatives.

Before any Work at the Site is started, a conference attended by District, Contractor, District's Representative, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to herein, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

At this conference District and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.10 Initial Acceptance of Schedules.

A. At least ten (10) Days before submission of the first Application for Payment a conference attended by Contractor, District's Representative, and others as appropriate will be held to review for acceptability to District's Representative the schedules submitted, as required by the Contract Documents. Contractor shall have an additional ten (10) Days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to District's Representative.

B. Acceptance of the schedules by District's Representative will not impose on responsibility for accuracy, for sequencing, scheduling, or progress of the Work, or

compliance with the Contract Documents. Acceptance will not interfere with or relieve Contractor from Contractor's full responsibility therefor.

2.11 Subcontractor Mobilization Meeting.

Prior to the start of each major Subcontractor's Site Work, the Contractor, the involved Subcontractor, and District's Representative shall attend a pre-start meeting to discuss the schedule, coordination, procedures, and other administrative issues.

ARTICLE 3 -CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent.

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to District.

C. Clarifications and interpretations of the Contract Documents shall be issued by District's Representative as provided in these General Conditions.

D. If utilities to equipment/fixtures are not shown but are necessary to operate the equipment/fixtures, the utilities service installation is considered to be part of the Work. The implied Work will conform to the appropriate sections of the Contract Documents.

E. Organization of the Contract Documents into divisions, sections, and articles, and arrangement of drawings shall not control the Contractor in dividing Work among subcontractors or in establishing the extent of Work to be performed by any trade.

3.2 Reference Standards.

A. Standards, Specifications, Codes, Laws, and Regulations.

1. Reference to Federal Specifications, Federal Standards, other standards, specifications, manuals, or codes of any technical society, organization, or association, or to Applicable Laws, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Applicable Laws in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of District, Contractor, or District's Representative, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to District or District's

Representative, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.3 Reporting and Resolving Discrepancies; Order of Precedence.

A. Reporting Discrepancies.

1. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to District's Representative any conflict, error, ambiguity, or discrepancy which Contractor discovers, should have discovered, or has actual knowledge of, and shall obtain a written interpretation or clarification from District's Representative before proceeding with any Work affected thereby.

2. If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (i) any applicable Law or Regulation, (ii) any standard, specification, manual, or code, or (iii) any instruction of any Supplier, then Contractor shall promptly submit a written RFI to District's Representative. Contractor shall not proceed with the Work affected thereby (except in an Emergency) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in the Contract Documents, and any Work performed by Contractor before receipt of an amendment or supplement shall be at Contractor's own risk.

B. Resolving Discrepancies; Order of Precedence.

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

   b. the provisions of any Applicable Laws (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Applicable Law).

2. In resolving conflicts among any of the Contract Documents, the order of precedence shall be as follows:

   a. Permits from other agencies as may be required by law;

   b. Change Orders or Pending Change Orders, most recent first

   c. Contract;

   d. Addenda, most recent first;

   e. Special Conditions;

   f. Technical Conditions;

   g. Drawings;

   h. General Conditions;

   i. Instructions to and Information for Bidders;

   j. Invitation to Bid;

   k. Contractor's Bid (Bid Forms);

   l. Green Book (except Section 1 – 9, which are specifically excluded);

   m. Referenced District Standard Specifications.

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

   a. Figures govern over scaled dimensions;

   b. Detail drawings govern over general drawings;

   c. Addenda/Change Order drawings govern over Drawings;

   d. Drawings govern over standard drawings.

4. Notwithstanding the orders of precedence established above, in the event of conflicts, the higher standard, higher quality and most expensive shall always apply.

3.4 Amending and Supplementing Contract Documents.

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof only by a Change Order.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized at no cost to District, by one or more of the following ways:

1. District's Representative's review of a Submittal, Shop Drawing, Sample or Substitution Request without exception (subject to the provisions of the Contract Documents); or

2. District's Representative's issuance of a response to an RFI.

However, no review or RFI response will reduce or modify the Contractor's obligation to fully satisfy and comply with the requirements of the Contract Documents.

3.5 Reuse of Documents.

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or Ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer of Record or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of District and Engineer of Record and specific written verification or adaptation by Engineer of Record.

B. The prohibitions of this Article 3.5 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.6 Electronic Data.

A. Unless otherwise stated in the Special Conditions, the data furnished by District or District's Representative to Contractor, or by Contractor to District or District's Representative, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within sixty (60) Days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-Day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 -AVAILABILITY AND OWNERSHIP OF LANDS AND MATERIALS; SUBSURFACE AND PHYSICAL CONDITIONS; UNDERGROUND UTILITIES; TRENCHING; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.1 Availability of Lands.

A. District shall furnish the Site. District shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. District will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities.

B. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment at no additional cost to District.

4.2 Ownership of Site Materials Found.

A. The title to water, soil, rock, gravel, sand, minerals, timber and any other materials developed or obtained in the excavation or other operations of Contractor or any of its Subcontractors in the performance of the Contract, and the right to use said items in carrying out the Contract, or to dispose of same, is hereby expressly reserved by District. Neither Contractor nor any of its Subcontractors nor any of their representatives or employees shall have any right, title, or interest in said materials, nor shall they assert or make any claim thereto. Contractor will, as determined by District's Representative, be permitted to use in the Work without charge, any such materials which meet the requirements of the Contract Documents, provided District shall have the right to use or consume these materials without payment to a third party.

4.3 Subsurface and Physical Conditions.

A. Reports and Drawings. The Special Conditions identify:

1. those reports known to District of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to District of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. Limited Reliance by Contractor on Technical Data Authorized. Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, which were expressly not created or obtained to evaluate or assist in the evaluation of constructability, and are not Contract Documents. Contractor shall make its own interpretation of the "technical data" and shall be solely responsible for any such interpretations. Except for reliance on the accuracy of such "technical data," Contractor may not rely upon or make any claim against District, District's Representative, or Engineer of Record, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including without limitation any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, conclusions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

C. Groundwater Elevation. It is Contractor's responsibility to determine and allow for the elevation of groundwater at the date of Project construction. It is expressly acknowledged by Contractor that groundwater elevations fluctuate and that the elevations shown in borings may not reflect conditions at time of construction. A difference in elevation between groundwater shown in soil boring logs and groundwater actually encountered during construction will not be considered as a basis for Additional Work or Claim.

D. Unauthorized Use of Technical Data. Contractor is prohibited from utilizing any information, including but not limited to "technical data" provided in conjunction with this Project. District, District's Representative, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.4 Differing Subsurface or Physical Conditions.

A. Notice. If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Section 00 72 13, Article 4.3.B is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly, but in no case more than five (5) Days after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an Emergency), notify District and District's Representative in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.5 Underground Facilities.

A. Shown or Indicated. The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to District or District's Representative by the owners of such Underground Facilities, including District, or by others. Unless it is otherwise expressly provided in the Special Conditions:

1. District and District's Representative shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents. Contractor shall determine the location and depth of all utilities, including service connections, which have been marked by the respective owners and which may affect or be affected by its operations. Full compensation for such Work shall be considered as included in Contractor's Bid price;

c. coordination of the Work with the owners of such Underground Facilities, including District, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated.

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly, but in no case more than five (5) Days after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Section 00 72 13, Article 6.20), identify the owner of such Underground Facility and give written notice to that owner and to District and District's Representative. District's Representative will promptly review the Underground Facility and determine the extent, if any, to which a

change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

C. Notice of Underground Excavation. As provided in Government Code section 4216.2, at least two (2) work days, but not more than 14 Days prior to commencing any excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations, Contractor shall contact the appropriate regional notification center and shall request all affected utility owners to mark or otherwise indicate the approximate locations of their subsurface installations.

1. After the utility survey is completed, the Contractor shall commence "potholing" or hand digging to determine the actual location of the pipe, duct, or conduit. District shall be given written notice prior to commencing potholing operations. The Contractor shall uncover all piping and conduits, to a point one (1) foot below the pipe, where crossings, interferences, or connections are shown on the Drawings, prior to trenching or excavating for any pipe or structures, to determine actual elevations. New pipelines shall be laid to such grade as to clear all existing facilities, which are to remain in service for any period subsequent to the construction of the run of pipe involved.

2. A "High Priority Subsurface Installation" is defined in section 4216 (e) as "high-pressure natural gas pipelines with normal operating pressures greater than 415kPA gauge (60psig) or greater than six inches nominal pipe diameter, petroleum pipelines, pressurized sewage pipelines, high-voltage electric supply lines, conductors, or cables that have a potential to ground of greater than or equal to 60kv, or hazardous materials pipelines that are potentially hazardous to workers or the public if damaged."

3. The Contractor's attention is directed to the requirements of Government Code section 4216.2 (a)(2) which provides: "When the excavation is proposed within 10 feet of a High Priority Subsurface Installation, the operator of the high priority subsurface installation shall notify the excavator of the existence of the high priority subsurface installation prior to the legal excavation start date and time, as such date and time are authorized pursuant to paragraph (1) of subdivision (a) of section 4216.2. The excavator and the operator or its representative shall conduct an onsite meeting at a mutually-agreed-on time to determine actions or activities required to verify the location of the high priority subsurface installation prior to start time." The Contractor shall notify District in advance of this meeting.

D. Protection of Utilities. Contractor shall not interrupt the service function or disturb the support of any utility, without authority from District or order from the utility owner. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff. Where protection is required to ensure support of utilities shown in the Contract Documents, Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.

E. Notification Requirements If Utility Disturbed. Contractor shall immediately notify District's Representative and the utility owner if any utility is disturbed or damaged.

Contractor shall bear the costs of repair or replacement of any utility damaged by Contractor.

F. Removal of Abandoned Utilities. Unless otherwise specified, Contractor shall remove all interfering portions of utilities shown in the Contract Documents or indicated in the Bidding Documents as "abandoned". Before starting removal operations, Contractor shall ascertain from the utility owner whether the abandonment is complete. The costs involved in the removal and disposal shall be included in the price for the item of Work necessitating such removals.

G. Relocation of Utilities.

1. When the Contract Documents provide for Contractor to alter, relocate, or reconstruct a utility, all costs for such Work shall be included in the Contract Price.

2. Temporary or permanent relocation or alteration of indicated utilities requested by Contractor for Contractor's convenience shall be Contractor's responsibility, and Contractor shall make all arrangements and bear all costs.

3. After award of the Contract, portions of utilities not indicated in the Contract Documents which are found to interfere with the Work may be relocated, altered, or reconstructed by the utility owner, or District's Representative may order changes in the Work to avoid interference. Such changes will be paid for in accordance with these General Conditions.

H. Access to the Work. When necessary, Contractor shall so conduct its operations as to permit access to the Site and provide time for utility work to be accomplished during normal work hours during the progress of the Work.

4.6 Trenches or Other Excavations.

A. If any portion of the Work involves digging trenches or other excavations that extend deeper than four feet below the surface:

1. Contractor shall promptly, and before the following conditions are disturbed, notify District's Representative, in writing, of any:

a. provide District's representative with a copy of any required permits;

b. material that Contractor believes may be material that is Hazardous Waste;

c. 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

d. 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. Upon such notification, District's Representative 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 Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order under the procedures described in this Contract.

3. In the event that a dispute arises between District and Contractor whether the conditions materially differ, or involve Hazardous Waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance of any part of the Work, Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

4.7 Hazardous Environmental Conditions at Site.

A. Reports and Drawings. The Special Conditions identify those reports and drawings known to District relating to Hazardous Environmental Conditions that have been identified at the Site.

B. Limited Reliance by Contractor on Technical Data Authorized. Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Special Conditions. Contractor shall make its own interpretation of the "technical data" and shall be solely responsible for any such interpretations. Except for reliance on the accuracy of such "technical data," Contractor may not rely upon or make any claim against District or District's Representative, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including without limitation any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an Emergency); and (iii) notify District and District's Representative (and promptly thereafter confirm such notice in writing). District shall promptly consult with District's Representative concerning the necessity for District to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after District has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then District may order the portion of the Work that is in the area affected by such condition to be deleted from the Work in accordance with the Contract Documents. District may have such deleted portion of the Work performed by District's own forces or others.

G. To the fullest extent permitted by Applicable Laws, Contractor shall indemnify, defend, and hold harmless District and District's Representative, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created, in whole or in part, by Contractor or by anyone for whom Contractor is responsible. Nothing in this Section shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

4.8 Protection and Restoration of Existing Improvements and Reference Points.

A. In the event that any historical stamps/impressions or survey monuments are located on existing sidewalks or curbs, which may be affected by the Work or construction activities, the disposition or reestablishment of those stamps/impressions shall be determined by District.

B. District shall provide engineering surveys to establish reference points for construction which in District's Representative's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of District. Contractor shall report to District's Representative whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

ARTICLE 5 -BONDS AND INSURANCE

5.1 Time for Compliance. Contractor shall not commence Work under this Agreement until it has provided evidence to District that it has secured all insurance required under this Section. Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein. Contractor shall not allow any subcontractor to commence work on any subcontract until it has provided evidence to District that the subcontractor has secured all insurance required under this Section.

5.2 Minimum Requirements. Contractor shall, at its expense, procure and maintain for the duration of the Agreement insurance against claims for injuries to persons or damages to property which may arise out of or result from the performance of the Work and Contractor's other obligations under the Contract Documents whether by Contractor, its agents, representatives, employees or subcontractors. Contractor shall also require all of its subcontractors to procure and maintain the same insurance for the duration of the Agreement and verify the subcontractors' compliance. Contractor's and subcontractors' insurance shall meet at least the following minimum levels of coverage:

A. Minimum Scope of Insurance. Coverage shall be at least as broad as the latest version of the following: (1) General Liability: Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001); (2) Automobile Liability: Insurance Services Office Business Auto Coverage form number CA 0001, code 1 (any auto) or if Contractor has no owned autos, non-owned, leased or hired autos Code 8 (hired) and Code 9 (non-owned); (3) Workers' Compensation and Employer's Liability: Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance; and (4) Installation Floater/Builder's Risk: "All Risk All Perils" form. The policies shall not contain any exclusion contrary to the Agreement, including but not limited to endorsements or provisions limiting coverage for (1) contractual liability or (2) cross liability for claims or suits by one insured against another. In addition, Contractor shall, if required in the Special Provisions, have and maintain the following insurance: Professional Liability/Errors and Omissions, and Pollution Liability, as described below.

B. Minimum Limits of Insurance. Contractor shall maintain limits no less than:

1. For Commercial General Liability, Contractor shall have limits of at least the amount that corresponds to the Contract Price in the following table:

Contract Price	**Amount of Liability Insurance** (per occurrence)
$ 0 - $ 2 million	$ 2 million
$ 2 million - $ 5 million	$ 3 million
$ 5 million - $ 10 million	$ 5 million
$10 million - $ 20 million	$10 million

If Commercial General Liability Insurance or other form with general aggregate limit is used including, but not limited to, form CG 25 03, either the general aggregate limit shall apply separately to the Project or the general aggregate limit shall be twice the required occurrence limit. Should any of the Work involve aircraft (fixed wing or helicopter) owned or operated by Contractor, liability insurance with limits of not less

than $5,000,000 per occurrence for bodily injury and property damage is required. Should any of the Work involve watercraft owned or operated by Contractor, liability insurance with limits of not less than $5,000,000 per occurrence for bodily injury and property damage is required.

2. Automobile Liability: $1 million per accident for bodily injury and property damage.

3. Workers' Compensation and Employer's Liability:

a. Workers' Compensation: statutory limits.

b. Employer's Liability limits of $1 million per accident for bodily injury or disease.

c. Should any of the Work be upon or contiguous to navigable bodies of water, Contractor shall carry insurance covering its employees for benefits available under the Federal Longshoremen's and Harbor Worker's Act to the extent required by law;

4. Excess/Umbrella Liability Policy may be provided to insure the total limits required for Commercial General Liability and Automobile Liability and must apply to all primary coverage afforded, including but not limited to general liability, owned and non-owned automobiles, leased and hired cars.

5. Notwithstanding the minimum limits set forth above, any available insurance proceeds in excess of the specified minimum limits of coverage shall be available to the parties required to be named as additional insureds.

C. Notices; Cancellation or Reduction of Coverage. At least fifteen (15) days prior to the expiration of any such policy, evidence showing that such insurance coverage has been renewed or extended shall be filed with District. If such coverage is cancelled or materially reduced, Contractor shall, within ten (10) days after receipt of written notice of such cancellation or reduction of coverage, file with District evidence of insurance showing that the required insurance has been reinstated or has been provided through another insurance company or companies. In the event any policy of insurance required under this Agreement does not comply with these specifications or is canceled and not replaced, District has the right but not the duty to obtain the insurance it deems necessary and any premium paid by District will be promptly reimbursed by Contractor or District may withhold amounts sufficient to pay premium from Contractor payments. In the alternative, District may suspend or terminate this Agreement.

5.3 Insurance Endorsements. The insurance policies shall contain the following provisions, or Contractor shall provide endorsements on forms approved by District to add the following provisions to the insurance policies:

A. General Liability. The general liability policy shall include or be endorsed (amended) to state that: (1) using ISO CG forms 20 10 and 20 37 (including completed operations), or endorsements providing the exact same coverage, District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions shall be covered as additional insureds with respect to the Work or ongoing and completed operations performed by

or on behalf of the Contractor, including materials, parts or equipment furnished in connection with such work; and (2) using ISO form 20 01, or endorsements providing the exact same coverage, the insurance coverage shall be primary insurance as respects District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions, or if excess, shall stand in an unbroken chain of coverage excess of the Contractor's scheduled underlying coverage. Any excess insurance shall contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of District, before District's own primary insurance or self-insurance shall be called upon to protect it as a named insured. Any insurance or self-insurance maintained by District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions shall be excess of the Contractor's insurance and shall not be called upon to contribute with it in any way.

B. Automobile Liability. The automobile liability policy shall include or be endorsed (amended) to state that: (1) District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions shall be covered as additional insureds with respect to the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by the Contractor or for which the Contractor is responsible; and (2) the insurance coverage shall be primary insurance as respects District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions, or if excess, shall stand in an unbroken chain of coverage excess of the Contractor's scheduled underlying coverage. Any insurance or self-insurance maintained by District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions shall be excess of the Contractor's insurance and shall not be called upon to contribute with it in any way.

C. Workers' Compensation and Employer's Liability Coverage. The insurer shall agree, using WC 00 03 13 or the exact equivalent, to waive all rights of subrogation against District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions for losses paid under the terms of the insurance policy.

D. All Coverages. Each insurance policy required by this Agreement shall be endorsed to include the following provisions:

1. coverage shall not be suspended, voided, reduced or canceled except after thirty (30) days (10 days for nonpayment of premium) prior written notice by mail has been given to District and all additional insureds.

2. any failure to comply with reporting or other provisions of the policies, including breaches of warranties, shall not affect coverage provided to District and any other additional insureds.

3. standard separation of insureds provisions.

4. No special limitations on the scope of protection afforded to District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions.

5. waiver of any right of subrogation of the insurer against District, its officials, officers, employees, agents, and volunteers, or any other additional insureds, or shall specifically allow Contractor or others providing insurance in compliance with these specifications to waive their right of recovery prior to a loss. By signing this agreement, Contractor hereby waives its own right of recovery against District or any other additional insureds, and shall require similar written express waivers and insurance clauses from each of its subcontractors.

5.4 Installation Floater Insurance shall be for the total value of project. The policy shall be written on an "All Risk, All Perils" form, to include coverage for earthquake, flood, and Acts of God (as defined in public Contract Code Section 7105), insuring for physical loss or damage to the Work, false work, completed work, work in progress, material, supplies, and equipment of the Work Site, but also to property at off-site storage locations and in transit, without regard to the location of the covered property. The policy shall be issued on a replacement cost basis, and shall insure against at least the following perils or causes of loss: fire, lightning, weather damage, explosion, extended replacement cost coverage, theft, vandalism, malicious mischief, collapse, debris removal, aircraft, demolition occasioned by enforcement of Applicable Laws, water damage from any source), snow, sleet, hail, wind, acts of terrorism, and such other perils not specifically listed. The policy shall include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects), allow for Partial Utilization of the Work by District, and include testing and startup.

If the replacement cost increases during the course of construction, additional insurance limits must be purchased by Contractor.

Should any of the Work involve construction or remodeling of, or addition to, a building or buildings, then Builder's Risk/Course of Construction Coverage shall be added to the Installation Floater Insurance. The Builder's Risk/Course of Construction coverage shall also include the perils of flood and earthquake.

Installation Floater Insurance deductible amounts may be selected by Contractor, but shall not exceed the maximum allowable deductible for the Contract Price of the Project in the table set forth below. The maximum allowable deductibles for the perils of earthquake and flood shall not be greater than five percent of the value at risk at the time of loss.

Contract Price	All Risk Perils Maximum Deductible
$ 0 - $ 2,000,000	$ 10,000
$ 2,000,001 - $ 5,000,000	$ 20,000
$ 5,000,001 - $ 10,000,000	$ 50,000
$ 10,000,001 - $ 50,000,000	$ 100,000

Installation Floater Insurance policy shall name District, Contractor and Subcontractors as insureds, with deductible amounts, if any, for the sole account of and payable by Contractor. Loss under Installation Floater Insurance shall be adjusted with and payable to District for the interest of all parties.

The amount of Installation Floater Insurance shall be sufficient to protect against such loss or damage in full until all Work is accepted by District. The premium for Installation Floater

Insurance will be paid at the lump sum price set forth in Schedule A of the Schedule of Pay Items.

5.5 Professional Liability. Professional Liability/Errors and Omissions Insurance, in the amounts set forth in the Special Provisions, if the Work includes engineering or architectural design work beyond that covered by Contractor's General Liability policy.

5.6 Pollution Liability insurance is required should any of the Work involve pollutants. Liability coverage shall include coverage for the environmental risk associated with the project and expenses related to such, including bodily injury, property damage, on and off site clean-up, transporting, carrying, or storing pollutants, coverage for non-owned disposal site in an amount not less than that set forth in the Special Provisions.

Pollutants include, but are not limited to, asbestos, mold, microbial matter, solid, liquid, gaseous or thermal irritants or contaminants, including smoke, vapor, soot, fumes, acids, alkalis, chemicals, and waste. Waste includes materials to be recycled, reconditioned, or reclaimed.

5.7 Receipt and Application of Insurance Proceeds.

Any insured loss under the policies of insurance required by Section 00 72 13, Article 5.4 will be adjusted with District and made payable to District as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Section 00 72 13, Article 5.4. District shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

District as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing to District's exercise of this power within fifteen (15) Days after the occurrence of loss. If such objection be made, District as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, District as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, District as fiduciary shall give bond for the proper performance of such duties.

5.8 Partial Utilization, Acknowledgment of Property Insurer.

If District finds it necessary to occupy or use a portion or portions of the Work prior to Completion of all the Work, no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

5.9 Deductibles and Self-Insurance Retentions. Any deductibles or self-insured retentions must be declared to and approved by District. Contractor shall guarantee that, at the option of District, either: (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects District, its directors, officials, officers, employees, agents, and volunteers and any other additional insureds named in the Special Provisions; or (2) the Contractor shall procure a bond guaranteeing payment of losses and related investigation costs, claims, and administrative and defense expenses.

5.10 Claims Made Policies. Claims made policies are not acceptable other than for Professional Liability. In addition to the requirements above, for any claims made policy:

A. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.

B. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after District's acceptance of the Work.

C. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of five (5) years District's acceptance of the Work.

5.11 Subcontractor Insurance Requirements. Contractor shall not allow any subcontractors to commence work on any subcontract relating to the Work until Contractor has verified that all subcontractors maintain insurance meeting all requirements under this Section and provided evidence to District of such insurance. For Commercial General Liability coverage subcontractors shall provide coverage with a format at least as broad as CG 20 38 04 13. If requested by Contractor, District may approve different scopes or minimum limits of insurance for particular subcontractors. Contractor shall confirm that District and entities identified in the Special Provisions shall be named as additional insureds on all subcontractors' policies of Commercial General Liability Insurance and Commercial Automobile Insurance.

5.12 Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating no less than A:VIII, licensed to do business in California, and satisfactory to District.

5.13 Verification of Coverage. Contractor shall furnish District with original certificates of insurance and endorsements effecting coverage required by this Agreement on forms satisfactory to District. The certificates and endorsements for each insurance policy shall be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements must be received and approved by District before work commences. District reserves the right to require complete, certified copies of all required insurance policies, at any time.

5.14 Reservation of Rights. District reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

ARTICLE 6 -CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence.

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to District and District's Representative except under extraordinary circumstances. Superintendent must be able to proficiently speak, read and write in English.

6.2 Labor; Working Hours.

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, which are defined as hours between 7:00 a.m. and 3:30 p.m. any day Monday through Friday of any week except on Holidays and/or during Schedule Constraints defined in the Contract Documents. Contractor will not permit the performance of Work on a Saturday, Sunday, any Holiday or during identified Schedule Constraints without District's written consent given after prior written notice to District's Representative. Contractor shall be responsible for, and shall reimburse District for, all inspection costs outside regular working hours, including overtime.

C. The Contractor will provide all labor needed to complete the Work within the Contract Times.

6.3 Progress Meetings.

A. The Contractor shall schedule and hold regular on-Site progress meetings at least weekly and at other times as requested by Engineer or as required by progress of the Work. The Contractor, District's Representative, and all Subcontractors active on the Site shall attend each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.

B. District's Representative will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the Contractor shall present any issues which may impact its progress with a view to resolve these issues expeditiously.

6.4 Cost-Loaded CPM Progress Schedule and Recovery Schedule.

A. Contractor shall adhere to the Cost-Loaded CPM Progress Schedule established in accordance with the Contract Documents as it may be adjusted from time to time as provided below.

1. Contractor shall submit to District's Representative for acceptance proposed adjustments in the Cost-Loaded CPM Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Cost-Loaded CPM Progress Schedule that will change the Contract Times or Milestones shall be submitted in accordance with the requirements of the Contract Documents. Adjustments in Contract Times or Milestones may only be made by a Change Order.

3. Should any of the following conditions exist, District may require Contractor to prepare, at no extra cost to District, a plan of action and a Recovery Schedule for completing the Work and achieving all contractual milestones within the allotted Contract Time:

a. The Contractor's monthly progress report indicates delays that are, in the opinion of District, of sufficient magnitude that District questions the Contractor's ability to complete the Work;

b. The CPM schedule shows the Contractor to be thirty (30) or more days behind the critical path at any time during construction;

c. The Contractor desires to make changes in the logic or the planned duration of future activities of the CPM schedule which, in the opinion of District, are major in nature.

d. The recovery schedule shall include proposed revisions to the Construction Schedule, demonstrating how Contractor intends to achieve all contractual milestones including contract completion within the allotted Contract Time. The submittal shall include a narrative describing the actions planned by the Contractor to recover the schedule.

e. Contractor shall submit the Recovery Schedule within seven (7) Days of District's request.

(i) If Contractor asserts that District is responsible for the delay, failure to submit the Recovery Schedule within seven (7) Days of District's request, will be considered a concurrent delay event attributable to Contractor, and Contractor shall only be entitled to non-compensable adjustments to Contract Times.

(ii) If Contractor is responsible for the delay, this provision will not limit or affect Contractor's liability and failure to submit the Recovery Schedule with seven (7) Days of District's request may result in District withholding progress payments or other amounts due under the Contract Documents.

f. Contractor is responsible for all costs associated with the preparation and execution of the Recovery Schedule, including any necessary recovery actions, which may include, but are not limited to, assignment of additional labor, and/or equipment, shift or overtime work, expediting of submittals or deliveries, overlapping of activities or sequencing changes to increase activity concurrence.

g. Regardless of whether District directs Contractor to prepare a Recovery Schedule pursuant to this Section, Contractor shall promptly undertake appropriate action at no additional cost to District to recover the schedule whenever the current Construction Schedule shows that the Contractor will not achieve a milestone and/or complete the Work within the allotted Contract Time. Services, Materials, and Equipment.

B. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work within the Contract Times.

6.5 Materials.

A. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All materials furnished by the Contractor shall be of the most suitable grade for the purpose intended considering strength, ductility, durability, and best industry practice.

B. All special warranties and guarantees required by the Contract Documents shall expressly run to the benefit of District. If required by District's Representative, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

D. Materials shall be furnished in ample quantities and at such times as to ensure uninterrupted progress of the Work and shall be stored properly and protected as required by the Contract Documents. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or Work until District has accepted the Work.

E. No materials, supplies, or equipment for Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and agrees upon completion to deliver the Work to District free from any claims, liens, or encumbrances.

F. Materials shall be stored on the Site in such manner so as not to interfere with any operations of District or any independent contractor.

6.6 Substitution of Equipment, Materials or Construction Methodology.

A. Pursuant to Public Contract Code section 3400(b) District may make a finding that is referenced in the invitation for bids that designates certain products, things, or services by specific brand or trade name.

B. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to District's Representative for review within fifteen (15) Days after Notice of Award.

C. If in District's Representative's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by District's Representative as an "or-equal" item, in which case review and acceptance of the proposed item may, in District's Representative's sole discretion, be utilized and incorporated into the Work. A proposed item of material or equipment will be considered functionally equal to an item so named if:

1. in District's Representative's sole discretion:

a. it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

b. it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

c. it has a proven record of performance and availability of responsive service; and

2. Contractor certifies that, if approved and incorporated into the Work:

a. there will be no increase in cost to District or increase in Contract Times; and

b. it will conform substantially to the detailed requirements of the item named in the Contract Documents.

D. Substitute Construction Methods or Procedures. If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction accepted by District's Representative. Contractor shall submit in writing sufficient information to allow District's Representative, in District's Representative's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. District's Representative will advise Contractor in writing of any acceptance or rejection of the proposed substitution.

E. District's Representative's Evaluation. District's Representative will be allowed a reasonable time within which to evaluate each proposed substitution. District's Representative may require Contractor to furnish additional data about the proposed substitute item. District's Representative will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed, or utilized until District's Representative's review is complete, District's Representative will advise Contractor in writing of any acceptance or rejection of the proposed substitution.

F. Special Guarantee. District may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

G. District's Representative's Cost Reimbursement. Whether or not District's Representative approves a substitute proposed or submitted by Contractor, Contractor shall reimburse District for the reasonable charges of evaluating each such proposed substitute. Contractor shall also reimburse District for the reasonable charges for making changes in the Contract Documents (or in the provisions of any other direct contract with District) resulting from the acceptance of any proposed substitute.

H. Contractor's Expense. Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.7 Submittals.

A. Schedule of Submittals.

Within ten (10) Days after the Effective Date of the Contract (unless otherwise specified in the Contract Documents), Contractor will prepare and deliver a Schedule of Submittals to District's Representative that has been fully integrated with the Cost-Loaded CPM Progress Schedule and identifies each Submittal required by the Contract Documents as well as the date on which Contractor will deliver each Submittal to District's Representative. Each Submittal must be delivered to District's Representative at least thirty (30) Days prior to the date the material or equipment is scheduled to be incorporated into the Work. The Contractor is responsible for any schedule delays resulting from the Submittal process.

B. Submittal Procedures.

1. Contractor will follow the following procedures for each Submittal, Shop Drawing and Sample required by the Contract Documents:

   a. Transmit three (3) copies of each with form _____ Submittal Transmittal.

   b. Transmittals will be sequentially numbered. Contractor to mark revised submittals with original number and sequential alphabetic suffix.

   c. Each submittal will identify the Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

   d. Contractor must sign each submittal, certifying that it has reviewed and approved the submittal, verified products required, field dimensions, adjacent construction Work, and that coordination of information is according to requirements of the Work and Contract Documents.

   e. Identify variations in Contract Documents and product or system limitations that may differ and/or be detrimental to successful performance of completed Work.

   f. When Submittal is revised for resubmission, Contractor shall promptly address District comments and resubmit. Contractor shall identify changes made since previous submission.

   g. District's review of shop drawings shall not relieve Contractor from responsibility for deviations from the Contract Documents unless Contractor has, in writing, called District's attention to such deviations at time of submission and District has taken no exception to the deviation. District's review of shop drawings shall not relieve Contractor from responsibility for errors in shop drawings.

   h. Submittals not required by the Contract Documents or requested by District's Representative will not be acknowledged or processed.

   i. Incomplete Submittals will not be reviewed by District's Representative. Delays resulting from incomplete submittals are not the responsibility of District's Representative.

j. Contractor shall not be entitled to any extension of the Contract Times as a result of the Submittal process.

2. Where a Submittal, Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to District's Representative's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

3. Schedule Milestone for Submittals. Contractor must submit all submittals required by the Contract Documents in accordance with the Schedule of Submittals. If Contractor fails to submit the submittals in accordance with the Schedule of Submittals, Contractor will be solely liable for any delays or impacts caused by the delayed submittal, whether direct or indirect. Contractor will be liable for the time calculated from the date the submittal is due until the date a compliant submittal is made. A compliant submittal will be one that is complete and satisfies the requirements of the Contract Documents.

6.8 Shop Drawing and Sample Submittal Procedures.

A. Before submitting each Shop Drawing or Sample, Contractor shall have:

1. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

2. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

3. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

4. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

B. With each submittal, Contractor shall give District's Representative specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal and, in addition, a specific notation made on each Shop Drawing or Sample submitted to District's Representative for review and approval of each such variation.

C. Shop Drawings.

1. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show District's Representative the services, materials, and equipment Contractor proposes to provide and to enable District's Representative to review the information Representative for assessing conformance with information given and design concept expressed in Contract Documents.

2. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings. Shop Drawings must include signed and sealed calculations to support design in a form suitable for submission to and approval by authorities having jurisdiction.

3. Contractor shall make revisions and provide additional information when required by authorities having jurisdiction.

D. Samples.

1. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as required to enable District's Representative to review the submittal for assessing conformance with information given and design concept expressed in Contract Documents.

2. Samples should be of appropriate size and detail to assess functional, aesthetic, color, texture, patterns and finish selection.

E. District's Representative's Review.

1. District's Representative will review of Shop Drawings and Samples in accordance with the Schedule of Submittals. District's Representative's review and acceptance will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. District's Representative's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. District's Representative's review and acceptance shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless District's Representative has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample.

F. Resubmittal Procedures.

1. Contractor shall make corrections required by District's Representative and shall return three (3) corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by District's Representative on previous submittals.

6.9 Concerning Subcontractors, Suppliers, and Others.

A. Contractor shall self-perform at least thirty percent (30%) of the Work.

B. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, against whom District may have reasonable objection.

C. Contractor shall be fully responsible to District for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between District or District's Representative and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of District or District's Representative to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Applicable Laws.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with District's Representative through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the terms and conditions of the Contract Documents for the benefit of District and District's Representative. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Section 00 72 13, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against District, Contractor, District's Representative, and all other individuals or entities identified in the Special Conditions to be listed as insured or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting

from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.10 Dust Control.

A. Contractor, at its expense, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas free from dust. Industry accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, light bituminous treatment or similar methods, will be permitted.

6.11 Air Pollution.

A. Contractor shall not discharge into the atmosphere from any source whatever smoke, dust, or other air contaminants in violation of the laws, rules, and regulations of the governmental entities having jurisdiction.

6.12 Patent Fees and Royalties.

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of District or District's Representative, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by District in the Contract Documents.

B. To the fullest extent permitted by Applicable Laws, Contractor shall indemnify, defend, and hold harmless District and District's Representative, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents or specified in the Contract Documents and identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

6.13 Permits and Licenses.

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

A. Contractor shall obtain and pay for all other permits and licenses required for the Work, including excavation permit and permits for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under jurisdiction of public agencies other than District.

B. The Contractor shall arrange and pay for all off-site inspection of the Work related to permits and licenses, including certification, required by the specifications, drawings, or by governing authorities, except for such off-site inspections identified as District's responsibility in the Contract Documents.

C. Before acceptance of the Work, the Contractor shall submit all licenses, permits, certificates of inspection and required approvals to District.

6.14 Applicable Laws.

A. Contractor shall give all notices required by and shall comply with all Applicable Laws applicable to the performance of the Work. Except where otherwise expressly required by Applicable Laws, neither District nor District's Representative shall be responsible for monitoring Contractor's compliance with any Applicable Laws.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Applicable Laws, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work.

6.15 Labor Laws and Contractor's Obligations.

A. Hours of Work. Eight (8) hours of work shall constitute a legal day's work. Contractor and each subcontractor shall forfeit, as penalty to District, twenty-five dollars ($25) for each worker employed in the execution of Work by the Contractor or any subcontractor for each day during which such worker is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any week in violation of the provisions of the Labor Code, and in particular, section 1810 to section 1815, except as provided in Labor Code section 1815.

B. Prevailing Wages. The Contractor is aware of the requirements of Labor Code sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Work involves an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is $1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. District has obtained the prevailing wage rates from the Director of the Department of Industrial Relations, State of California. Copies of the prevailing wage rates are on file at District's office and shall be made available to any interested party on request. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform the Work available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Site. Contractor shall defend, indemnify and hold District, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws.

1. Pursuant to Labor Code section 1775, Contractor is hereby advised that in the event that Contractor fails to pay prevailing wages, Contractor will be held liable

for penalties and for shortfalls in wages and such amounts may be withheld from progress payments. Contractor and each subcontractor shall forfeit as a penalty to District not more than two hundred dollars ($200) for each Day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each 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.

2. Contractor shall post, at appropriate conspicuous points on the Site, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.

C. Payroll Records. Pursuant to Labor Code section 1776, the Contractor and each subcontractor shall maintain weekly certified payroll records showing the name, address, social security number, work classification, straight time and overtime hours paid each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the Work. The Contractor shall certify under penalty of perjury that records maintained and submitted by the Contractor are true and accurate. The Contractor shall also require subcontractor(s) to certify weekly payroll records under penalty of perjury.

1. In accordance with Labor Code section 1771.4, the Contractor and each subcontractor shall furnish the certified payroll records directly to the Department of Industrial Relations ("DIR") on a weekly basis and in the format prescribed by the DIR. This may include electronic submission. The Contractor shall ensure full compliance with all requirements and regulations from the DIR relating to labor compliance monitoring and enforcement and all other applicable labor law.

2. If not subject to paragraph (1), above, the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") of the DIR.

3. In the event of noncompliance with the requirements of this section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying any item or actions necessary to ensure compliance with this section. Should noncompliance still be evident after such ten (10) day period, the Contractor shall, as a penalty to the District, forfeit One Hundred Dollars ($100.00) for each day, or portion thereof, for each worker until strict compliance is effectuated. Upon the request of the DIR, such penalties shall be withheld from contract payments.

D. Employment of Apprentices. The Contractor's attention is directed to the provisions of sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning employment of apprentices by the Contractor or any subcontractor. The Contractor shall obtain a certificate of apprenticeship before employing any apprentice pursuant to sections 1777.5, 1777.6, and 1777.7 of the Labor Code. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, the Administrator of Apprenticeships, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

E. Nondiscrimination. Pursuant to Labor Code section 1735 and other applicable provisions of law, the Contractor and its subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap on this Work. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.

F. Workers Compensation. Pursuant to Labor Code section 1860, the Contractor shall secure the payment of workers' compensation to its employees in accordance with the provisions of Labor Code section 3700. Prior to commencement of work, the Contractor shall sign and file with District the following certification:

> "I am aware of provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's 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."

6.16 Taxes.

A. The Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid in accordance with the Applicable Laws of the place of the Project which are applicable during the performance of the Work.

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

C. The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work. The Contractor shall assume all liability and responsibility arising from the use of any patented, or allegedly patented, materials, equipment, devices or processes used in or incorporated with the Work, and shall defend, indemnify and hold harmless District, its officials, officers, agents, employees and representatives from and against any and all liabilities, demands, claims, damages, losses, costs and expenses, of whatsoever kind or nature, arising from such use.

6.17 Use of Site and Other Areas.

A. Limitation on Use of Site and Other Areas.

1. The Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Applicable Laws, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land or area, or to District or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such District or occupant because of the performance of the Work, the Contractor shall promptly settle with such other party

by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

B. Removal of Debris During Performance of the Work. During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to Applicable Laws.

C. Cleaning. Prior to Completion of the Work, the Contractor shall clean the Site and the Work and make it ready for utilization by District. At the completion of the Work, the Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. Loading Structures. The Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.18 Utility Usage.

A. All temporary utilities, including but not limited to electricity, water, gas, and telephone, used on the Work shall be furnished and paid for by the Contractor. The Contractor shall provide necessary temporary distribution systems, including meters, if necessary, from distribution points to points on the Work where the utility is needed. Upon completion of the Work, the Contractor shall remove all temporary distribution systems.

B. The Contractor shall provide necessary and adequate utilities and pay all costs for water, electricity, gas, oil, and sewer charges required for completion of the Work, including but not limited to startup and testing required in the Contract Documents.

C. All permanent meters installed shall be listed in the Contractor's name until the Work is accepted.

D. If Work is to be performed in existing District facilities, the Contractor may, to the extent authorized by District in writing, use District's existing utilities. If the Contractor uses District utilities, it shall compensate District for utilities used.

6.19 Record Documents.

A. The Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to District's Representative for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to District. See 01 00 00 for additional Record Drawing requirements.

6.20 Safety and Protection.

A. The Contractor shall be solely responsible for all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety laws. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. The Contractor shall comply with all Applicable Laws relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. The Contractor shall comply with the applicable requirements of the of the District's safety programs, if any. The Special Conditions identify the District's safety programs that are applicable to the Work.

D. The Contractor shall inform the District and the District's Representative of the specific requirements of Contractor's safety program with which District and District's Representative's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by the Contractor.

F. The Contractor's duties and responsibilities for safety and for protection of the Work shall continue until District files the Notice of Completion in accordance with Contract Documents.

6.21 Safety Representative.

A. The Contractor shall designate an OSHA-certified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs. The Contractor shall provide the District Representative the name and contract information of the safety representative in writing.

6.22 Hazard Communication Programs.

A. The Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Applicable Laws.

6.23 Emergencies.

A. In an emergency affecting safety of life or of Work or of adjoining property, the Contractor, without special instruction or authorization from District, shall act to prevent such threatened loss or injury; and the Contractor shall so act, without appeal, if directed or instructed by the District. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with the Contract Documents.

6.24 Continuing the Work.

A. The Contractor shall carry on the Work during negotiation of all Change Orders and all disputes or disagreements with District. No Work shall be delayed or postponed pending resolution of any Change Orders, disputes or disagreements, unless District and Contractor otherwise agree in writing.

6.25 Contractor's General Warranty and Guarantee.

A. The Contractor warrants and guarantees to the District that all Work will be in accordance with the Contract Documents and will not be defective. The District and District's Representative, and their officers, directors, members, partners, employees, agents, consultants, and subcontractors, shall be entitled to rely on representation of the Contractor's warranty and guarantee.

B. The Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. Observation or inspection by the District's Representative;

2. approval of a payment application or payment by District of any progress or final payment;

3. use or occupancy of the Work or any part thereof by District;

4. any review and/or acceptance of a Submittal, Shop Drawing or Sample;

5. any inspection, test, or approval by others; or

6. any correction of Defective Work by District.

6.26 Indemnification.

A. To the fullest extent allowed by law, the Contractor shall defend (with counsel of the District's choosing), indemnify and hold the District, its officials, officers, agents, employees, and representatives free and harmless from any and all claims, demands, causes of action, costs, expenses, liabilities, losses, damages or injuries, in law or in equity, to property or persons, including wrongful death, regardless of whether the allegations are false, fraudulent, or groundless, arising out of, related to, or in connection with the Work or this Contract, including claims made by subcontractors for nonpayment, and including without limitation the payment of all consequential damages and attorney's fees and other related costs and expenses. The Contractor shall defend, at the Contractor's own cost, expense and risk, with counsel of the District's choosing, any and all such suits, actions or other legal proceedings of every kind that may be brought or instituted against the District, its officials, officers, agents, employees and representatives. The Contractor shall pay and satisfy any judgment, award or decree that may be rendered against the District, its officials, officers, agents, employees and representatives, in any such suit, action or other legal proceeding. The Contractor shall reimburse the District, its officials, officers, agents, employees and representatives for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code section 2782.

B. Contractor agrees to pay, or reimburse the District and the District's Representative, for regulatory agency or court imposed fees, fines, or penalties imposed on the District and the District's Representative arising from the Contractor's failure to complete the Work in a timely manner and/or in accordance with the Contract Documents and any applicable permits or Applicable Laws. The Contractor's responsibility and obligation to pay, or reimburse the District and the District's Representative, for these fees, fines, or penalties shall be in addition to the assessment of liquidated damages for late completion of the Work.

6.27 Delegation of Professional Design Services.

A. The Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required 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.

B. The Contractor shall cause such services or certifications to be provided by a properly licensed 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 District's Representative.

C. The District and the District's Representative shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals.

D. The District's Representative's review and acceptance of design calculations and design drawings will be only for the limited purpose of checking for conformance with the design concept expressed in the Contract Documents.

ARTICLE 7 -OTHER WORK AT THE SITE

7.1 Related Work at Site.

A. Nothing contained in the Contract Documents shall be interpreted as granting to the Contractor exclusive occupancy at the Site. The District may perform other work related to the Project at the Site with District's employees or through other direct contracts, or have other work performed by utility owners (collectively, "Other Contractors"). If such other work is not noted in the Contract Documents, then written notice thereof will be given to the Contractor prior to starting any such other work.

B. Cost of Coordination. The Contractor shall include in its Bid all costs associated with coordinating its Work with Other Contractors. The Contractor shall not be entitled to additional compensation from the District for damages resulting from such simultaneous, collateral, and essential Work. If necessary to avoid or minimize such damage or delay, the Contractor shall redeploy its work forces to other parts of the Work, or adjust its Work schedule including reasonable acceleration of the Work.

C. Contractor's Responsibility. The Contractor shall do all cutting, fitting, and patching of the Work that may be required to make its several parts come together properly and integrate with such other work.

D. Contractor Shall Not Endanger Existing Work. The Contractor shall not endanger any work of Other Contractor by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the District's Representative and the Other Contractor whose work will be affected.

E. Contractor shall afford each Other Contractor proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. The Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. The Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that the Contractor may cut or alter others' work with the written consent of the District's Representative and the others whose work will be affected.

F. If the proper execution or results of any part of the Contractor's Work depends upon work performed by Other Contractors, the Contractor shall inspect such other work and promptly report to the District's Representative in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. The Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with the Contractor's Work except for latent defects and deficiencies in such other work.

G. Claims by Other Contractors. If any claims are made by Other Contractors arising out of Contractor's performance of the Work, the Contractor shall be responsible to

immediately resolve the dispute and indemnify District pursuant to the Contract Documents.

7.2 Coordination.

A. If the District intends have work performed by Other Contractors at the Site~~,~~ the following will be set forth in the Special Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Special Conditions, the District shall have sole authority and responsibility for such coordination.

C. Coordination Delays. The District's Representative shall arrange meetings with Other Contractors performing work to plan coordination of construction activities but will not be responsible to direct coordination efforts. Any difference or conflict arising between the Contractor and any Other Contractor shall be submitted to the District's Representative for a decision in the matter. The Contractor shall comply with direction from the District's Representative whose decision on coordination matters will be final.

7.3 For Delays by Others.

A. By entering into this Contract, the Contractor acknowledges that there may be Other Contractors on the Site whose work will be coordinated with that of the Contractor. The Contractor expressly warrants and agrees that Contractor will cooperate with Other Contractors and will do nothing to delay, hinder, or interfere with the work of Other Contractors, the District, or the District's Representative. The Contractor also expressly agrees that, in the event its Work is hindered, delayed, interfered with, or otherwise affected by a separate contractor, its sole remedy will be a direct action against the Other Contractor. The Contractor will have no remedy, and hereby expressly waives any remedy, against the District or the District's Representative on account of delay, hindrance, interference, or other event caused by Other Contractor.

7.4 Contractor's Delay or Damage.

A. The Contractor shall be liable to District and any Other Contractor for the direct delay and disruption costs or damages incurred by such Other Contractor as a result of the Contractor's wrongful action or inactions.

ARTICLE 8 -ALLOWANCES; UNIT PRICE WORK

8.1 Allowances.

A. It is understood that the Contractor has included in the Contract Price all Allowances so named in Schedule B of the Schedule of Pay Items and shall cause the Work so

covered to be performed for such sums and by such persons or entities as may be acceptable to the District and the District's Representative.

B. The Contractor agrees that all Allowances are for the sole use of the District to cover scope Work anticipated but not specifically identified on the Contract Drawings.

C. Prior to final payment, an appropriate Change Order will be issued as recommended by the District's Representative to reflect actual amounts due the Contractor on account of Work covered by Allowances, and the Contract Price shall be correspondingly adjusted.

8.2 Unit Price Work.

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work multiplied by the estimated quantity of each item as indicated in the Contract.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by the Contractor will be made by the District's Representative.

C. Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's Overhead and Profit for each separately identified item.

D. The District or the Contractor may initiate a Change Order to adjust the Contract Price in accordance with Contractor Documents based on actual quantities of Unit Price Work.

E. The District or the Contractor may make a Claim for an adjustment in the Unit Price in accordance with the Contract Documents if:

1. the quantity of any item of Unit Price Work performed by the Contractor differs by twenty-five percent (25%) or more from the estimated quantity of such item indicated in the Contract; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. the Contractor believes that the Contractor is entitled to an increase in Unit Price as a result of having incurred additional expense or the District believes that the District is entitled to a decrease in Unit Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 9 -CHANGE OF CONTRACT PRICE; CHANGE IN CONTRACT TIMES

9.1 Contract Change Orders.

A. The District, without invalidating the Contract, may order changes in the Work consisting of additions, deletions or other revisions, and the Contract Price and Contract Time shall be adjusted accordingly. All such changes in the Work shall be authorized by written Change Order, and shall be performed under the applicable conditions of the Contract Documents. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including any adjustment in the Contract Price or the Contract Times, and the full and final settlement of all costs (direct, indirect and overhead) related to the Work authorized by the Change Order.

B. The Contractor shall promptly execute changes in the Work as directed in writing by District even when the parties have not reached agreement on whether the change increases the scope of Work or affects the Contract Price of Contract Time, if any. All claims for additional compensation to the Contractor shall be presented in writing. No claim will be considered after the work in question has been done unless a written Change Order has been issued or a timely written notice of claim has been made by the Contractor. The Contractor shall not be entitled to claim or bring suit for damages, whether for loss of profits or otherwise, on account of any decrease or omission of any item or portion of Work to be done. Whenever any change is made as provided for herein, such change shall be considered and treated as though originally included in the Contract Documents, and shall be subject to all terms, conditions and provisions of the original Contract Documents.

C. All Change Orders will be in the form as provided in Attachment A. The Contractor shall not reserve a right to assert impact costs, extended job site costs, extended overhead (direct or indirect), constructive acceleration and/or actual acceleration beyond what is stated in the Change Order. No claims shall be allowed for impact, extended overhead costs, constructive acceleration and/or actual acceleration due to a multiplicity of changes and/or clarifications. The Contractor may not change or modify District’s Change Order form in an attempt to reserve additional rights.

D. No changes in the work covered by this Agreement shall exonerate any surety or any bond given in connection with this Agreement.

9.2 Contract Price Change.

A. Process for Determining Adjustments in Contract Price.

1. Request for Proposal (RFP). When the District desires a change in the Work, District’s Representative may issue an RFP to the Contractor. The Contractor will be required to respond within seven (7) Days or the time indicated by District’s Representative. If the Contractor fails to submit its Change Order Request (“COR”) within seven (7) Days of receiving the RFP, or the time indicated by the District’s Representative, the Contractor shall be solely liable for any delays or impacts caused by the delayed submittal of the COR.

2. Contractor Initiated Change. As further described below, the Contractor must give written notice of a COR, additional compensation or adjustment of the Contract

Times within seven (7) Days of discovery of the facts giving rise to the proposed change order.

3. COR Detail. The Contractor's COR shall include material, labor, and equipment separately priced for each element of Work. Allowable Overhead and Profit may be added to the total of these costs if allowed by the Contract Documents. As general guidance, all cost documentation shall be tabulated from detailed computerized spreadsheets in a "workbook" which will be compiled into useful summary spreadsheets as directed by the District's Representative.

    a. Unit Price Method. Where the Additional Work involved is covered or is of the same character as the original Contract, Unit Price Work by application of those unit prices to the quantities of the items involved;

    b. Lump Sum Bilateral Change Method. By mutual acceptance of a lump sum price negotiated on the basis of the Contractor's itemized estimate of the anticipated costs of the Additional Work.

    c. Time and Materials Method. The District may direct the Contractor to proceed with the Additional Work with payments to be made on the basis of the actual cost of the labor and materials required to complete the Additional Work.

4. COR Form: The Contractor's COR shall be on forms acceptable to the District's Representative. The Contractor's COR shall certify in writing that the amounts included cover all direct, supplemental, indirect, consequential, and cumulative costs and delays, as applicable, and that those costs and delays would be or were necessarily incurred, despite Contractor's reasonable and diligent efforts to mitigate them. Mitigation efforts undertaken by the Contractor must be described.

B. Unit Price Change Orders.

1. When the actual quantity of a Unit Price item varies from the Bid Form, compensation for the change in quantity will be calculated by multiplying the actual quantity by the Unit Price. This calculation may result in either an additive or deductive Change Order pursuant to the Contract Documents.

2. No Mark Up for Overhead And Profit. Since the Contract Unit Prices provided by in the Bid Form include Overhead and Profit as determined by the Contractor at time of Bid submission, no mark up or deduction for Overhead and Profit will be included in Unit Price Change Orders.

C. Lump Sum Change Orders. Compensation for Lump Sum Change Orders shall be limited to expenditures necessitated specifically by the Additional Work, and shall be segregated as follows:

1. Labor. The costs of labor will be the actual cost for wages prevailing locally for each craft or type of worker at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from federal, state or local laws, as well as assessment or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the cost of the

Additional Work will not be permitted unless the Contractor establishes the necessity for such new classifications. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

2. Materials. The cost of materials shall be at invoice or lowest current price at which such materials are locally available in the quantities involved, plus sales tax, freight and delivery. Materials cost shall be based upon supplier or manufacturer's invoice. If invoices or other satisfactory evidence of cost are not furnished within fifteen (15) Days of delivery, then the District shall determine the materials cost, at its sole discretion.

3. Tool and Equipment Use. Costs for the use of small tools, which are tools that have a replacement value of $1,000 or less, shall be considered included in the Overhead and Profit markups established below. Regardless of Ownership, the rates to be used in determining equipment use costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, at the time the Work is performed.

D. Time and Materials Change Orders.

1. General. The term Time and Materials means the sum of all costs reasonably and necessarily incurred and paid by the Contractor for labor, materials, and equipment in the proper performance of Additional Work. Except as otherwise may be agreed to in writing by the District, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items.

2. Timely and Final Documentation.

   a. The Contractor must submit timesheets, materials invoices, records of equipment hours and records of rental equipment hours to the District's Representative for an approval signature each day Additional Work is performed. Failure to get the District's Representative's approval signature each Day may result in a waiver of the Contractor's right to claim these costs.

   b. All documentation of incurred costs shall be submitted by the Contractor and approved by the District's Representative within three (3) Days of incurring the cost for labor, material, equipment, and special services. The Contractor's total actual cost shall be presented in a summary table in an electronic spreadsheet file by labor, material, equipment, and special services (T&M Summary Sheets). The Contractor's failure to provide the T&M Summary Sheets within three (3) Days of performance of the work will result in the Contractor's otherwise allowable profit being reduced by 50% for that portion of Additional Work which was not documented in a timely manner. The Contractor's failure to submit the T&M Summary Sheets within three (7) Days of completion of the work will result in the Contractor's waiver for any reimbursement of any costs associated with the T&M Summary Sheets or the performance of the Additional Work.

3. Labor. The costs of labor will be the actual cost substantiated by timesheets and certified payroll for wages prevailing for each craft or type of workers performing

the Additional Work at the time the Additional Work is done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessments or benefits required by lawful collective bargaining agreements.

a. Equipment Operator Exception. Labor costs for equipment operators and helpers shall be paid only when such costs are not included in the invoice for equipment rental.

b. Foreman Exception. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to the Additional Work shall be paid. Indirect labor costs, including without limitation the superintendent, project manager, and other labor identified in the Contract Documents will be considered Overhead.

4. Materials. The cost of materials reported shall be itemized at invoice or lowest current price at which materials are locally available and delivered to the Site in the quantities involved, plus the cost of sales tax, freight, delivery, and storage.

   a. Trade discounts available to the purchaser shall be credited to the District notwithstanding the fact that such discounts may not have been taken by Contractor.

   b. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the District's Representative.

   c. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on Additional Work items or the current wholesale price for such materials delivered to the Site, whichever price is lower.

   d. If in the opinion of the District's Representative the cost of materials is excessive, or the Contractor does not furnish satisfactory evidence of the cost of such materials, then the cost shall be deemed to be the lowest current wholesale price for the total quantity concerned delivered to the Site less trade discounts.

   e. The District reserves the right to furnish materials for the Additional Work and no Claim shall be allowed by the Contractor for costs of such materials or Indirect Costs or profit on District furnished materials.

5. Equipment. The Contractor will be paid for the use of equipment at the rental rates listed for that equipment in the California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, which is in effect on the date upon which the Contract was executed. Such rental rate will be used to compute payments for equipment whether the equipment is under the Contractor's control through direct Ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the District for the total period of use.

If it is deemed necessary by the Contractor to use equipment not listed in the publication, an equitable rental rate for the equipment will be established by the District's Representative. The Contractor may furnish cost data which might assist the District's Representative in the establishment of the rental rate.

a. All equipment shall, in the opinion of the District's Representative, be in good working condition and suitable for the purpose for which the equipment is to be used.

b. Before construction equipment is used on the Additional Work, the Contractor shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the District's Representative, in duplicate, a description of the equipment and its identifying number and the scheduled Additional Work activities planned.

c. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

6. Rental Equipment.

a. Rental Time. The rental time to be paid for equipment on the Site shall be the time the equipment is in productive operation on the Additional Work being performed and, in addition, shall include the time required to move the equipment to the location of the Additional Work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the Additional Work, even though located at the site of the Additional Work.

b. Rental Time Not Allowed. Rental time will not be allowed while equipment is inoperative due to breakdowns.

c. Computation Method. The following shall be used in computing the rental time of equipment on the Site.

(i) When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be ½-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.

(ii) When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be ½-day of operation.

7. Contractor-Owned Equipment. For the Contractor-owned equipment, the allowed equipment rental rate will be limited to the monthly equipment rental rate using a utilization rate of 173 hours per month which is found in the rental rate source identified in the Special Conditions for rental equipment.

8. Special Services. Special work or services are defined as that Additional Work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry.

    a. Invoices for Special Services. When the District's Representative and the Contractor determine that a special service is required which cannot be performed by the forces of the Contractor or those of any of its Subcontractors, the special service may be performed by an entity especially skilled in the Additional Work. Invoices for special services based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs, after validation of market values by the District's Representative.

    b. Discount and Allowance. All invoices for special services will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of Overhead and Profit specified in Section 00 72 13, Article 19.10.B, a total allowance not to exceed fifteen percent (15%) for Overhead and Profit will be added to invoices for Special Services.

9. Excluded Costs. The term Time and Materials shall not include any of the following costs or any other home or field office overhead costs, all of which are to be considered administrative costs covered by the Contractor's allowance for Overhead and Profit.

    a. Overhead Cost. Payroll costs and other compensation of the Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, timekeepers, clerks and other personnel employed by the Contractor whether at the Site or in the Contractor's principal office or any branch office, material yard, or shop for general administration of the Additional Work;

    b. Office Expenses. Expenses of the Contractor's principal and branch offices;

    c. Capital Expenses. Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Additional Work and charges against the Contractor for delinquent payments;

    d. Negligence. Costs due to the negligence of the Contractor or any Subcontractor or Supplier, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including without limitation the correction of Defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property;

    e. Other. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included by the Contract Documents.

    f. Small Tools. Cost of small tools valued at less than $1000 and that remain the property of Contractor;

g. Administrative Costs. Costs associated with the preparation of Change Orders (whether or not ultimately authorized), cost estimates, or the preparation or filing of Claims;

h. Anticipated Lost Profits. Expenses of the Contractor associated with anticipated lost profits or lost revenues, lost income or earnings, lost interest on earnings or unpaid retention;

i. Home Office Overhead. Costs derived from the computation of a "home office overhead" rate by application of the *Eichleay*, *Allegheny*, burden fluctuation, or other similar methods; or

j. Special Consultants and Attorneys. Costs of special consultants or attorneys, whether or not in the direct employ of the Contractor, employed for services specifically related to the resolution of a Claim, dispute, or other matter arising out of or relating to the performance of the Additional Work.

10. Overhead and Profit for Lump Sum and Time and Materials Change Orders.

a. The mark-up to be added to Lump Sum and Time and Materials Change Orders for Overhead (including supervision) and Profit on Additional Work shall be determined in accordance with the following provisions:

(i) "Net Cost" is defined as the actual costs of labor, materials and tools and equipment as defined herein only, excluding Overhead and Profit. The costs of applicable insurance and bond premium will be reimbursed to the Contractor and subcontractors at cost only, without mark-up and in no case shall the total costs exceed one and one-half percent (1.5%) of Net Cost. The Contractor shall provide the District with documentation of the costs, including not limited to payroll records, invoices, and such other information as the District may reasonably request.

(ii) For Work performed by the Contractor's forces the added cost for overhead and profit shall not exceed fifteen (15%) percent of the Net Cost of the Work.

(iii) For Work performed by a subcontractor, the added cost for overhead and profit shall not exceed fifteen (15%) percent of the Subcontractor's Net Cost of the Work, to which the Contractor may add five (5%) percent of the Subcontractor's Net Cost.

(iv) For Work performed by a sub-subcontractor the added cost for overhead and profit shall not exceed fifteen (15 %) percent of the Net Cost for Work, to which the subcontractor and general contractor may each add an additional five (5 %) percent of the Net Cost of the lower tier subcontractor.

(v) No additional markup will be allowed for lower tier subcontractors, and in no case shall the added cost for overhead and profit payable by District exceed twenty-five (25%) percent of the Net Cost, as defined herein, of the party that performs the Work.

b. All of the following costs are included in the markups for overhead and profit described above, and the Contractor shall not receive any additional compensation for: Submittals, drawings: field drawings, Shop Drawings, including submissions of drawings; field inspection; General Superintendence; General administration and preparation of cost proposals, schedule analysis, Change Orders, and other supporting documentation; computer services; reproduction services; Salaries of project engineer, superintendent, timekeeper, storekeeper, and secretaries; Janitorial services; Small tools, incidentals and consumables; Temporary on-Site facilities (Offices, Telephones, Internet access, Plumbing, Electrical Power, lighting; Platforms, Fencing, Water), Jobsite and Home office overhead or other expenses; vehicles and fuel used for work otherwise included in the Contract Documents; Surveying; Estimating; Protection of Work; Handling and disposal fees; Final cleanup; Other incidental Work; Related warranties.

9.3 Unilateral Change Orders.

If District disagrees with the COR submitted by the Contractor, it will notify the Contractor and the District will provide its opinion of the appropriate price and/or time extension. If the Contractor agrees with the District, a Change Order will be issued in accordance with the terms of this Article. If no agreement can be reached, the District shall have the right to issue a unilateral change order setting forth its determination of the reasonable additions or savings in costs and time attributable to the extra or deleted work. Such determination shall become final and binding if the Contractor fails to submit a claim in writing to the District within fifteen (15) Days of the issuance of the unilateral change order, disputing the terms of the unilateral change order and providing such supporting documentation for its position as the District may reasonably require.

9.4 Costs Relating to Weather Damage.

A. The Contractor shall not be entitled to any change in the Contract Price arising out of or related to the action of the elements or weather. Weather-related adjustments to Contract Times may be made in accordance with Section 00 72 16, Article 9.6.

9.5 District Right to Direct Use of Competitive Bids.

A. Where Additional Work involves subcontractor trades not listed in the Contract, the District reserves the right to direct the Contractor to solicit competitive bids for the Additional Work. If required by the District, the Contractor shall obtain competitive bids from subcontractors acceptable to the Contractor and shall present such bids to the District to collaboratively determine, which bid is accepted.

9.6 Change of Contract Times.

A. The Contract Times may only be changed by a Change Order.

B. All changes in the Contract Price and/or adjustments to the Contract Times related to each change shall be included in the Contractor's COR pursuant to Section 00 72 13, Article 9.2. No cost or time will be allowed for cumulative effects of multiple changes. All Change Orders must state that the Contract Time is not changed or is either increased or decreased by a specific number of days. Failure to include a change to

time shall waive any change to the time unless the parties mutually agree in writing to postpone a determination of the change to time resulting from the Change Order.

C. Notice of the amount of the request for adjustment in the Contract Times with supporting data shall be delivered within seven (7) Days after such start of occurrence, unless District's Representative allows an additional period of time to ascertain more accurate data in support of the request. No extension of time or additional compensation shall be given for a delay if the Contractor failed to give notice in the manner and within the time prescribed.

D. The District may elect, at the District's sole discretion, to grant an extension in Contract Times, without the Contractor's request, because of delays or other factors.

E. Use of Float and Critical Path.

1. Float is for the benefit of the Project. Float shall not be considered for the exclusive use or benefit of either the District or the Contractor.

2. The Contractor shall not be entitled to compensation, and the District will not compensate the Contractor, for delays which impact early completion. Any difference in time between the Contractor's early completion and the Contract Time shall be considered a part of the Project float.

F. The Contractor's entitlement to an extension of the Contract Times is limited to an District-caused extension of the critical path, reduced by the Contractor's concurrent delays, and established by a proper time impact analysis. No time extension shall be allowed unless, and then only to the extent that, the District-caused delay extends the critical path beyond the previously approved Contract Time. If approved, the increase in time required to complete the Work shall be added to the Contract Time.

1. The Contractor shall not be entitled to an adjustment in the Contract Price or Contract Times for delays within the control of the Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of the Contractor.

2. If the Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions (as determined by District), Acts of God, acts or failures to act of utility owners not under the control of the District, or other causes not the fault of and beyond control of the District and the Contractor, then the Contractor shall be entitled to an time extension when the Work stopped is on the critical path. Such a non-compensable adjustment shall be the Contractor's sole and exclusive remedy for such delays. The Contractor must submit a timely request in accordance with the requirements of this Article.

3. Utility-Related Delays.

   a. The Contractor shall immediately notify in writing the utility owner and the District's Representative of its construction schedule and any subsequent changes in the construction schedule which will affect the time available for protection, removal, or relocation of utilities. Requests for extensions of time arising out of utility relocation or repair delays shall be filed in accordance with this Article.

   b. The Contractor shall not be entitled to damages or additional payment for delays attributable to utility relocations or alterations if correctly located, as noted in the Contract Documents or by the Underground Service Alert survey.

G. Content for Requests for Contract Extension. The Contractor's justification for entitlement shall be clear and complete citing specific Contract Document references and reasons on which the Contractor's entitlement is based. At a minimum, each request for a time extension must include:

   1. Each request for an extension of Contract Time must identify the impacting event, in narrative form, providing a description of the delay event and sufficient justification as to why the Contractor is entitled to a time extension. The Contractor must demonstrate that the delay arises from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and any Subcontractors or Suppliers, or any other persons or organizations employed by any of them or for whose acts any of them may be liable, and that such causes in fact lead to performance or completion of the Work, or specified part in question, beyond the corresponding Contract Times, despite the Contractor's reasonable and diligent actions to guard against those effects.

   2. Each request for an extension of Contract Time must include a time impact analysis in CPM format, using the Contemporaneous Impacted As-Planned Schedule Analysis to calculate the impact of the delay event.

H. No Damages for Reasonable Delay.

   1. The District's liability to the Contractor for delays for which the District is responsible shall be limited to only an extension of time unless such delays were unreasonable under the circumstances. In no case shall the District be liable for any costs which are borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and other ongoing costs.

   2. Damages caused by unreasonable District delay that impacts the critical path, including delays caused by items that are the responsibility of the District pursuant to Government Code section 4215, shall be compensated at the Daily Rate established in the Special Conditions, no other calculations, proportions or formulas shall be used to calculate any delay damages.

   3. The District and the District's Representative, and the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each of them, shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by the Contractor on or in connection with any other project or anticipated project.

I. The Contractor's failure, neglect, or refusal to comply with the requirements of the Contract Documents, or any portion thereof, shall bar the Contractor's request for extensions of the Contract Times. Such failure, neglect, or refusal prejudices the District's and the District's Representative's ability to recognize and mitigate delay, and such failure, neglect, or refusal prevent the timely analysis of requests for extensions of Contract Times, and whether such extensions may be warranted. The Contractor hereby waives all rights to extensions of Contract Times due to delays or accelerations that result from or occur during periods of time for which the Contractor fails, neglects, or refuses to fully comply with the requirements of this Article.

ARTICLE 10 -TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK; NOTICE OF DEFECTS

10.1 Notice of Defective Work.

A. Prompt notice of all Defective Work of which the District or the District's Representative has actual knowledge will be given to the Contractor. Defective Work may be rejected, corrected, or accepted as provided in the Contract Documents.

10.2 Access to Work.

A. The District, the District's Representative, their consultants and other representatives and personnel, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. The Contractor shall provide them proper and safe conditions for such access and advise them of the Contractor's safety procedures and programs.

10.3 Tests and Inspections.

A. The Contractor shall give the District's Representative timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Except as provided by the Contract Documents, the District shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents.

C. If Applicable Laws of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, the Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish the District's Representative the required certificates of inspection or approval.

D. The Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the District and the District's Representative's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to the District.

E. The District will provide inspection during normal working hours from 7:00 a.m. to 3:30 p.m. Monday through Friday. Inspection before or after this time will be charged to the contractor as reimbursable inspection time. Inspections on weekends requires two days' notice for review and approval. Upon written request and approval the 8.5 hour working day may be changed to other limits subject to city/county ordinance.

10.4 Uncovering Work.

A. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by the Contractor without written concurrence of the District's Representative, the Contractor shall, if requested by the District's Representative, uncover such Work for observation.

B. Uncovering Work shall be at the Contractor's expense unless the Contractor has given the District's Representative timely notice of the Contractor's intention to cover the same and the District's Representative has not acted with reasonable promptness in response to such notice.

C. If the Contractor has given the District's Representative timely notice of the Contractor's intention to cover the work and the District's Representative has not acted with reasonable promptness in response to such notice, and the District's Representative later considers it necessary or advisable that covered Work be observed by the District's Representative or inspected or tested by others, the Contractor, at the District's Representative's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the District's Representative may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, the Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and the District shall be entitled to an appropriate decrease in the Contract Price.

2. If the uncovered Work is not found to be defective, the Contractor shall be allowed an increase in the Contract Price and/or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

10.5 District May Stop the Work.

A. If the Work is defective, the District may in its sole discretion order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated. All delays associated with the Stop Work Order will be the responsibility of the Contractor.

10.6 Correction or Removal of Defective Work.

A. Promptly after receipt of written notice, the Contractor shall correct all Defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by the District or the District's Representative, remove it from the Project and replace it with Work that is not defective. The Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting Defective, the Contractor shall take no action that would void or otherwise impair the District's special warranty and guarantee, if any, on said Work.

10.7 Acceptance of Defective Work.

A. If, instead of requiring correction or removal and replacement of Defective Work, the District prefers to accept it, District may do so. The Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to the District's evaluation of and determination to accept such Defective Work and for the diminished value of the Work.

B. If any acceptance of defective work occurs prior to release of the Project Retention, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and the District shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work and all costs incurred by the District.

C. If the Project Retention is held in an escrow account as permitted by the Contract Documents, the Contractor will promptly alert the escrow holder, in writing, of the amount of Retention to be paid to the District.

D. If the acceptance of defective occurs after release of the Project Retention, an appropriate amount will be paid by Contractor to District.

10.8 District May Correct Defective Work.

A. If the Contractor fails within a reasonable time after written notice from the District's Representative to correct Defective Work, or to remove and replace rejected Work as required by the District, or if the Contractor fails to perform the Work in accordance with the Contract Documents, or if the Contractor fails to comply with any other provision of the Contract Documents, the District may, after seven (7) Days written notice to the Contractor, correct, or remedy any such deficiency.

B. In connection with such corrective or remedial action, the District may exclude the Contractor from all or part of the Site, take possession of all or part of the Work and suspend the Contractor's services related thereto, take possession of the Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which the District has paid the Contractor but which are stored elsewhere. The Contractor shall allow the District and the District's Representative, and the agents, employees, other contractors, and consultants of each of them, access to the Site to enable the District to exercise the rights and remedies to correct the defective work.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by the District correcting the defective work will be charged against the Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the District shall be entitled to an appropriate decrease in the Contract Price.

D. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of defective Work.

E. If the Change Order is executed after all payments under the Contract have been paid by District and the Project Retention is held in an escrow account as permitted by the Contract Documents, the Contractor will promptly alert the escrow holder, in writing, of the amount of Retention to be paid to the District.

F. If the Change Order is executed after release of the Project Retention, an appropriate amount will be paid by the Contractor to the District.

G. The Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the District correcting defective work.

10.9 Warranty Period.

A. If within one (1) year after commencement of the Warranty, or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective or not performing suitably for its intended use, or if the repair of any damages to the Site or areas made available for Contractor's use during the performance of the Work is found to be defective, Contractor shall promptly, without cost to District and in accordance with District's written instructions:

1. repair such defective land or areas;

2. correct such defective or non-performing work;

3. if the Defective Work has been rejected by District pursuant to the Contract Documents, remove it from the Project and replace it with Work that is not defective; and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If the Contractor does not promptly comply with the terms of the District's written instructions, or in an emergency where delay would cause serious risk of loss or damage, the District may have the Defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by the Contractor in accordance with Section 00 72 13, Article 11.1.E.

C. Where Defective Work (or damage to other Work resulting therefrom) has been corrected or removed and replaced, the Warranty period hereunder with respect to such Work shall be extended for an additional period of one (1) year after such correction or removal and replacement has been satisfactorily completed.

D. The Contractor's obligations under this Article are in addition to any other obligation or warranty and do not limit the District's rights and remedies pursuant to California Code of Civil Procedure sections 337.10 and 337.15. or any other Applicable Law.

ARTICLE 11 -PAYMENTS TO CONTRACTOR AND COMPLETION

11.1 Progress Payments. The Cost-Loaded CPM Progress Schedule will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the District's Representative. Progress payments on account of Unit Price Work will be based on the number of units completed.

A. Applications for Payments.

1. By the twenty-fifth (25th) day of each month the Contractor shall submit to the District's Representative for review an Application for Payment filled out and signed by the Contractor covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the District has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect the District's interest therein, all of which must be satisfactory to District.

2. Beginning with the second Application for Payment, each Application shall include an affidavit executed by the Contractor stating that it has paid all amounts due on account of the Work paid by the District in the prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as set forth in the Special Conditions.

B. Review of Applications.

1. The District's Representative will either indicate in writing a recommendation of payment to District or return the Application for Payment to Contractor indicating in writing the District's Representative's reasons for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application for Payment.

2. By recommending any such payment the District's Representative will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to the District's Representative in the Contract Documents; or

   b. there may not be other matters or issues between the parties that might entitle the Contractor to be paid additionally by the District or entitle the District to withhold payment to the Contractor.

3. Neither the District's Representative's review of the Contractor's Work for the purposes of recommending payments nor the District's Representative's recommendation of any payment, including final payment, will impose responsibility on the District's Representative:

   a. to supervise, direct, or control the Work;

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

   c. for the Contractor's failure to comply with Applicable Laws applicable to the Contractor's performance of the Work;

   d. to make any examination to ascertain how or for what purposes the Contractor has used the moneys paid on account of the Contract Price; or

   e. to determine that title to any of the Work, materials, or equipment has passed to District free and clear of any Liens.

4. The District's Representative may refuse to recommend the whole or any part of any payment due to subsequently discovered evidence or the results of subsequent inspections or tests. The District retains the right to revise or revoke any such payment recommendation previously made, to such extent as may be necessary in the District's opinion to protect the District from loss.

C. Payment Becomes Due.

1. Thirty (30) Days after presentation of an undisputed and properly submitted Application for Payment to the District's Representative, and subject to the District's Representative's recommendation, subject to the modifications above, the amount recommended will become due, and when due will be paid by the District to the Contractor.

D. Retention and Securities in Lieu of Retention.

1. Unless Project has been deemed substantially complex as noted in the Notice Inviting Bids or Special Conditions, the District will retain five percent (5%) of the amount invoiced in accordance with Applicable Laws.

2. Pursuant to Public Contract Code section 22300, the Contractor may substitute securities for any moneys withheld as a retention by the District to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the District, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

    a. Alternatively, the Contractor may request, and the District shall make payment of retentions earned directly to the escrow agent selected by the Contractor. At the expense of the Contractor, the Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for in Public Contract Code section 22300 for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent when the District authorizes the escrow agent to release these funds to the Contractor, pursuant to the terms of Public Contract Code section 22300.

3. Securities eligible for investment 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 District.

4. The escrow agreement shall be in the form of the Escrow Agreement provided as part of the Contract Documents.

E. District's Reduction in Recommended Payment.

1. In addition to reductions recommended by the District's Representative, the District may refuse to make payment of the full amount recommended by the District's Representative because:

    a. Claims have been made against the District on account of the Contractor's performance or furnishing of the Work.

b. Stop Payment Notices or Liens have been filed in connection with the Work.

c. Defective Work not remedied.

d. Failure of the Contractor to make proper payments to its subcontractors or suppliers.

e. Completion of the Contract if there exists a reasonable doubt that the Work can be completed for the unpaid Contract balance.

f. Damage to another contractor or third party.

g. Amounts which may be due District for claims against the Contractor.

h. Failure of the Contractor to keep the record ('as-built") drawings up to date.

i. Failure to provide updates on the construction schedule.

j. Site cleanup.

k. Failure of the Contractor to comply with requirements of the Contract Documents.

l. Liquidated Damages.

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

11.2 Contractor's Warranty of Title.

A. The Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to the District no later than the time of payment free and clear of all Liens.

11.3 Partial Utilization.

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

11.4 Final Inspection.

A. Upon written notice from the Contractor that the entire Work is complete, the District's Representative will promptly make a final inspection with the District and the Contractor and will notify the Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. The Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

11.5 Final Acceptance.

A. After the Contractor has, in the opinion of the District's Representative, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents, and other documents required by the Contract Documents, the District shall execute and file with the County in which the Project is located a Notice of Completion, constituting final acceptance and completion of the Project, except as may be expressly noted.

11.6 Final Payment.

A. Application for Payment.

1. Upon execution of the Notice of Completion, the Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance;

b. consent of the surety to final payment;

c. a fully completed Conditional Waiver and Release on Final Payment.

B. District's Representative's Review of Application and Acceptance.

1. If, on the basis of the District's Representative's observation of the Work during construction and final inspection, and the District's Representative's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, the District's Representative is satisfied that the Work has been completed and the Contractor has satisfied all other requirements for final payment, the District's Representative will indicate in writing the District's Representative's recommendation of payment and present the Application for Payment to the District for payment. Otherwise, the District's Representative will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case the Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due.

1. Within sixty (60) Days after the presentation to the District's Representative of the proper and complete final Application for Payment and accompanying documentation, the amount recommended by the District's Representative, less any sum the District is entitled to set off pursuant to the Contract Documents, will become due and will be paid by the District to the Contractor.

11.7 Waiver of Claims.

A. The making and acceptance of final payment will constitute a waiver of all Claims by the Contractor against the District other than those previously made in accordance with the requirements herein and expressly acknowledged by the District in writing as still unsettled.

ARTICLE 12 -SUSPENSION OF WORK AND TERMINATION

12.1 District May Suspend Work.

A. The District may, at its sole option, decide to suspend at any time the performance of all or any portion of the Work by notice in writing to the Contractor. Such notice of suspension of Work will designate the amount and type of plant, labor, and equipment to be committed to the Project during the period of suspension. The Contractor shall use its best efforts to utilize its plant, labor, and equipment in such a manner as to minimize costs associated with suspension.

B. Upon receipt of any such notice, the Contractor shall, unless the notice requires otherwise:

1. Immediately discontinue Work on the date and to the extent specified in the notice;

2. Place no further orders or subcontracts for material, services, or facilities with respect to suspended Work other than to the extent required in the notice;

3. Promptly make every reasonable effort to obtain suspension upon terms satisfactory to the District's Representative of all orders, subcontracts, and rental agreements to the extent they relate to performance of Work suspended; and

4. Continue to protect and maintain the Work including those portions on which Work has been suspended.

C. Should such suspension cause a delay to the Project critical path, the Contractor shall be granted an adjustment in the Contract Price based on the Reverse Liquidated Damages clause contained in the Special Conditions and an extension of the Contract Times equal to the number of days the critical path was impacted when the performance of Work is suspended as full and complete compensation for such suspension; provided, however, that no adjustment of Contract Price or extension of Contract Times shall be granted if the suspension results from the Contractor's non-compliance with the requirements of the Contract.

D. If the Contract Schedule of Pay Items includes a Schedule B bid item requiring the Contractor to provide a lump sum bid price for mobilization and demobilization and District exercises its option to suspend the Project and directs the Contractor to demobilize, the Contractor will be paid the lump sum demobilization bid item provided by the Contractor in Schedule B of the Bid Form. If, within one year of demobilization, District directs the Contractor to remobilize, the Contractor will be paid the lump sum remobilization bid item provided by the Contractor in Schedule B of the Bid Form.

12.2 District May Terminate for Cause.

A. The District may, without prejudice to any other right or remedy, serve written notice upon the Contractor of its intention to terminate this Contract in whole or in part if the Contractor: (i) refuses or fails to prosecute the Work or any part thereof with such diligence as will ensure its completion within the Contract Time; (ii) fails to complete the Work within the required time; (iii) files a bankruptcy petition or is adjudged a bankruptcy; (iv) makes a general assignment for the benefit of its creditors; (v) has a receiver appointed; (vi) refuses or fails to supply enough properly skilled workers or proper materials to complete the Work; (vii) fails to make prompt payment to subcontractors or for material or labor; (viii) disregards Applicable Laws, other requirements or instructions of District; or (ix) violates any of the provisions of the Contract Documents.

B. The Notice of Default and Intent to Terminate shall state the reasons for termination. Unless within five (5) Days after the service of such notice, the Contractor resolves the circumstances giving rise to the Notice of Default to the District's satisfaction, or makes arrangements acceptable to District for the required corrective action, the District may terminate this Contract. In such case, the Contractor shall not be entitled to receive any further payment until the Work has been finished. The District may take over and complete the Work by any method it may deem appropriate, including enforcement of the Project Performance Bond. The Contractor and its surety shall be liable to the District for any excess costs or other damages incurred by the District to complete the Work. If the District takes over the Work, the District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plant, and other property belonging to the Contractor as may be on the Site.

12.3 District May Terminate for Convenience.

A. In addition to its right to terminate this Contract for default, the District may terminate the Contract, in whole or in part, at any time upon seven (7) Days written notice to the Contractor. The Notice of Termination shall specify that the termination is for the convenience of the District, the extent of termination, and the effective date of such termination ("Effective Date of Termination").

B. After receipt of Notice of Termination, and except as directed by the District, the Contractor shall, regardless of any delay in determining or adjusting any amounts due under this Termination for Convenience clause, immediately proceed with the following obligations:

1. Stop Work as specified in the Notice.

2. Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality called for under the Contract Documents.

3. Leave the Site and any other property upon which the Contractor was working in a safe and sanitary manner such that it does not pose any threat to the public health or safety.

4. Terminate all subcontracts and purchase orders to the extent that they relate to the portions of the Work terminated.

5. Place no further subcontracts or orders, except as necessary to complete the remaining portion of the Work.

   Submit to the District, within fifteen (15) Days from the Notice of Termination, all of the documentation called for by the Contract Documents to substantiate all costs incurred by the Contractor for labor, materials and equipment through the Notice of Termination. Any documentation substantiating costs incurred by the Contractor solely as a result of the District's exercise of its right to terminate this Contract pursuant to this clause, which costs the Contractor is authorized under the Contract Documents to incur, shall: (i) be submitted to and received by the District no later than thirty (30) Days after the Effective Date of the Notice of Termination; (ii) describe the costs incurred with particularity; and (iii) be conspicuously identified as "Termination Costs Occasioned by District's Termination for Convenience."

6. The District's total liability to the Contractor by reason of the termination shall be limited to the total (without duplication of any items) of:

   a. The reasonable cost to the Contractor for all Work performed prior to the Effective Date of Termination, including the Work done to secure the Project for termination. Reasonable cost may not exceed the applicable percentage completion values derived from the progress schedule and the Cost Breakdown. Deductions shall be made for cost of materials to be retained by the Contractor, cost of Work defectively performed, amounts realized by sale of materials, and for other appropriate credits or offsets against cost of Work as allowed by the Contract Documents.

   b. When, in the District's opinion, the cost of any item of Work is excessively high due to costs incurred to remedy or replace defective or rejected Work, reasonable cost to be allowed will be the estimated reasonable cost of performing the Work in compliance with requirements of the Contract Documents and excessive actual cost shall be disallowed.

   c. Any Work required by the Termination for Convenience that is not included in the Contract Documents will be negotiated pursuant to the Contract Change Order provisions.

   d. Reasonable costs to the Contractor of handling material returned to vendors, delivered to the District or otherwise disposed of as directed by the District.

   e. A reasonable allowance for the Contractor's internal administrative costs in preparing termination claim.

   f. Reasonable demobilization costs, and reasonable payments made to Subcontractors or suppliers on account of termination.

7. In no event shall the District be liable for unreasonable costs incurred by the Contractor or subcontractors after receipt of a Notice of Termination. Such non-recoverable costs include, but are not limited to, the cost of or anticipated profits on Work not performed as of the date of termination, post-termination employee salaries, unreasonable post-termination administrative expenses, post-termination overhead or unabsorbed overhead, surety costs of any type, costs of preparing and submitting the Contractor's termination claim, attorney fees of any type, and all other costs relating to prosecution of a claim or lawsuit.

8. The District shall have no obligation to pay the Contractor under this Article unless and until the Contractor provides the District with updated and acceptable As-Builts and Record Documents for Work completed prior to termination as required by the Contract Documents.

9. In arriving at the amount due the Contractor under this clause there shall be deducted in whole, or in the appropriate part(s) if the termination is partial:

    a. All unliquidated advances or other payments on account previously made to the Contractor, including without limitation all payments which are applicable to the terminated portion of the Contract Documents,

    b. Any claim the District may have against the Contractor in connection with the Work or any amounts that may be withheld in accordance with the Contract Documents, and

    c. The agreed price for, or proceeds of sale of, any materials, supplies, or other things kept by the Contractor and not otherwise recovered by or credited to the District.

    These provisions are in addition to and not in limitation of any other rights or remedies available to the District.

    The Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss or consequential damages arising out of or resulting from such termination.

10. Notwithstanding any other provision of this Article, when immediate action is necessary to protect life and safety or to reduce significant exposure or liability, the District may immediately order the Contractor to cease Work until such safety or liability issues are addressed to the satisfaction of the District or the Contract is terminated.

11. If the District terminates the Contractor for cause, and if it is later determined that the termination was wrongful, such default termination shall automatically be converted to and treated as a termination for convenience. In such event, the Contractor shall be entitled to receive only the amounts payable under this section, and the Contractor specifically waives any claim for any other amounts or damages, including, but not limited to, any claim for consequential damages or lost profits.

ARTICLE 13 -CLAIMS, DISPUTE AVOIDANCE AND RESOLUTION

13.1 Prerequisite to Initiating Claims.

The Contractor shall timely comply with all notices and requests for changes to the Contract Time or Contract Price, including but not limited to Changes and Extra Work, as a prerequisite to filing any claim governed by this Section. The failure to timely submit a notice of delay or notice of change, or to timely request a change to the Contract Price or Contract Time, or to timely provide any other notice or request required herein shall constitute a waiver of the right to further pursue the claim under the Contract or at law.

13.2 Intent.

A. Effective January 1, 1991, Section 20104 et seq., of the California Public Contract Code prescribes a process utilizing informal conferences, non-binding judicial supervised mediation, and judicial arbitration to resolve disputes on construction claims of $375,000 or less. Effective January 1, 2017, Section 9204 of the Public Contract Code prescribes a process for negotiation and mediation to resolve disputes on construction claims. The intent of this Section is to implement Sections 20104 et seq. and Section 9204 of the California Public Contract Code. This Section shall be construed to be consistent with said statutes.

13.4 Claims.

A. For purposes of this Section, “Claim” means a separate demand by the Contractor, after a change order duly requested in accordance with the terms of this Contract has been denied by the District, for (A) a time extension, (B) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract, or (C) an amount the payment of which is disputed by the District. Claims governed by this Section may not be filed unless and until the Contractor completes all procedures for giving notice of delay or change and for the requesting of a time extension or change order, including but not necessarily limited to the change order procedures contained herein, and the Contractor’s request for a change has been denied in whole or in part. Claims governed by this Section must be filed no later than the date of final payment. The claim shall be submitted in writing to the District and shall include on its first page the following in 16 point capital font: “THIS IS A CLAIM.” Furthermore, the claim shall include the documents necessary to substantiate the claim. Nothing in this Section is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims, including all requirements pertaining to compensation or payment for extra Work, disputed Work, and/or changed conditions. Failure to follow such contractual requirements shall bar any claims or subsequent lawsuits for compensation or payment thereon.

13.5 Supporting Documentation.

A. The Contractor shall submit all claims in the following format:

1. Summary of claim merit and price, reference Contract Document provisions pursuant to which the claim is made.

2. List of documents relating to claim:

a. Specifications

b. Drawings

c. Clarifications (Requests for Information)

d. Schedules

e. Other

3. Chronology of events and correspondence

4. Analysis of claim merit

5. Analysis of claim cost

6. Time impact analysis in CPM format

13.6 District's Response.

A. Upon receipt of a claim pursuant to this Section, the District shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 days after the District issues its written statement.

1. If the District needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

2. Within 30 days of receipt of a claim, the District may request in writing additional documentation supporting the claim or relating to defenses or claims the District may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the District and the Contractor.

3. The District's written response to the claim, as further documented, shall be submitted to the Contractor within 30 days (if the claim is less than $50,000, 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 or requested documentation, whichever is greater.

13.7 Meet and Confer Process.

A. If the Contractor disputes the District's written response, or the District fails to respond within the time prescribed, the Contractor may so notify District, in writing, either within

15 days of receipt of the District's response or within 15 days of the District'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 receipt of a demand, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute.

13.8 Mediation.

A. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and the Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing, unless the parties agree to select a mediator at a later time.

1. If the Parties cannot agree upon a mediator, each Party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each Party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.

2. For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the Parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

3. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

4. The mediation shall be held no earlier than the date the Contractor completes the Work or the date that the Contractor last performs Work, whichever is earlier. All unresolved claims shall be considered jointly in a single mediation, unless a new unrelated claim arises after mediation is completed..

13.9 Procedures After Mediation.

A. If following the mediation, the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits its written Claim until the completion of the Meet and Confer process.

B. Except as provided herein, nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1

(commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

13.10 Government Code Claims.

A. In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, claims and/or changed conditions, the Contractor must comply with the claim procedures set forth in Government Code sections 900 et seq. prior to filing any lawsuit against the District. Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, claims, and/or changed conditions have been followed by the Contractor. If no such Government Code claim is submitted, or if any prerequisite contractual requirements are not otherwise satisfied as specified herein, the Contractor shall be barred from bringing and maintaining a valid lawsuit against the District. A Government Code claim must be filed no earlier than the date the work is completed or the date the Contractor last performs work on the Project, whichever occurs first. A Government Code claim shall be inclusive of all unresolved claims unless a new unrelated claim arises after the Government Code claim is submitted.

13.11 Non-Waiver.

A. The District's failure to respond to a claim from the Contractor within the time periods described in this Section or to otherwise meet the time requirements of this Section shall result in the claim being deemed rejected in its entirety. The District's failure to respond shall not waive the District's rights to any subsequent procedures for the resolution of disputed claims.

13.12 Duty to Continue Performance.

A. Unless provided to the contrary in the Contract Documents, the Contractor shall continue to perform the Work and the District shall continue to satisfy its payment obligations to the Contractor, pending the final resolution of any dispute or disagreement between the Contractor and the District.

ARTICLE 14 -MISCELLANEOUS

14.1 Giving Notice.

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

14.2 Limitations on District's Responsibilities.

A. The District shall not supervise, direct, or have control or authority over, nor be responsible for, the Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with Applicable Laws applicable to the performance of the Work. District will not be responsible for the Contractor's failure to perform the Work in accordance with the Contract Documents.

14.3 Cumulative Remedies.

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Applicable Laws, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Section will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

14.4 Survival of Obligations.

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

14.5 Controlling Law.

A. Notwithstanding any subcontract or other contract with any Subcontractor, Supplier, or other person or organization performing any part of the Work, this Contract shall be governed by the law of the State of California excluding any choice of law provisions.

14.6 Jurisdiction; Venue.

A. The Contractor and any Subcontractor, Supplier, or other person or organization performing any part of the Work agree that any action or suits at law or in equity arising out of or related to the bidding, award, or performance of the Work shall be maintained in the Superior Court of Imperial County, California, and expressly consent to the jurisdiction of said court, regardless of residence or domicile, and agree that said court shall be a proper venue for any such action.

14.7 Headings.

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

14.8 Right to Audit.

A. The Contractor shall make available to the District for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the District.

B. If the Contractor submits a Change Order Request, a Request for Proposal, or a Claim to the District, the District shall have the right to audit the Contractor's books, records, documents, and other evidence to the extent they are relevant.

C. The right to audit shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the Claim has been submitted, including but not limited to job cost reports, estimates, bids, bid papers, documents of other work administered by the Contractor's home office, and any and all other documentation relied upon by the Contractor to obtain this Contract. The District shall have the right to make and take copies of any records examined.

D. The right to audit shall include the right to inspect the Contractor's plans, or such parts thereof, as may be or have been engaged in the performance of the Work.

E. The Contractor further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors.

F. The right to audit provided herein shall be exercisable through such representatives as the District deems desirable during the Contractor's normal business hours at Contractor's office.

G. In accordance with Government Code section 8546.7, records of both the District and the Contractor shall be subject to examination and audit by the State Auditor General for a period of three (3) years after final payment. The Contractor shall make available to the District any of the Contractor's other documents related to the Work immediately upon request of the District. In addition to the State Auditor's rights described above, the District shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including electronic records, computations and projections) related to negotiating, pricing, or performing the Work in order to evaluate the accuracy and completeness of the cost or pricing data, for a period of four (4) years after final payment.

14.9 Assignment.

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

B. As set forth in Public Contract Code section 7103.5, 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 awarding body 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 Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgment by the parties.

14.10 All Legal Provisions Included.

A. The Contractor shall give all notices and comply with all federal, state and local laws, ordinances, rules and regulations bearing on conduct of work as indicated and specified by their terms. References to specific laws, rules or regulations in this Contract are for reference purposes only, and shall not limit or affect the applicability of provisions not specifically mentioned. If the Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the District in writing and any necessary changes shall be adjusted as provided for in this Contract for changes in Work. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the District, he shall bear all costs arising therefrom.

B. The Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 U.S.C. § 12101 et seq.). The Work will be performed in compliance with ADA laws, rules and regulations. The Contractor shall comply with the Historic Building Code, including, but not limited to, as it relates to the ADA, whenever applicable.

C. The Contractor acknowledges and understands that, pursuant to Public Contract Code section 20676, sellers of "mined material" must be on an approved list of sellers published pursuant to Public Resources Code section 2717(b) in order to supply mined material for this Contract.

D. No District official or representative who is authorized in such capacity and on behalf of the District to negotiate, supervise, make, accept, or approve, or to take part in negotiating, supervising, making, accepting or approving any engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Work, shall be or become directly or indirectly interested financially in the Contract.

E. All provisions of law required to be inserted in the Contract or Contract Documents pursuant to any Applicable Laws shall be and are inserted herein. If through mistake, neglect, oversight, or otherwise, any such provision is not herein inserted or inserted in improper form, upon the application of either party, the Contract or Contract Documents shall be changed by the District, at no increase in Contract Price or extension in Contract Times, so as to strictly comply with the Applicable Laws and without prejudice to the rights of either party hereunder.

14.11 State License Board Notice.

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

14.12 Air Pollution Control.

A. The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes. All containers of paint, thinner, curing compound, solvent or liquid asphalt shall be labeled to indicate that the contents fully comply with the applicable material requirements.

B. Without limiting the foregoing, the Contractor must fully comply with all applicable laws, rules and regulations in furnishing or using equipment and/or providing services, including, but not limited to, emissions limits and permitting requirements imposed by the Air Quality Management District with jurisdiction over the Project and/or California Air Resources Board (CARB). The Contractor shall specifically be aware of the application of these limits and requirements to "portable equipment", which definition is considered includes any item of equipment with a fuel-powered engine.

14.13 Noise.

A. The Contractor shall use only such equipment on the Work and in such state of repair so that the emission of sound therefrom is within the noise tolerance level of that equipment as established by CAL-OSHA.

B. The Contractor shall comply with the most restrictive of the following: (1) local sound control and noise level rules, regulations and ordinances and (2) the requirements contained in these Contract Documents, including hours of operation requirements. No internal combustion engine shall be operated on the Work without a muffler of the type recommended by the manufacturer. Should any muffler or other control device sustain damage or be determined to be ineffective or defective, the Contractor shall promptly remove the equipment and shall not return that equipment to the Site until the device is repaired or replaced. Noise and vibration level requirements shall apply to all equipment on the jobsite or related to the Work, including but not limited to, trucks, transit mixers or transit equipment that may or may not be owned by the Contractor.

14.14 Change In Name And Nature Of Contractor's Legal Entity.

A. Should a change be contemplated in the name or nature of the Contractor's legal entity, the Contractor shall first notify the District in order that proper steps may be taken to have the change reflected on the Contract and all related documents. No change of the Contractor's name or nature will affect the District's rights under the Contract, including but not limited to the bonds.

14.15 Notice Of Third Party Claims.

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

END GENERAL CONDITIONS

IMPERIAL COMMUNITY COLLEGE DISTRICT

00 73 13 – SPECIAL CONDITIONS

1.1 Architect of Record.

A. For purposes of this Project, the Architect of Record or Architect shall be: Sanders, Inc.

1.2 Location of the Project.

A. The Project is located Imperial Valley College, 380 E. Aten Road, Imperial, CA 92251

1.3 Description of the Project.

A. The Project consists of the items set forth below and related facilities:

1. Provide a new restroom/concession facility; and
2. Provide soccer field/track lighting; and
3. Provide perimeter roadway street lighting; and
4. Provide 3200 Building rear patio lighting; and
5. Provide 3100 Building Obstacle Course lighting; and
6. Provide (1) borderlink antenna; and
7. Ancillary AC roadway and concrete site work.

1.4 Status of the Project Area and Rights-of-Way.

A. The District, at its expense, will provide all rights-of-way or permits, or both, covering the crossing of private property and public and private rights-of-way necessary for the permanent Work; provided, however, the Contractor shall, at its expense, obtain any bonds or insurance policies or pay any fees and enter into any agreements required by a controlling authority, *e.g.*, Caltrans or Southern Pacific Railroad Company, before the Contractor enters upon any property or right-of-way under the jurisdiction of any such controlling authority for the purpose of performing Work.

B. The District has acquired or is negotiating to acquire any rights-of-way, or both, necessary for the permanent Work.

C. If such permits are required, all operations of the Contractor shall conform to the restrictions, regulations, and requirements set forth in said permits, copies of which will be included in the Contract Documents.

D. The Contractor may be required, as a condition for receiving final payment, to obtain, and provide the District's Representative with copies of, executed damage releases from the owners of public and private property whose property has been damaged by the Work. The damage releases will be on a form provided by the District.

E. The Contractor shall, also, as a condition for receiving final payment, obtain, and provide the District's Representative with copies of, executed damage releases from the owners of certain public and private property or areas which have been crossed by the Work or otherwise affected by the Work. The damage releases will be on a form provided by the District.

1.5 Site Data.

A. The data provided herein is for the information of the Contractor and is subject to all limitations and conditions set forth in the Contract Documents.

B. Other Site Data:

1. Geotechnical Report

C. Copies of these reports, drawings and other materials may be examined at the District's office during regular business hours.

1.6 Pre-Purchased Material.

A. The District has pre-purchased the following equipment and/or material to be incorporated into the Project:

- Field Lighting Poles

B. The Contractor is responsible for coordination with manufacturer and complete installation of the equipment and/or material as if the Contractor had purchased it directly.

1.7 Designation of District's Representative.

A. Unless otherwise modified by the District, the District's Representative shall be Sanders, Inc. Architecture/Engineering.

1.8 Modification of Hours of Work.

[NOT USED.]

1.9 Project Retention

In accordance with Public Contract Code § 7201, the District will withhold 5% of each progress payment as retention on the Project.

1.10 Liquidated Damages Due to Contractor Delay.

A. Time is of the essence. Should the Contractor fail to complete all or any part of the Work within the time specified in the Contract Documents, the District will suffer damage, the amount of which is difficult, if not impossible, to ascertain and, pursuant to the authority of Government Code section 53069.85, the District shall therefore be entitled to **$2000.00** per Day as liquidated damages for each Day or part thereof that actual completion extends beyond the time specified.

B. Liquidated damages may be deducted from progress payments due the Contractor, Project retention or may be collected directly from the Contractor, or from the Contractor's surety. These provisions for liquidated damages shall not prevent the District, in case of the Contractor's default, from terminating the Contractor.

1.11 Utility Outages – Notices to Residents.

A. Should the Contractor's operations require interruption of any utility service, Contractor shall notify the District at least ten (10) Days prior to the scheduled outage. The Contractor will notify all impacted residents on a form provided by the District at least seven (7) days prior to the scheduled outage.

B. The Contractor shall be responsible for providing, at its cost, any temporary utility or facilities necessitated by the utility outage.

1.12 Schedule Constraints.

NOT USED.

1.13 Noise Restrictions

NOT USED.

1.14 Environmental Conditions

NOT USED.

1.15 Safety Programs.

NOT USED.

1.16 Coordination with Other Contractors.

NOT USED.

1.17 Temporary Field Office

A. Inspector's Field Office. The Contractor shall be responsible for providing the inspector's field office. The office shall be a substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. Door shall have a key type lock or padlock clasp. The office shall have heating and air conditioning and shall be equipped with a telephone, a telephone answering machine, high-speed internet connection, and a fax machine at the Contractor's expense. A table satisfactory for the study of plans and two chairs shall be provided by the Contractor. The Contractor shall provide and pay for adequate electric lights, local telephone service, and adequate heat and air conditioning for the field office until authorized removal.

B. Utility Services. The Contractor, at its expense, shall arrange for, develop and maintain all utilities, including but not limited to water, electric power, sewage disposal and telephone communications, at the Site to meet the requirements of the Work.

C. Sanitation. The Contractor shall provide sanitary facilities for all persons working on the project. These facilities shall be kept clean and shall not be unsightly or produce odors.

1.18 Fugitive Dust

A. In addition to all other environmental and air quality requirements of the Contract Documents, Contractor must also comply with the most recent version of Imperial County Air Pollution Control District's Rule 800 – Fugitive Dust, to reduce the amount of particulate matter entrained in the ambient air as a result of the Project.

B. No additional time or compensation will be added to the Contract due to these requirements.

END OF SPECIAL CONDITIONS

01 00 00 – GENERAL REQUIREMENTS

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Provide (1) new restroom/concession facility and sport field lighting.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

PART 2 -- PRODUCTS (NOT USED)

PART 3 -- EXECUTION

3.1 LAYOUT OF WORK AND QUANTITY SURVEYS

A. General. The Contractor shall utilize a properly licensed surveyor to perform all layout surveys required for the control and completion of the Work, and all necessary surveys to compute quantities of Work performed.

The District and/or the Engineer of Record has established primary control to be used by the Contractor for establishing lines and grades required for the Work.

Primary control consists of benchmarks and horizontal control points in the vicinity of the Work. A listing and identification of the primary control is provided on the Drawings. Before beginning any layout work or construction activity, the Contractor shall check and verify primary control, and shall advise the District Representative of any discrepancies.

B. Quantity surveys. The Contractor shall perform such surveys and computations as are necessary to determine quantities of Work performed or placed during each progress payment period, and shall perform all surveys necessary for the District Representative to determine final quantities of Work in place. The District Representative will determine final quantities based upon the survey data provided by the Contractor, and the design lines and grades. If requested by the District Representative, the Contractor shall provide an electronic copy of data used for quantity computations.

All surveys performed for measurement of final quantities of Work and material shall be subject to approval of the District's Representative. Unless waived by the District's Representative in each specific case, quantity surveys made by the Contractor shall be made in the presence of the District's Representative.

C. Surveying

1. Accuracy. Degree of accuracy shall be an order high enough to satisfy tolerances specified for the Work and the following:

(a) Right-of-way and alignment of tangents and curves shall be within 0.1 foot.

(b) Structure points shall be set within 0.01 foot, except where operational function of the special features or installation of metalwork and equipment require closer tolerances. When formwork has been placed and is ready for concrete, the Contractor shall check the formwork for conformance with the drawings and to ensure that the forms are sufficiently within the tolerance limits for the completed work.

(c) Cross-section points shall be located within 0.1 foot, horizontally and vertically.

(d) Aerial Mapping shall meet National Mapping Standards for 2-foot contour intervals.

D. Records. Survey data shall be recorded in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded on electronic data collectors or in standard field books and must be of sufficient quality to enable the Contractor to prepare accurate record drawings as required by the Contract Documents.

E. Cost. – Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required for surveys for the layout of work and quantity surveys shall be included in the Schedule of Pay Items for items of work requiring the surveys. No additional compensation shall be made to the Contractor for this Work.

3.2 SUBMITTAL REQUIREMENTS FOR MANUALS AND RECORD DRAWINGS

A. General. The Contractor shall furnish all materials and perform all Work required for furnishing submittals to the District in accordance with the Contract Documents.

B. Technical Manuals.

1. The Contractor shall submit technical operation and maintenance information for each item of mechanical, electrical and instrumentation equipment in an organized manner in the Technical Manual. It shall be written so that it can be used and understood by the District's operation and maintenance staff.

2. The Technical Manual shall be subdivided first by specification section number; second, by equipment item; and last, by "Category." "Categories" shall conform to the following (as applicable):

(a) Category 1 - Equipment Summary:

(1) Summary: A summary table shall indicate the equipment name, equipment number, and process area in which the equipment is installed.

(b) Category 2 - Operational Procedures:

(1) Procedures: Manufacturer-recommended procedures on the following shall be included in Part 2:

a. Installation

b. Adjustment

c. Startup

d. Location of controls, special tools, equipment required, or related instrumentation needed for operation

e. Operation procedures

f. Load changes

g. Calibration

h. Shutdown

i. Troubleshooting

j. Disassembly

k. Reassembly

l. Realignment

m. Testing to determine performance efficiency

n. Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices

o. List of all electrical relay settings including alarm and contact settings

(c) Category 3 - Preventive Maintenance Procedures:

(1) Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.

(2) Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.

(d) Category 4 - Parts List:

(1) Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included.

(2) Drawings: Cross-sectional or exploded view drawings shall accompany the parts list.

(e) Category 5 - Wiring Diagrams:

(1) Diagrams: Part 5 shall include complete internal and connection wiring diagrams for electrical equipment items.

(f) Category 6 - Shop Drawings:

(1) Drawings: This part shall include approved shop or fabrication drawings, complete with dimensions.

(g) Category 7 - Safety:

(1) Procedures: This part describes the safety precautions to be taken when operating and maintaining the equipment or working near it.

(h) Category 8 - Documentation:

(1) All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.

3. The Contractor shall furnish to District six (6) identical Technical Manuals. Each set shall consist of one or more volumes, each of which shall be bound in a standard binder.

C. Spare Parts List - The Contractor shall furnish to District six (6) identical sets of spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall include those spare parts which each manufacturer recommends be maintained by District in inventory. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to assist District in ordering. The Contractor shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. The spare parts lists shall be bound in standard size, 3-ring binder.

D. Record Drawings

1. The Contractor shall maintain one record set of Drawings at the Site. On these, it shall mark all Project conditions, locations, configurations, and any other changes or deviations which may vary from the information represented in the original Contract Documents, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to fully indicate the Work as actually constructed. These master record drawings of the as-built conditions, including all revisions made necessary by Addenda and Change Orders shall be maintained up-to-date during the progress of the Project. Red ink shall be used for alterations and notes. Notes shall identify relevant Change Orders by number and date.

2. For all Projects involving the installation of any pipeline, the Contractor shall survey and record the top of the pipe at a minimum of every 100 linear feet, and at each bend, recording both the horizontal and vertical locations.

3. Record drawings shall be accessible to the District's Representative at all times during the construction period.

4. Upon Completion of the Project and as a condition of final acceptance, the Contractor shall finalize and deliver a complete set of Record Drawings to the District's Representative. The information submitted by the Contractor will be assumed to be correct, and the Contractor shall be responsible for, and liable to the District, for the accuracy of such information, and for any errors or omissions which may or may not appear on the Record Drawings.

E. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to complete the Manuals and Record Drawings shall be included in the Contractor's bid and distributed in the Schedule of Pay. No additional compensation shall be made to the Contractor for this Work.

3.3 MATERIALS

A. Materials to be Furnished by the Contractor

1. Inspection of Materials. Materials furnished by the Contractor which will become a part of the Project shall be subject to inspection at any one or more of the following locations, as determined by the District's Representative: at the place of production or manufacture, at the shipping point, or at the site of the Work. To allow sufficient time to provide for inspection, the Contractor shall submit to the District's Representative, at the time of issuance, copies of purchase orders or other written instrument confirming procurement of the materials, including drawings and other pertinent information, covering materials on which inspection will be made.

2. No later than fourteen (14) Days prior to manufacture of material, the Contractor shall inform the District's Representative, in writing, the date the material is to be manufactured.

3. Contractors Obligations. The inspection of materials at any of the locations specified above or the waiving of the inspection thereof shall not impact whether the materials and equipment conform to the Contract Documents. The Contractor will not be relieved from furnishing materials meeting the requirements of the Contract Documents due to the District's inspection or lack of inspection of the equipment or materials. Acceptance of any materials will be made only after materials are installed in the Project.

4. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to accommodate District's testing efforts, including any travel required by the Contractor's forces, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items related to the materials requiring testing. No additional compensation shall be made to the Contractor for this Work.

3.4 LOCAL CONDITIONS AND REQUIREMENTS

A. Access to Work and Haul Routes

1. General. All work on the rights-of-way necessary for access to the Site shall be performed by the Contractor.

2. Access, Damage, Restoration. The Contractor shall make his own investigation of the condition of available public or private roads and of clearances, restrictions, bridge-load limits, permit or bond requirements, and other limitations that affect or may affect transportation and ingress or egress at the Site. Claims for changes in Contract Price or Contract Times arising out of the unavailability of transportation facilities or limitations thereon shall not be considered by the District.

3. The Contractor shall maintain and repair any damage arising out of the Contractor's operations to all roads used during construction of the Project, and upon completion of all Work, but prior to final acceptance, the roads shall be restored to their original condition. Prior to using any road for access to the Site, the Contractor shall conduct a photograph and/or video survey of the roadway with a copy submitted to the District's representative.

4. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to complete this Work, shall be included in Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

B. Construction at Existing Utilities

1. General. Where the Work to be performed crosses or otherwise interferes with water, sewer, gas, or oil pipelines; buried cable; or other public or private utilities, the Contractor shall perform construction in such a manner so that no damage will result to either public or private utilities. It shall be the responsibility of the Contractor to determine the actual locations of, and make accommodates to maintain, all utilities.

2. Permission, Notice and Liability. Before any utility is taken out of service, permission shall be obtained by the Contractor from the owner. The owner, any impacted resident or business owner and the District Representative will be advised of the nature and duration of the utility outage as well as the Contractor's plan for providing temporary utilities if required by the owner. The Contractor shall be liable for all damage which may result from its failure to maintain utilities during the progress of the Work, and the Contractor shall indemnify the District as required by the Contract Documents from all claims arising out of or connected with damage to utilities encountered during construction; damages resulting from disruption of service; and injury to persons or damage to property resulting from the negligent, accidental, or intentional breaching of utilities.

3. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to complete this Work, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

C. Traffic Control

1. General. The Contractor shall abide by traffic control plans approved by the appropriate jurisdiction.

2. Protections. Roads subject to interference by the Work shall be kept open or suitable temporary passages through the Work shall be provided and maintained by the Contractor. The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient flasher lights, flag persons, danger signals, and signs, and shall take all necessary precautions for the protection of the Work and the safety of the public. No construction work along public or private roads may proceed until the Contractor has proper barricades, flasher lights, flag persons, signals, and signs in place at the construction site.

3. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to complete this Work, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

3.5 ENVIRONMENTAL QUALITY PROTECTION

A. Landscape and Vegetation Preservation

1. General. The Contractor shall exercise care to preserve the natural landscape and vegetation, and shall conduct operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the Work.

2. Damage and Restoration. Movement of crews and equipment within the rights-of-way and over routes provided for access to the Work shall be performed in a manner to prevent damage to property. When no longer required, construction roads shall be restored to original contours.

3. Upon completion of the Work, and following removal of construction facilities and required cleanup, land used for construction purposes and not required for the completed installation shall be scarified and regraded, as required, so that all surfaces are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.

4. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to complete this Work, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

B. Protected Species

1. General. If, in the performance of the Work, evidence of the possible occurrence of any Federally listed threatened or endangered plant or animal is discovered, the Contractor shall notify the District Representative immediately, giving the location and nature of the findings. Written confirmation of the evidence, location and nature of the findings shall be forwarded to the District within 2 Days.

2. Procedures. The Contractor shall immediately cease all construction activities in the immediate area of the discovery to the extent necessary to protect the endangered plant or animal.

   If directed by the District Representative, the Contractor will refrain from working in the immediate area, suspend the Work in its entirety, or alter its performance to ensure full compliance with all applicable permits, laws and regulations. Any District directed changes to the Work as a result of a siting will be pursuant to the Contract Documents.

3. False Siting. Any costs or delays incurred by the District or the Contractor due to unreasonable or false notification of an endangered plant or animal will be borne by the Contractor.

4. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to comply with this paragraph, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

C. Preservation of Historical and Archeological Resources

1. General. If, in the performance of the Work, the Contractor should unearth cultural resources (for example, human remains, animal bones, stone tools, artifacts and/or midden deposits) through excavation, grading, watering or other means, the Contractor notify the Construction/Archeological Monitor and/or the District Representative immediately, giving the location and nature of the findings. Written confirmation of the evidence, location and nature of the findings shall be forwarded to the Construction/Archeological Monitor and/or the District within two (2) days.

2. Procedures. The Contractor shall immediately cease all construction activities in the immediate area of the discovery to the extent necessary to protect the cultural resource.

   If directed by the District Representative, the Contractor will refrain from working in the immediate area, suspend the Work in its entirety, or re-sequence and/or alter its performance to ensure full compliance with all applicable permits, laws and regulations. Should the presence of cultural resources be confirmed, the Contractor will assist the District Representative and the Construction/Archeological Monitor in the preparation and implementation of a data recovery plan. The Contractor shall provide such cooperation and assistance as may be necessary to preserve the cultural resources for removal or other disposition. Any District directed changes to the Work as a result of the cultural resource will be pursuant to the Contract Documents.

3. Contractor's Liability. Should the Contractor, without permission, injure, destroy, excavate, appropriate, or remove any cultural resource on or adjacent to the Site, it will be subject to disciplinary action, arrest and penalty under applicable law. The Contractor shall be principally responsible for all costs of mitigation and/or restoration of cultural resources related to the unauthorized actions identified above. The Contractor shall be required to pay for unauthorized damage and

mitigation costs to cultural resources (historical and archeological resources) as a result of unauthorized activities that damage cultural resources and shall indemnify the District pursuant to the Contract Documents.

4. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to comply with this paragraph, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

D. Dust and Pollution Control

1. The Contractor shall provide all necessary material, equipment and labor to prevent and control the emission of dust and any other potential pollutant on site.

2. The Contractor shall not discharge into the atmosphere from any source smoke, dust or other air contaminants in violation of the law, rules, and regulations of the governing agency.

3. Cost. Unless otherwise called for by the Contract Documents, the cost of all material, equipment, and labor required to comply with this paragraph, shall be included in the Contractor's bid and distributed in the Schedule of Pay Items. No additional compensation shall be made to the Contractor for this Work.

E. Management of Storm, Surface and Other Waters

1. Storm water, surface water, groundwater, and nuisance, or other waters may be encountered at various times during construction of the Project. Federal and State laws require District and its contractors to manage such waters pursuant to the requirements of California State Water Resources Control Board Order Number 2009-0009-DWQ, the Federal Clean Water Act, and the California Porter Cologne Water Quality Control Act. The Contractor acknowledges that it has investigated the risk arising from such waters in conjunction with the Project, and assumes any and all risks and liabilities arising therefrom.

2. The Contractor shall perform all construction operations in such a manner as to comply, and ensure all subcontractors to comply, with all applicable Federal, State, and local laws, orders, and regulations concerning the control and abatement of water pollution; and all terms and conditions of any applicable permits issued for the Project. In the event there is a conflict between Federal, State, and local laws, regulations, and requirements, the most stringent shall apply.

3. Contractor violations. If noncompliance should occur, the Contractor shall report this to the District Representative immediately, with the specific information submitted in writing within 2 Days. Consistent violations of applicable Federal, State, or local laws, orders, regulations, or Water Quality Standards may result in District stopping all site activity until compliance is ensured. The Contractor shall not be entitled to any change in Contract Price or Contract Times, claim for damage, or additional compensation by reason of such a work stoppage. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.

4. Compliance with Construction General Storm water Permit. Contractor shall be required to comply with all aspects of the State Water Resources Control Board (State Board) Water Quality Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity (Permit) for all projects that involve construction on or disturbance of one acre or more of land or which are part of a larger common area of development.

   (a) The Contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for the Project site based on the appropriate Risk Level requirements, and draft and coordinate submittal of all Permit related documents with District's Legally Responsible Person and/or Authorized Signatory as those terms are defined in the Permit. The Contractor shall submit the SWPPP to the District Representative for review not less than fifteen (15) Days prior to the start of on- site construction work. The District will file the Notice of Intent and pay the filing fee.

   (b) The SWPPP shall be developed by a Qualified SWPPP Developer and implemented by a Qualified SWPPP Practitioner as those terms are defined in the Permit and shall include industry standard requirements for water quality control including but not be limited to the following:

      (1) Sediment and erosion control measures to manage sediment and erosion including vegetative practices, structural control, silt fences, straw dikes, sediment controls or operator controls as appropriate. Storm water management measures shall be instituted as required, including velocity dissipaters, and solid waste controls shall address controls for building materials and offsite tracking of sediment.

      (2) Wastewater and storm water management controls to divert offsite surface flows around the Project site and to divert surface flows within the Project area away from areas of open earth or stockpiles of building and other materials. Wastewater from general construction activities, such as drain water collection, aggregate processing, concrete batching, drilling, grouting, or other construction operations, shall not enter flowing or dry watercourses without having met the authorized non-storm water discharge requirements listed in State Board Water Quality Order No. 2009-0009-DWQ, Section III.C., including proper notification to the Regional Water Board.

      (3) Pollution prevention measures including methods of dewatering, unwatering, excavating, or stockpiling earth and rock materials which include prevention measures to control silting and erosion, and which will intercept and settle any runoff of sediment-laden waters.

      (4) Turbidity prevention measures for prevention of excess turbidity including, but are not restricted to, intercepting ditches, settling ponds, gravel filter entrapment dikes, flocculating processes, recirculation, combinations thereof, or other approved methods that are not harmful to aquatic life. All such wastewaters discharged into surface waters, shall contain the least concentration of settleable material possible, and shall meet all conditions of section 402, the National Pollutant Discharge Elimination System (NPDES) permit.

(5) Overall construction site management measures to address changes at the Project site as the Project moves through different phases and changes that account for rainy and dry season management practices.

(6) Pollution control measures and construction activity methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes, into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. Such pollutants and wastes include, but are not restricted to: refuse, garbage, cement, sanitary waste, industrial waste, hazardous materials, radioactive substances, oil and other petroleum products, aggregate processing, tailings, mineral salts, and thermal pollution.

(7) Control measures for stockpiled or deposited materials prohibiting the stockpile or deposit of excavated materials, or other construction materials, near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can, in any way, encroach upon the watercourse.

(8) Develop and implement a Rain Event Action Plan (REAP), if required, that must be designed and implemented to protect all exposed portions of the site 48 hours prior to any likely precipitation event.

(9) Monitoring, reporting and record keeping, as necessary to achieve compliance with applicable Permit requirements, including but not limited to annual reports and rain event reports.

(c) Before any Permit related documents, including the SWPPP, rain event reports, or annual reports may be submitted to the State Board or implemented on the Project site, they must first be reviewed and approved by the District.

(d) The District retains the right to procure and maintain coverage under the Permit for the Project site if the Contractor fails to draft a SWPPP or other Permit related document, or fails to proceed in a manner that is satisfactory to the District. The District reserves the right to implement its own SWPPP at the Project site, and hire additional contractors to maintain compliance. Whether the Contractor has adequately maintained compliance with the Permit shall be the District's sole determination. In the event that the Contractor has failed or is unable to maintain compliance with the Permit, any costs or fines incurred by the District in implementing a SWPPP, or otherwise maintaining compliance with the Construction General Permit shall be paid by the Contractor.

(e) Failure to implement the SWPPP or otherwise comply with the Permit is a violation of federal and state law. The Contractor hereby agrees to indemnify the District as required by the Contract Documents for any noncompliance or alleged noncompliance with the Permit arising out of or in connection with the Project, except for liability resulting from the sole established negligence, willful misconduct or active negligence of the District. The District may seek damages from the Contractor for delay in completing the Contract in accordance with the Contract Documents, caused by the Contractor's failure to comply with the Permit.

5. In addition to compliance with the Permit, the Contractor shall comply with the lawful requirements of any applicable municipality, the District, drainage district, flood control district, and other local agencies regarding discharges of storm water, surface water, groundwater or other nuisance waters off of the Project site.

6. Oil storage tanks management.

   (a) Storage tank placement. All oil or other petroleum product (hereinafter referred to collectively as oil) storage tanks shall be placed at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source.

   (b) Storage area dikes. Storage areas shall be diked at least 12 inches high or graded and sloped to permit safe containment of leaks and spills equal to the capacity of all tanks and/or containers located within each area, plus a sufficient amount of freeboard to contain the 25-year rainstorm.

   (c) Diked area barriers. Diked areas shall have an impermeable barrier at least 10 mils thick. Areas used for refueling operations shall have an impermeable liner at least 10 mils thick buried under 2 to 4 inches of soil.

   (d) Spill Prevention Control and Countermeasure Plan (SPCC). Where the location of a construction site is such that oil from an accidental spillage could reasonably be expected to enter into or upon the navigable waters of the United States or adjoining shorelines, and the aggregate storage of oil at the site is over 1,320 gallons or a single container has a capacity in excess of 660 gallons, the Contractor shall prepare an SPCC Plan. The Contractor shall submit the SPCC Plan to the Engineer at least 30 days prior to delivery or storage of oil at the site. The Plan must have been reviewed and certified by a registered professional engineer in accordance with 40 C.F.R., part 112

7. Underground tank prohibition. The Contractor shall not use underground storage tanks.

8. Construction safety standards. The Contractor shall comply with the sanitation and potable water requirements of Section 7 of United States Bureau of Reclamation's publication “Reclamation Safety And Health Standards.”

9. Dredge and fill permit. The District will obtain a permit to discharge dredge and fill material into the waters of the United States, as required under Section 404 of the Clean Water Act. All work occurring within the waters of the United States shall comply with the conditions of the permit and conditions of the Section 401 Water Quality Certification.

10. Other Permits.

    (a) Other permits applicable to the Project are listed in the Special Conditions. The Contractor shall obtain all other necessary licenses and permits.

    (b) Monitoring. The Contractor is required to conduct monitoring in order to meet the requirements of the permits, which may include sampling, testing and inspections.

    (c) Recordkeeping. The Contractor shall retain all records and data required by the permits for the time specified in the contract.

11. Cost. Except as specified herein, the cost of complying with this section shall be included in the Schedule of Pay Items for work which necessitate the water pollution prevention measures required by this paragraph.

END OF GENERAL REQUIREMENTS

TECHNICAL CONDITIONS

SECTION 01 12 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY OF THE WORK

A. The Work under this Contract necessary for and incidental to the execution and completion of all Work indicated in the Contract Documents for the construction of:

Imperial Valley College
Sport Field Restroom, Concession, Lighting and Border Link Antenna
Imperial, California
Imperial Community College District

1.02 GENERAL DESCRIPTION OF WORK

A. The Work under this Contract includes furnishing all labor, materials, services and transportation, except as specifically excluded which is required for completion of the Project in accordance with the provisions of the Contract Documents.

1.03 REGULATORY REQUIREMENTS

A. CODE INFORMATION:

1. Codes: All work shall comply with the following Codes:

2022 CALIFORNIA ADMINISTRATIVE CODE, PART 1, TITLE 24, CCR
2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24, CCR
2019 CALIFORNIA ELECTRIC CODE (CEC), PART 3, TITLE 24, CCR
(2017 NATIONAL ELECTRIC CODE WITH CALIFORNIA 2016 AMENDMENTS)
2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24, CCR
(2018 UNIFORM MECHANICAL CODE WITH CALIFORNIA 2016 AMENDMENTS)
2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24, CCR
(2018 UNIFORM PLUMBING CODE WTH CALIFORNIA 2016 AMENDMENTS)
2019 CALIFORNIA ENERGY CODE, PART 6 TITLE 24 CCR
2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24, CCR
(2018 INTERNATIONAL FIRE CODE WITH CALIFORNIA 2016 AMENDMENTS)
2019 CALIFORNIA GREEN BUILDING STANDARDS CODE, PART 11, TITLE 24 CCR
2019 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHALL REGULATIONS

B. Addenda and Construction Change Documents:

1. In accordance with Part 1, Title 24, Section 4-338, California Code of Regulations, all addenda and construction change documents shall be approved by the Department of General Services and DGS.

C. Perform work in accordance with the applicable provisions of Parts 1 through 12, inclusive, Title 24 (T-24), California Code of Regulations.

D. Particular attention is directed to the following Sections of the Safety of Construction of Public Schools, Chapter 4, Part 1, T-24, CCR.

1. Section 4-343: Duties of the Contractor.

2. Section 4-342: Duties of the Project Inspector.

3. Section 4-335: Structural Tests and Special Inspections.

4. Section 4-336: Verified Reports.

E. During the entire construction period, it shall be the sole responsibility of each Contractor to maintain conditions at the Project Site to meet the requirements of the Federal Occupational Safety and Health Administration (OSHA) and California occupational regulations. This provision shall cover the Contractor's employees and all other persons working upon or visiting the site. The Contractor shall become fully informed of all applicable standards and regulations and inform all persons and representatives responsible for work under this Contract.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:

1. Work by other Contractor(s), and Work by Owner, if required.

2. Use of site and premises by Owner and public when and if Owner takes beneficial occupancy of portions of project.

B. Access to Site: Coordinate with Architect.

C. Building Exits During Construction: Maintain all exits. Do not obstruct at any time.

D. Time and Construction Schedule Considerations affecting school operations if Owner requires partial occupancy.

1. Schedule all construction operations with Architect.

2. Construction operations generating excessive noise, such as use of pneumatic tools and power actuated fastener equipment, shall be scheduled with the Architect.

Locate all noise generating equipment, such as cut-off saws, in a remote location away from classroom areas.

Provide Architect with 10 working days notice prior to commencing such operations.

3. Construction operations, such as material deliveries, debris removal, and crane operations shall not occur when students, staff or visitors are present at construction site. Schedule such operations around school schedule, including recess and lunch periods. Where, in the sole opinion of the Architect the construction site is sufficiently remote or isolated that students, staff or visitors are not exposed to such operations construction operations may proceed as scheduled.

4. After Owner takes a beneficial occupancy of portions of project the Contractor, subcontractors and all support staff will not be allowed to enter such school facilities during hours school is in session. Where access is required to complete the work, coordinate access and scheduling with Architect for non-school time.

E. Utility Outages and Shutdown: Provide minimum 15 working days notice of any utility interruption. No deviation to the commencement, nor duration of the outage or shutdown from the schedule agreed upon is allowed.

F. Storage Areas: Coordinate with Architect. Architect will establish acceptable path for products, staging areas and trash disposals.

1.05 OWNER OCCUPANCY

A. The Owner may take beneficial occupancy of certain portions of the project for the conduct of normal school and business operations prior to final completion.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

1.06 FEES, BONDS AND PERMITS

A. Obtain all required permits required for work under this contract, including but not necessarily limited to the following:

1. Encroachment permits.

2. Shoring, trenching and grading permits.

3. Permits required for connection to public services and utilities.

B. Arrange for all required improvements bonds required for work under this contract.

C. All fees, improvement bond costs, public utility engineering fees and related fees, shall be paid by Contractor. Upon submission of documentation satisfactory to the Owner, such costs paid by Contractor shall be reimbursed by Owner.

1.07 PERMISSIBLE WORKING DAYS AND HOURS

A. CONFORM TO Section 01 20 00 for required payment for Inspector's services performed during overtime hours.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 12 00

SECTION 01 20 00 – CONTRACT MODIFICATIONS AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of Values.

B. Inspector of Record Payment Provisions

C. Change Procedures.

D. Progress Payment Coordination

E. Payment for Contract Modifications

F. Request for Information

1.02 RELATED DOCUMENTS OR SECTIONS

A. Document 00 52 26 – Agreement Form - Construction Manager.

B. Document 00 72 26 – General Conditions.

C. Document 01 33 00 – Submittal Procedures.

1.03 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703-Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic print-out format may be considered, at Architects and Construction Manager's discretion.

B. Submit Schedule of Values per schedule defined in General Conditions.

1. Provide separate schedule of values for each building, and a single schedule for site work. Provide separate line items for each allowance.

C. Format: Conform, to the requirements of the General Conditions. Identify each line item with number and title of the major specification section. Identify site mobilization bonds and insurance.

D. Revise schedule to list approved Change Orders, with each Application for Payment.

E. Include in each line item a directly proportional amount representing Contractors overhead and profit.

1.04 INSPECTOR OF RECORD PAYMENT PROVISIONS

A. In the event Contractors performance of the work activities requires the District's Inspector of Record to work overtime, holidays or weekends, Inspector's cost shall be reimbursed by Contractor to District by deductive contract adjustment.

1.05 CHANGE PROCEDURES

A. Architect's Supplemental Instructions (ASI): The Architect will advise of minor changes in the Work that does not involve an adjustment to Contract Price or Contract Time by issuing supplemental instructions on AIA Form G710.

B. Proposal Request (PR): The Architect may issue a Proposal Request, which includes a detailed description of a proposed change with supplementary or revised drawings and specifications. Contractor shall prepare and submit an estimate within 10 days. If accepted by Owner, Construction Manager will prepare Change Order.

C. Change Order Request (COR):

1. Contractor may submit a COR to the Construction Manager for submittal to the Architect for changes in conditions, Owner changes, or other direction from the Architect, jurisdictional authority or Owners inspector

2. Document the proposed change and its complete impact, including its effect on the cost and schedule of the work.

3. Construction Manager and Architect will review COR and either deny request or prepare a Change Order.

4. Present total cost and schedule impacts in documentation, including all mark-ups permitted by General Conditions. Provide detailed back-up as required by Architect, including supplier costs, subcontractor labor time and rates, and all other data deemed necessary by Architect.

5. Following final review by Architect of original and supplemental information, and if COR is accepted, no additional cost or schedule adjustments will be included.

D. Change Order (CO): Change Order and Construction Change Directives will be issued by the Architect in accordance with procedures established in General Conditions.

1. Change Order Forms: AIA G701 Change Order Form, current edition, or other format as selected by Architect.

2. Execution of Change Orders: Construction Manager will issue Change Orders for signatures of parties as provided in the General Conditions of the Contract.

E. Construction Change Directives (CCD): Construction Change Directives (CCD) will be issued by the Architect.

1. Construction Change Directive Forms: AIA G701 Change Order Form, current edition, or other format as selected by Architect.

2. Unless otherwise agreed, maintain detailed records of work done under the direction of a CCD on Time and Materials basis. Provide full information required to substantiate costs for changes in the work.

F. Execution of Change Orders: Architect will issue Change Orders for signature of parties as provided in the General Conditions of the Contract.

G. All changes in contract for construction, regardless of effects on Contract Price or Contract Time, require the approval of DSA in accordance with Section 4-338, Part 1, T-24 CCR,

"Addenda and Change Orders".

1.06 PROGRESS PAYMENT COORDINATION

A. See Section 01 77 19 – Closeout Procedures for requirements and relationship between progress payment and maintenance of record drawings.

B. See Section 01 33 00 – Submittals for requirements and relationship between progress payment and construction schedule updates.

C. Submit application on AIA Form G702-Application and Certificate for Payment as follows:

1. Submit initial rough draft of pay application on or before the 20th day of each calendar month during Work progress, for a sum equal to ninety percent (90%) of the value of work performed up to the last day of the previous month, less the aggregate of previous payments to Architect, Construction Manager, and Inspector of Record for review.

2. Construction Manager will return initial rough draft of pay application to Contractor following review by all parties.

3. Submit six (6) copies of adjusted pay application to Construction Manager for submittal to DISTRICT, consisting of 3 complete copies with all back-up and justification, 2 [partial copies (cover sheet, schedule of values and releases) and one pencil copy showing corrections required on initial rough draft. Failure to attach applicable attachments within the time frames specified by the Construction Manager will result in processing not sooner than the next application period.

4. Submit conditional lien releases for work covered by current application, and unconditional releases for work covered by previous month's billings.

D. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

E. Payment Period: Monthly, scheduled as defined in General Conditions.

1.07 PAYMENT FOR CONTRACT MODIFICATIONS

A. The Contractor shall compensate the Owner, by Owner-Contractor Contract adjustment, for the Architect's reasonable costs to modify Contract Documents required by work not performed in accordance with approved Contract Documents.

1.08 REQUEST FOR INFORMATION

A. When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.

1. Whenever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Construction Manager for submittal to the Architect.

B. Submit all RFI's on attached form. Use of Contractors form will not be accepted. RFI's submitted by subcontractors or suppliers will not be accepted.

C. RFI's shall be originated by the Contractor:

1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Construction Manager for Architect's approval.

2. RFI's sent by subcontractor directly to the Construction Manager or Architect shall not be accepted and will be returned unanswered.

D. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's which request information available in the Contract Documents will be deemed either "improper" or "frivolous".

E. In cases where RFI's are issued to request clarification of coordination issues, for example pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

F. The Architect will respond to legitimate and bonafide Requests for Information (RFI) initiated by Contractor.

G. Contractor shall compensate the Architect, by Owner-Contractor Contract adjustment, for the Architects reasonable costs to respond to RFI's if the Architect determines:

1. The RFI does not reflect careful study and review of the documents, or;

2. Demonstrates a lack of knowledge or construction competency reasonably expected of a Contractor performing the work.

H. The Architect's action will be taken with such reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review.

I. In the event the Contractor believes that a clarification by the Architect results in additional cost or time. Contractor shall not proceed with the work indicated by the RFI until an Instruction Bulletin is issued to the Contractor to proceed with the work. RFI's shall not automatically justify a cost increase in the work or a change in the project schedule.

1. Answered RFI's shall not be construed as approval to perform extra work.

2. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.

J. Construction Manager shall prepare and maintain a log of RFI's, and at each weekly meeting, Construction Manager shall furnish copies of the log showing outstanding RFI's. Construction Manager shall note unanswered RFI's in the log.

K. Contractor shall allow up to 14 days review and response time for RFI's, however, the Architect will endeavor to respond in a timely fashion to RFI's.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

ATTACHMENT: REQUEST FOR INFORMATION FORM

END OF SECTION 01 20 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall provide the following Allowances for the exclusive use of the owner and / or their representatives. The allowances shall be carried as a separate line item included in the bid.

B. Types of allowances required include the following:

1. Lump-sum allowances.

C. Any portion of Allowances not used shall be returned to the owner via deductive change order

D. Provide Lump-sum allowances included in BASE BID for the following items:

1.	Provide Allowance 01 for unknown utilities	$ 40,000.00
2.	Provide Allowance 02 for additional site concrete work	$ 60,000.00
3.	Provide Allownace 03 for additional site improvements	$ 60,000.00
4.	Provide Allowance 04 for addiational architectural finishes	$ 50,000.00

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 21 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 DESCRIPTION

A. In order to allow the Owner to compare total costs where alternate materials and methods might be used, and to enable the Owner's decision to awarding the Contract, certain alternatives have been established as described in this Section.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Pertinent sections of these Specifications describe the materials and methods required under the various alternatives.

1.03 SUBMITTALS

A. Reflect all alternatives described in this Section in the bid submitted for the work, on Bid Form provided.

1.04 PRODUCT HANDLING

A. If the owner elects to proceed on the basis of one or more of the alternatives, make all modifications to the work required in the furnishings and installation of the selected alternative or alternatives to the approval of the Architect and at no additional cost to the Owner other than as proposed on Contractor bid proposal.

PART 2 - PRODUCTS

2.01 ALTERNATES – Refer to Section 00 41 13 – BID FORM for project alternates.

PART 3 - EXECUTION

3.01 ADVANCE COORDINATION

A. Immediately after award of Contract, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of alternatives selected by the Owner; use all means necessary to alert those personnel and suppliers involved as to all changes in the Work caused by Owner's selection of alternatives.

3.02 SURFACE CONDITIONS

A. Prior to installation of the alternative items, verify that all surfaces have been modified as necessary to accept the installation and that the manufacturer's current recommendations; in the event of discrepancy, immediately notify the Architect and proceed as directed.

END OF SECTION 01 23 00

SECTION 01 29 76 - APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.01 SUMMARY

A. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule.

B. Schedule of Values: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1. Submit the Schedule of Values at the earliest possible date but no later than 7 days before submittal of the initial Applications for Payment.

C. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

D. Applications for Payment shall be consistent with previous applications and payments as certified by the Construction Manager and Architect and paid for by the Owner.

E. Payment-Application Times: As per General Conditions, Article 58.

F. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 (OR EQUAL) as the form for Applications for Payment.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 76

SECTION 01 31 19 - COORDINATION AND MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination.

B. Pre-construction meeting.

C. Progress meetings.

D. Pre-installation meetings.

1.02 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later and for accommodating items to be installed by the Owner.

B. Coordinate sequence of Work to accommodate Owner occupancy, as specified in Document 01 12 00.

1.03 PRECONSTRUCTION MEETING

A. Construction Manager will schedule a meeting after Notice of Award.

B. Attendance Required: Construction Manager, Architect, Project Coordinator, Prime Contractors, Major Subcontractors, Project Inspector and key Owner personnel.

C. Agenda:

1. Contract Agreement:
   a. Transmit Performance and Material Bonds to Architect.
   b. Review General/Supplementary Conditions.
   c. Deferred Approvals.

2. Receive documentation from Contractor:
   a. Construction Schedule
   b. Schedule of Values
   c. List of Subcontractors with addresses and phone numbers.
   d. List of Submittals and estimated date of submittal.

3. Project Administration:
   a. Application for Payment, Project Schedule, Lien Release, As-built Documents.
   b. LCP Requirements
   c. Change Orders and Proposal Requests.
   d. Submittals and Substitutions, Deferred Approvals.
   e. Site Meetings.
   f. Testing Lab.
   g. Verified Reports

4. Special Owner Conditions
   a. Temporary facilities.

b. Owner Occupancy.

c. Work by Owner.
d. Access to Site - Owner Contact.

5. Construction Process:
   a. Contractor to give overview of construction.
   b. Contractor to identify items to be selected by Architect/Owner and date selections must be made.
   c. Contractor to review special requirements for equipment, safety, and noise.

6. Project Close-out:
   a. Close-out Binder.
   b. As-Built Documents.
   c. Final Verified Reports.

D. Construction Manager to record minutes and distribute copies within five (5) days after meeting to participants and those affected by decisions made.

1.04 PROGRESS MEETINGS

A. Construction Manager will schedule and administer meetings throughout progress of the work as needed.

B. Construction Manager will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance Required: Construction Manager, Project Coordinator, Prime Contractors, Major Subcontractors, Project Inspector, key Owner personnel and Architect as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.

E. Construction Manager to record minutes and distribute copies within two (2) days after meeting to participants, and those affected by decisions made.

1.05 PREINSTALLATION MEETING

A. When required in individual specification sections, Contractor shall convene a pre-installation meeting prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect and Construction Manager fourteen days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.

2. Review coordination with related work.

E. Contractor to record minutes and distribute copies within two days, after meeting, to participants, Architect, Construction Manager and those affected by decisions made.

1.06 COORDINATION OF SUBMITTALS

A. Submit submittals as specified in Section 01 33 00 – Submittal Procedures.

1.07 COORDINATION OF SPACE

A. Coordinate use of Project space and sequence of installation of mechanical, and electrical work, which is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practical, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

B. In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.08 COORDINATION WITH WORK BY OWNER

A. Coordinate with Construction Manager for any work by Owner and installation of all Owner provided and Contractor installed F.O.B. material, as it pertains to work in each Bid Package.

1.09 COORDINATION OF CONTRACT CLOSE-OUT

A. Coordinate completion and cleanup of own work in preparation for Substantial Completion.

B. After Owner occupancy of premises, coordinate access to site for own work for correction or defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Assemble and coordinate close-out submittals under provisions of Section 01 77 19, Contract Closeout Procedures.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 31 19

SECTION 01 32 16 – PROJECT CONSTRUCTION SCHEDULE

PART 1 – GENERAL

1.01 SUMMARY

A. The work includes the preparation and submission of the sub-schedules and reports specified herein, including the up-to-date maintenance thereof as required by the CONSTRUCTION MANAGER. The Conditions of the contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.02 CONSTRUCTION SCHEDULE

A. The enclosed "PROJECT CONSTRUCTION SCHEDULE" is composed of tentative starting dates and fixed duration's for each major activity of work on the project.

1. Within 14 days of Contractors receipt of District's Notice of Award Letter, each Prime Contractor will be required to provide the following details to the Construction Manager:

2. Proposed manpower loading of each scheduled field activity in order to properly complete same within the PROJECT CONSTRUCTION SCHEDULE'S fixed duration's.

3. Establish submittal lead time's which will allow for the proper review time by the Architect without delaying the timely scheduled procurement of products, materials, and/or assemblies.

4. Establish fabrication and/or Procurement lead times which will maintain that no operation will be delayed from its scheduled starting date.

B. Bid Package Contractor acknowledges that the Pull Planning (a.k.a. Last Planner®) supplemental means of activity scheduling is required to meet the project schedule. Therefore, Bid Package Contractor agrees to provide a supervisory and management level of representation at all Pull Planning weekly sessions. Bid Package Contractor also agrees to provide a Foreman level of representation at all Pull Planning daily update "quick meets".

C. CONTRACTOR must coordinate all work with all other contractors on the project through the CONSTRUCTION MANAGER'S Project Superintendent in order to complete each activity of their work within the fixed durations assigned to same as shown on the "PROJECT CONSTRUCTION SCHEDULE".

D. Schedule start dates as shown on the PROJECT CONSTRUCTION SCHEDULE are referred to as "tentative" only to the affect that said dates will be continually adjusted either forward or backward by the CONSTRUCTION MANAGER as the project progresses. Upon receipt of 48 hours advanced notice by the CONSTRUCTION MANAGER to begin work on an activity, CONTRACTOR must properly man and perform the work of said activity and complete same within the noted number of consecutive working days or less assigned to said activity in the PROJECT CONSTRUCTION SCHEDULE.

E. CONTRACTOR is expected to continually monitor all phases of the project field construction progress in order to insure that CONTRACTOR'S work is properly implemented into the overall project improvements.

F. CONTRACTOR is expected to provide properly trained and skilled mechanics in adequate numbers and equipment needed and/or required in order to properly and efficiently complete all work activities per the schedule. Should CONSTRUCTION MANAGER have reason to believe at any time that CONTRACTOR is not providing an adequate workforce armed with the proper materials and/or equipment, CONSTRUCTION MANAGER shall give CONTRACTOR written notice of same. Activity Manpower loading submitted in item 1.02-A-2 above shall in no way limit the responsibility of the CONTRACTOR to perform to the fixed duration requirements of the PROJECT CONSTRUCTION SCHEDULE.

G. The time for total project completion shall be within the total time specified in the Contract documents. The CONSTRUCTION MANAGER will use established contract fixed durations (refer to 1.02A) to prepare and update a Critical Path Method Schedule (C.P.M.) by buildings and site. This schedule will be the basis of weekly production review meetings and the method of measuring each CONTRACTOR'S performance and impact on dependent CONTRACTORS, required cure, and the assessment of liquidated damages.

ATTACHMENT: CONSTRUCTION SCHEDULE

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Submittal Procedures: Coordinate submittal preparation with construction, fabrication, other submittals, and activities that require sequential operations. Transmit in advance of construction operations to avoid delay.

1. Coordinate submittals for related operations to avoid delay because of the need to review submittals concurrently for coordination. The Architect reserves the right to withhold action on a submittal requiring coordination until related submittals are received. Specifically, in order to assure proper coordination of all project colors, no submittals which require the selection of material colors will be processed and released until all submittals requiring the selection of material colors have been submitted.
2. Processing: Allow 14 days for initial review. Allow more time if the Architect must delay processing to permit coordination. Allow 14 days for reprocessing.

    a. No extension of Contract Time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing.

3. Submittal Preparation: Place a permanent label on each submittal for identification. Provide a 4- by 5-inch (100- by 125-mm) space on the label or beside title block to record review and approval markings and action taken. Include the following information on the label for processing and recording action taken.

    a. Project name.
    b. Date.
    c. Name and address of the Architect.
    d. Name and address of the Contractor.
    e. Name and address of the subcontractor.
    f. Name and address of the supplier.
    g. Name of the manufacturer.
    h. Number and title of appropriate Specification Section.

4. Submittal Transmittal: Package each submittal appropriately. Transmit with a transmittal form. The Architect will not accept submittals from sources other than the Contractor.
5. An extended processing period is required for submittals and resubmittal of “Deferred Approval Items” which required approval of the Division of the State Architect. The Owner cannot guarantee processing of such submittals within a stipulated time period.

B. Contractor's Construction Schedule:

1. As per General Conditions, Article 32.

C. Daily Construction Reports: Prepare a daily report recording events at the site. Submit duplicate copies to the CONSTRUCTION MANAGER at daily intervals. Include the following information:

1. List of subcontractors at the site.
2. High and low temperatures, general weather conditions.
3. Accidents and unusual events.
4. Stoppages, delays, shortages, and losses.

5. Meter readings and similar recordings.
6. Emergency procedures.
7. Orders and requests of governing authorities.
8. Services connected, disconnected.
9. Equipment or system tests and startups.
10. Substantial Completions authorized.

D. Shop Drawings: Submit newly prepared information drawn to scale. Indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates and full-size Drawings, submit six copies on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.

    a. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

E. Product Data: Collect Product Data into a single submittal for each element of construction. Mark each copy to show applicable choices and options. Where Product Data includes information on several products, mark copies to indicate applicable information.

1. Include the following information:

    a. Manufacturer's printed recommendations.
    b. Compliance with trade association standards.
    c. Compliance with recognized testing agency standards.
    d. Application of testing agency labels and seals.
    e. Notation of dimensions verified by field measurement.
    f. Notation of coordination requirements.

2. Submittals: Submit 6 copies. The Architect will retain two and return the others marked with action taken. Electronic copies where applicable may be submitted in lieu of hard copies.

    a. Unless noncompliance with Contract Documents is observed, the submittal serves as the final submittal.

3. Distribution: Furnish copies to installers, subcontractors, suppliers, and others required for performance of construction activities. Show distribution on transmittal forms. Do not proceed with installation until a copy of Product Data is in the Installer's possession.

    a. Do not use unmarked Product Data for construction.

F. Samples: Submit full-size Samples cured and finished as specified and identical with the material proposed. Mount Samples to facilitate review of qualities.

1. Include the following:

    a. Specification Section number and reference.
    b. Generic description of the Sample.
    c. Sample source.

d. Product name or name of the manufacturer.
e. Compliance with recognized standards.
f. Availability and delivery time.

2. Submit Samples for review of size, kind, color, pattern, and texture, for a check of these characteristics, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed. Where variations are inherent in the material, submit at least 3 units that show limits of the variations.

a. Refer to other Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar characteristics.
b. Refer to other Sections for Samples to be incorporated in the Work. Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
c. Samples not incorporated into the Work, or designated as the Owner's property, are the Contractor's property and shall be removed from the site.

3. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. One set will be returned marked with the action taken. Maintain sets of Samples, at the Project Site, for quality comparison.

a. Unless noncompliance with Contract Documents is observed, the submittal may serve as the final submittal.
b. Sample sets may be used to obtain final acceptance of the construction associated with each set.

4. Distribution of Samples: Distribute additional sets to subcontractors, manufacturers, and others as required for performance of the Work. Show distribution on transmittal forms.

G. Quality Assurance Submittals: Submit quality-control submittals, including design data, certifications, manufacturer's instructions, and manufacturer's field reports required under other Sections of the Specifications.

1. Certifications: Where certification that a product or installation complies with specified requirements is required, submit a notarized certification from the manufacturer certifying compliance.

a. Signature: Certification shall be signed by an officer authorized to sign documents on behalf of the company.

H. Architect's Action: Except for submittals for the record or information, where action and return are required, the Architect will review each submittal, mark to indicate action taken, and return. Compliance with specified characteristics is the Contractor's responsibility.

1. Action Stamp: The Architect will stamp each submittal with an action stamp. The Architect will mark the stamp appropriately to indicate the action taken.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 33 00

SECTION 01 35 23 – CONTRACTOR SAFETY

1.01 GENERAL

A. HEALTH AND SAFETY POLICY

1. The policy of the District is to promote safety at a level to minimize personal injury and potential property damage.

2. Employees of contractors working on this project are required to meet or exceed all established and recognized codes and standards for safety and protection of personnel and property.

3. The safety guidelines included here are made available to you, the Contractor, as an extension of the safety clause in your Contract General Conditions Article 72.

4. These guidelines are not intended to be complete in every detail, but are merely of a general nature. The separate contractors are in no way relieved of their responsibilities for safety of persons and property, and compliance with all statutes, rules, regulations and orders applicable to the conduct of the work.

5. The possession, use of and/or sale of any alcoholic beverage or illegal controlled drug substance will not be permitted on or immediately adjacent to the job site by any contractor, contractor employee, subcontractor employer or associate.

6. The abuse of prescribed medication will not be permitted on or immediately adjacent to the job site by any contractor, contractor employee, subcontractor employee or associate.

7. This Contractor, and other contractors, share the responsibility of monitoring and enforcing, as necessary, A.5 and A.6 above. Any known, (or with due cause believed to be), violator of A.5 or A.6 shall be immediately reported to the Construction Manager.

8. The District reserves the right to take corrective action, as deemed in the best interest of the project and the DISTRICT, for violation of any health or safety standard. This corrective action may include, but is not limited to; removal (from the job site) any unsafe tools/equipment, temporary work stoppage for any unhealthy or unsafe condition, immediate removal (from the job site) any person that is unwilling or incapable of conducting themselves in a manner that promotes a healthy and safe working atmosphere. Any person found to be repeatedly in violation of health and/or safety standards will be permanently removed from the site.

B. RESPONSIBILITIES

1. The District demands that all project contractors perform in a reasonable and safe manner.

2. The Contractors working on this project have the ultimate and total responsibility to conduct a sound accident control program as it pertains to their work and their employees, as well as to ensure safe working conditions for employees of other contractors.

3. The Contractor will ensure his employees cooperate with and coordinate safety matters with other contractors to form a joint safety effort.

4. Employees who have been, or will be exposed to excessive (measured against applicable standards) levels of toxic materials or harmful physical agents shall be notified by the Contractor. Notice of corrective action being taken shall be provided to the employees. Accurate records must be kept of all exposures which are required to be monitored under the State and Federal Codes.

5. In the event of a defense by the Contractor against unsafe independent employee actions, the Appeals Board requires that you must show evidence of the following:
   a. That the employee was experienced in the job being performed;
   b. That you as the employer have a well devised safety program which includes training employees in safety matters relating to their individual job assignments;
   c. That you effectively enforce your safety program;
   d. That you have and enforce a policy of sanctions against employees who violate your safety program; and
   e. That the employee caused a safety infraction which he or she knew was in violation of your safety requirement.

C. SAFETY ACTIVITIES

1. Contractors will conduct or initiate:
   a. Safety program as required by current State of California requirements.
   b. Weekly "tool box" safety meetings between Contractor and Contractor's supervisors, foremen, employees, and subcontractors working on the project; and

   c. Weekly safety inspections of your work area and those areas of work under your responsibility or shared responsibility as well as taking any other necessary safety precautions.

D. REPORTS

1. Submit all preliminary, weekly, periodic and special reports to the Construction Manager. The Contractor is in no way relieved of the requirements for submission of reports to any agency or authority.
   a. All reports listing deficiencies, accidents, or injuries shall show corrective action taken.
   b. A weekly status and summary report of each "tool box" meeting held and items discussed. Each report shall also contain attendance names, signatures and company affiliation.
   c. A weekly status report of inspection results. The attached status forms are for your convenience only.
   d. A continuing list of deficiencies found, date identified, responsible party, corrective action and date corrected.
   e. Accident reports and injury forms. Submit a copy of one of the following to the Construction Manager for each case:
      1) California Division of Labor Statistics and Research Form 5020 (latest rev.), or;
      2) Federal OSHA Form 101, or;
      3) Insurance Company form similar to 1 or 2 above.

f. A copy of CAL/OSHA Form 200 “Log and Summary of Occupational Injuries and Illness”.

2. Special Reports
   a. Notify the Construction Manager immediately of any accident involving injury to personnel or property; and complete written reports within 24 hours of a death or injury of five (5) or more employees as a result of one accident.
   b. Copies of all toxic or harmful agent reports (See paragraph B.4.)

3. Governmental Reports
   a. Notification of governmental authorities is the responsibility of each affected contractor.

E. SAFETY DEFICIENCY CORRECTION

1. All safety deficiencies will be corrected by contractors in accordance with the following priorities.
   a. Immediate correction of items with any probability of major or minor injury to people.
   b. Correction immediately of any accident probability which could involve people an/or equipment.
   c. Correction within one day (or sooner) of potential injury or damage to property.

F. OUTSIDE SAFETY INSPECTIONS

1. Unannounced inspections by city, state or federal safety agencies or insurance companies may occur.
   a. Contractors are to escort representatives of these agencies or companies directly to the Construction Manager and assist him as required or directed.
   b. If the Construction Manager is not available, the Contractor’s foreman or representative shall accompany the inspector on the inspection.

G. INVESTIGATING

1. All injuries are to be investigated by the contractors and reported.

2. The Construction Manager shall be notified prior to proceeding with an investigation.

H. SAFETY STANDARDS AND CODE

1. All contractors are to provide their job supervision with applicable safety code publications and ensure they are familiar with the contents.

2. Occupation Safety and Health Administration Standards (latest applicable edition) on the designated applicable safety standards.

3. In states with OSHA approved plans, state codes will take precedence unless federal standards are more stringent, in which case federal standards shall apply.

4. On General Services Administration (GSA) projects, applicable sections of the GSA Manual Accident & Fire Prevention on Construction and Alteration Work will apply in addition to all other codes and standards.

5. All code and standard conflicts will be resolved by applying the most restrictive code and/or standard.

6. Suggested references for contractors are:
   a. Safety & Health Regulation for construction, U.S. Department of Labor, OSHA, Volume 37, No. 243.
   b. Construction safety orders, State Standard, CAL/OSHA, state of California, latest edition.
   c. GSA Manual - GSA - PBSP 5900.3.
   d. U.S. Army Engineering Manual - EM 385-1.
   e. Accident Prevention, Associated General Contractors.
   f. A short guide to the California Occupational Safety and Health Act - National Federation of Independent Business, 150 West 20th Avenue, San Mateo, California 94403.

I. REQUIRED NOTICES: TO BE VISIBLY DISPLAYED

1. Workers' Compensation Insurance Notice.

2. OSHA poster: Safety and Health Protection on the job.

3. State of California Department of Human Resources: Notice to Employees Unemployment Insurance - Disability Insurance.

4. Hard Hat Area Signs.

5. List of ambulances, doctors and hospitals with telephone numbers which can be called during an emergency.

6. Name and title of the safety representative from each contractor's organization.

7. Any other safety signs, slogans, etc. that will improve the general awareness of a joint safety program.

J. PERMITS

1. Permits from the Division in Industrial Safety are required before contractors may undertake the following kinds of work:
   a. Construction of trenches or excavations which are 5 feet or more deep, into which a person is required to descend;
   b. Construction of any building, structure, false work, or scaffolding more than three stories high.

2. The Division of Industrial Safety may investigate or confer with the employer before the start of work. If a pre-job safety conference between the Division of Industrial Safety personnel and the employer is a requirement specified by the Division of Industrial Safety at the time the permit is issued, employees or their representatives are to be included at the conference.

3. Permits must be posted at or near each place of employment requiring a permit. If posting at the actual job site is not possible, the permit must be available for inspection at all times on the site, or, in the case of a mobile unit, at the employer's head office in the area.

4. Additional permits may be required from the Division of Industrial Safety or other applicable governmental agencies. It is the responsibility of each contractor to determine, procure, and pay for their own such permits.

END OF SECTION 01 35 23

SECTION 01 45 24 – TESTING AND INSPECTION REQUIREMENTS FOR SCHOOL CONSTRUCTION

PART 1 - GENERAL

1.01 SUMMARY

A. Regulatory Requirements:

1. Part 1, Title 24, Section 4-335, California Code of Regulations: Testing required by the Division of the State Architect (DSA).
2. Part 2, Title 24, California Code of Regulations (2015 IBC and 2016 California Amendments): Inspections, testing and approvals required by individual sections therein.

B. Selection of the material required to be tested shall be by the laboratory or the Owner's representative and not by the Contractor.

C. Minimum test and inspections required: See Structural Tests and Inspections, Division of the State Architect form DSA 103 (2016 CBC).

D. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.

E. Selection and Payment of Testing Laboratory:

1. Owner will employ and pay for services of an independent Testing Laboratory approved by the Architect, DSA, and the Structural Engineer to perform inspection and testing in accordance with Part 1, Title 24, Section 4-335, California Code of Regulations.
2. Contractor shall pay for mileage and travel time for inspection services, required travel more than 300 miles from this project to test products purchased by Contractor. Testing Laboratory shall forward all billings and records of such costs to the Owner for approval. Such costs, if determined by the Owner to be attributable to the Contractor under this provision, will be deducted from Contractors final payment (or any funds due and payable) by change order.
3. When materials tested fail to meet requirements herein specified, they shall be promptly corrected or removed and replaced and retested. Costs involved in retesting will be paid by the Owner and deducted from Contractors final payment (or any funds due and payable) by change order.

F. Laboratory Responsibilities:

1. Laboratory shall be licensed to conduct testing and inspection operations in California. It shall be supervised by a State Licensed Civil Engineer who shall certify all reports.
2. Perform specified inspection, sampling and testing of Products in accordance with standards specified herein.
3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
4. Promptly notify Architect, Project Inspector and Contractor by letter of observed irregularities of non-conformance of Work or Products.
5. Immediately upon Testing Laboratory determination of a test failure, the laboratory shall telephone the results of test to Architect. On the same day laboratory shall send written test results to those named on the distribution list below.

G. Laboratory Reports:

1. After each inspection and test, the testing facility shall promptly (no later then 14 days after test is complete) submit one copy of laboratory report to the following.

    a. Owner
    b. Architect
    c. Project Inspector
    d. General Contractor
    e. Structural Engineer
    f. Mechanical and Electrical Engineers (Related Tests and Inspections)
    g. Division of the State Architect

2. Test reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Titles 21 and 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.
3. Submit a report verifying that tests and inspections herein specified and otherwise required have been completed and material and workmanship complies with the contract documents. Such verification reports shall be submitted at any time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.

H. Limits on Testing Laboratory Authority

1. Laboratory may not release, revoke, alter or enlarge on requirements of Contract Documents.
2. Laboratory may not approve or accept any portion of the Work.
3. Laboratory may not assume any duties of the Contractor.
4. Laboratory has no authority to stop work.
5. Laboratory shall not interpret code in relation to the design of the building.

I. Contractor Responsibility

1. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing.
2. Cooperate with laboratory personnel, Owner’s Representatives, Project Inspector and the Architect, and provide access to the work including weekends and after hours and to manufacturer’s facilities.
3. Provide incidental labor and materials and facilities to provide at all times, safe access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
4. Notify Construction Manager, Project Inspector and laboratory 24 hours prior to expected time and operations requiring inspection and testing services. Also notify Owner in advance of manufacturer of materials to allow testing at source of supply for materials which require testing and inspection.
5. Inspecting and Testing performed exclusively for the Contractor’s convenience shall be the sole responsibility of the Contractor.

J. Inspection by the Owner

1. The Owner and his representative shall at all times have access for the purpose of inspection to all parts of the work and to the shops therein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

2. The Owner shall have the right to reject materials and workmanship which are defective or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected material shall be removed from the premises without cost to owner the Owner. If the Contractor fails to correct such rejected work within a reasonable time, fixed by written notice, the Owner will correct same and charge the expense to the Contractor by Change Order.
3. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor by change order.

K. Inspector - Owners:

1. An Inspector employed by the Owner and approved by the Division of the State Architect in accordance with the requirements of State of California Code of Regulations, Title 24 Part 1 will be assigned to the continuous inspection of the work. His duties are specifically defined in Section 4-342 Part I, Title 24 CCR.
2. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.

L. Inspector -- Owner -- FIELD OFFICE: See General Conditions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 45 24

SECTION 01 50 00 – CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat**,** ventilation, telephone service, water service and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, water, dust, noise & pollution control, parking and traffic control, and protection of the Work.

C. Construction Facilities: Access roads, progress cleaning, field offices, sheds and removal.

D. Operational Requirements: Security, project ID/signage and documentation.

1.02 RELATED SECTIONS

A. Section 01 77 19 - Contract Closeout Procedures.

1.03 TEMPORARY ELECTRICITY

A. Temporary power will be provided by Electrical Contractor within 50’ of buildings.

B. Any temporary power requirements beyond the 50’ provided will be the responsibility of the Contractor requiring the same.

C. All welding will be done with self-contained gas-powered units.

D. Provide generator power for your operations until temporary power is available.

1.04 TEMPORARY LIGHTING

A. Each Contractor shall be responsible to provide and maintain all temporary lighting as required to safely access and perform their scope of work.

B. Provide and maintain adequate lighting for construction operations for own work.

C. Provide adequate lighting for security of construction operations and storage areas for own work. Coordinate with Construction Manager.

D. Provide and maintain at ALL times, temporary lighting and exit/path devices in corridor areas as required by applicable codes.

1.05 TEMPORARY HEAT

A. Provide temporary heat devices as required to maintain specified conditions for construction operations.

B. Use of permanent equipment for temporary heating is prohibited without prior approval by Architect.

C. Unless specified elsewhere, maintain minimum 50°F at interior construction areas.

1.06 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials to dissipate humidity and to prevent accumulation of dust, fumes, vapors or gases. Where necessary to comply with item B., provide ducted ventilation system.

B. Locate ventilation discharge point at an approved location, away from walkways, HVAC intakes, windows of occupied areas, and other similar locations.

C. Utilize temporary fan units as required to exhaust noxious fumes directly to the outside of the building.

1.07 TELEPHONE

A. Provide, maintain and pay for own telephone service and associated office equipment to own field office as required. No public telephone will be provided.

1.08 TEMPORARY WATER SERVICE

A. Plumbing Contractor will provide and maintain for suitable water source for construction operations.

B. Each Prime Contractor is responsible for their own distribution, including but not limited to water trucks, hoses, piping, etc. from water source to area of work, as required for own Work.

1.09 TEMPORARY SANITARY FACILITIES

A. Construction Manager will provide and maintain required temporary chemical type toilet facilities and enclosures.

1.10 BARRIERS AND BARRICADES

A. Exteriors

1. Provide barriers to protect adjacent properties from damage from construction operations and demolition. When regulated by Codes, such legal requirements for protection shall be considered as minimum requirements. Provide protective measures in excess of such minimum requirements as specified or required.

2. Provide barricades around excavations.
3. Provide protection for all plant life designated to remain.

a. Replace damaged plant life with approved equivalent.
b. Erect tree protection within 3 days of mobilization. Enclose trees designated to remain with 2 x 4 wood frame. Install frame minimum 6 feet from trunk diameter, all sides. Provide 4 x 4 post supports, minimum 3 feet high, embedded 3 feet, at 3 foot on center maximum. Wrap frame with snow type fencing in bright iridescent color visible at night.
c. Protect non-owned vehicular traffic, stored materials and structures from damage.

B. Interior

1. Where required to permit Owners ongoing operations, provide barriers as specified.

   a. Construct barriers as metal framed/fire-resistive gypsum board fire resistive corridor construction, with self-closing, latching door assembly. Provide temporary partition and door assembly fire resistivity rating equal to the assembly being replaced. Close joints and seal edges at intersections with existing surfaces.
   b. Use of sheet plastic dust barriers in place of rated assemblies is prohibited.

2. Protect existing surfaces, equipment and furnishings from damage from construction operations and demolition. Where necessary, remove and store in separate area.
3. Where demolition or construction operations generate fine dust or airborne particulates, provide fire retardant drop cloths, screening or other approved barriers to prevent dust inhalation into existing cabinet interiors, equipment, drawers, and similar conditions.
4. Provide contamination control mats at construction access locations to prevent tracking of construction dust and dirt into owner occupied portion of building.

1.11 FENCING

A. A temporary fence with locked entrance gates will be provided to enclose the Work to deter unauthorized entry, vandalism and/or theft.

1. The fence will be a 6 foot high commercial grade chain link with vehicular and pedestrian gates and locks.
2. Any Contractor requiring fencing/barricades above and beyond the fencing shown on the plan sheet, for the execution of their work, shall furnish, install and maintain same as required by local authorities and state safety ordinances and as necessary for the protection of the public.

1.12 DUST CONTROL

A. Conduct earthwork operations in a manner to prevent windblown dust and dirt from interfering with the progress of the Work, DISTRICT's activities and the existing occupied structures in the areas immediately adjacent as well as adjacent properties.

B. Periodically water construction areas as required to minimize accumulation of dust and dirt.

C. Water spray or cover with tarpaulins truck loads of soil to additionally minimize generation of dust and dirt from construction operations.

D. Prevent dust and dirt from accumulating on walks, roadways, parking areas and from washing into sewer and storm drain lines.

1.13 POLLUTION CONTROL

A. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Burning of refuse, debris or other materials will not be permitted on the Site.

C. Comply with regulatory requirements and anti-pollution ordinances during the course of construction and disposal operations.

1.14 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work areas to minimize damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

1.15 PARKING AND TRAFFIC CONTROL

A. Parking Criteria

1. Space is limited. Coordinate location and number of parking spaces required with Construction Manager.

B. Traffic Control

1. Traffic Maintenance: Prior to the start of own work, determine the routing of construction vehicles, and the safeguards and procedures necessary to carry out the work. Obtain the Construction Manager's approval of the onsite traffic routes and for any removal, temporary relocation and reinstallation of traffic control signage. Obtain traffic control approval by local jurisdiction for street work. In addition:

a. Be responsible for controlling construction traffic within and adjacent to the site for own work.
b. Provide entrances, lifts and safeguards required or necessary to the progress of the work, and effectively control such traffic to provide minimum hazard to the work and all persons.
c. Route construction equipment, trucks, and similar vehicles via existing public streets to and from the site as approved by the governing authorities.
d. Obtain and pay for permits and inspections made necessary by use of public street, sidewalks, curbs, and paving. Post guarantees and bonds that may be required, and repair and make good any damages thereto acceptable to the authorities having jurisdiction.
e. Construct and maintain temporary walks for pedestrians. Keep streets adjacent to the site open to vehicular and pedestrian traffic.
f. Maintain constant access for police, fire and ambulance service.
g. Provide and maintain for proper control of traffic and safety of all concerned. Provide all necessary barricades, suitable and sufficient lights, reflectors, and danger signals.
h. Provide warning and closure signs, directional and detour signs, and whatever additional measures are necessary.
i. Indicate on a 24-hour basis restricted and dangerous conditions existing on or adjacent to the site. Illuminate barricades, danger signals, warning signs and obstructions at night. Keep warning lights burning from sunset until sunrise.

1.16 ACCESS ROADS

A. Provide and maintain access to fire lanes and fire hydrants at all times, free of obstructions. Coordinate location, locking device and dimension of gates with fire department having jurisdiction.

B. Designated existing on-site roads may be used for construction traffic.

C. Do not permit delivery trucks to block, park or wait on public streets or in student bus lane.

1.17 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Each applicable Contractor shall remove debris and rubbish from pipes chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Each applicable Contractor shall broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Remove waste materials, debris, and rubbish from interior spaces daily and from site weekly and dispose of off-site.

E. Maintain all public streets free of dust, mud, and debris as required by jurisdictional authority.

1.18 TEMPORARY FACILITIES AND SHEDS

A. Locate temporary facility and shed, as required, where directed by Construction Manager and maintain in a safe and sanitary condition at all times until completion of the Contract.

B. Contractor shall cooperate with Construction Manager and other Contractors to coordinate space requirements for Contractor's equipment, job office, operation, and material storage. Contractor shall move equipment, trailers, and material storage at the request of the Construction Manager with no additional compensation.

C. Field offices shall remain the property of the Contractor and shall be removed from the site upon completion of the work.

D. Furnish, install and maintain tool cribs, sheds and storage units for the Contractors use as necessary for the proper execution of the work.

1. Provide all necessary barricades, warning devices and enclosures required to protect and direct visitors and staff around tool and equipment located in passageways and corridors.
2. Return all small tools and secure in locked compartments or cribs at close of workday.
3. Safe-off or lock all equipment and large tools. Disable from malicious or accidental start-up and operation.

E. Requirements of regulatory agencies: Comply with requirements or regulatory agencies having jurisdiction. Obtain and apply for permits required by governing authorities.

1.19 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials for own work, prior to Final Application for Payment.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.20 SECURITY

A. Provide security and facilities as necessary to protect work and staff from vandalism, unauthorized entry, theft, damage, or assault.

B. Within a 48-hour period, replace or repair, to District and Architect's satisfaction, all surfaces or items damaged by graffiti during course of construction.

C. Where Owner has given approval to take fire detection system off-line, return system to active status at completion of work or end of each work period.

1. Fire Safety During Construction: Comply with provisions of Article 87, California Fire Code, CCR, including but not limited to, access roads, fire extinguisher and fire watch regulations.
2. Where security or fire detection systems are disabled for any reason, including where owner has given approval for such system shut-down, provide fire watch or security guard service as directed by Owner and at no additional cost to the Owner.

D. All Contractor staff, subcontractors and suppliers shall notify Construction Manager when on site, and sign in and out as directed by Construction Manager . Notify Construction Manager when work is completed or shut-down for that work period.

E. No smoking or use of tobacco products is permitted on school property.

F. Radio or other music is not permitted at any time.

1.21 DOCUMENTATION OF EXISTING IMPROVEMENTS

A. Use of explosives is not allowed.

B. Prior to beginning any alterations, including grading, paving, landscape, etc, prepare a record of existing improvements affected by the work of this contract, including but not limited to the following.

1. Off-site street and frontage improvements, identifying all evidence of existing settlement, cracking and other signs of damage, distress or failure.
2. Condition of adjacent properties, including fencing, retaining walls, pools, paving, and structures. Clearly identify all evidence of existing settlement, cracking, alignment and other signs of damage, distress or failure.
3. Condition of landscaping, including canopy overhang, shrubbery and grass/groundcover. Clearly identify all evidence of existing trunk damage, grass compaction, crushed and broken shrubs and other signs of distress or failure.

C. Format

1. Prepare record documentation using color video and any other means of documentation necessary to describe existing condition.
2. Prepare color video at such scale and detail as required to document existing damage occurred prior to beginning work. If the record documents do not clearly show damage as a pre-existent condition, Contractor shall be responsible for repair or replacement of such damaged improvements.
3. Obtain Owner's Inspector of Record certification that documents were prepared prior to beginning construction.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 50 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

A. Cutting and Patching Proposal: Submit a proposal describing procedures in advance of the time cutting and patching will be performed. Request approval to proceed. Include the following:

1. Describe extent of cutting and patching. Show how it will be performed and indicate why it cannot be avoided.
2. Describe changes to existing construction. Include changes to structural elements and operating components and changes in the building's appearance and other significant visual elements.
3. List products to be used and firms that will perform Work.
4. Indicate dates when cutting and patching will be performed.
5. Utilities: List utilities that will be disturbed or relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
7. Approval to proceed does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Unless Specifically shown on plans no structural member shall be cut, neither drilled nor notched without prior written authorization from the structural engineer and the Division of the State Architect.
2. Obtain approval before cutting and patching the following structural elements:

a. Foundation construction.
b. Bearing and retaining walls.
c. Timber and primary wood framing.

C. Operational Limitations: Do not cut and patch operating elements in a manner that would reduce their capacity to perform as intended. Do not cut and patch operating elements in a manner that would increase maintenance or decrease operational life or safety.

1. Obtain approval before cutting and patching the following operating elements or safety related systems:

a. Primary operational systems and equipment.
b. Fire protection systems.
c. Electrical wiring systems.

D. Visual Requirements: Do not cut and patch exposed construction in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1. Retain the original Installer to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer, engage a recognized experienced and specialized firm.

a. Ornamental metal.
b. Matched-veneer woodwork.
c. Stucco and ornamental plaster.

E. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged in such a manner as not to void warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use materials identical to existing materials. Use materials that visually match adjacent surfaces to the fullest extent possible if identical materials are unavailable. Use materials whose performance will equal that of existing materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which work is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action.

1. Before proceeding, meet with parties involved. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of work to be cut.

B. Protection: Protect existing construction to prevent damage. Provide protection from adverse weather conditions for portions that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Avoid cutting pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. Performance: Employ skilled workmen. Proceed at the earliest feasible time and complete without delay.

1. Cut construction to install other components or perform other construction and subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut using methods that will not damage elements retained or adjoining construction. Comply with the original Installer's recommendations.

1. Use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
5. Where services are required to be removed, relocated, or abandoned, by-pass utility services before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove floor and wall coverings and replace with new materials to achieve uniform color and appearance.

    a. Where patching occurs in a smooth painted surface, extend final paint coat over entire surface containing the patch after the area has received primer and second coat.

4. Patch, repair, or rehang ceilings as necessary to provide an even-plane surface of uniform appearance.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar items. Clean piping, conduit, and similar features before applying paint or finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

SECTION 01 74 00 PROGRESS AND FINAL CLEANING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Maintain project site, surrounding areas, and public properties free from accumulations of waste, debris, and rubbish caused by operations.

C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean sight-exposed surfaces. Leave project site clean and ready for occupancy.

1.02 GENERAL

A. Conduct cleaning and disposal operation in accordance with legal requirements.

1. Do not dump or bury rubbish and waste materials on project site.
2. Do not dispose of volatile wastes in storm or sanitary drains.

B. Hazards Control:

1. Store volatile wastes and hazardous materials (i.e. paint, oils, etc.) in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

1.03 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

1.04 PROGRESS CLEANING DURING CONSTRUCTION

A. Execute cleaning daily to ensure project site, Owner’s premises, adjacent and public properties are maintained free from accumulations of waste materials, debris and rubbish.

B. Provide on project dump site, containers for collection of waste materials, debris, and rubbish.

C. Remove waste materials, debris and rubbish from Owner’s premises and legally dispose of off Owner’s property.

D. Vacuum clean interior areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

E. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

1.05 FINAL CLEANING

A. Employ experienced workers or professional cleaners for final cleaning.

B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of accessible concealed spaces.

C. Clean glass and surfaces exposed to view. Remove temporary labels, stains, and foreign substances.

D. Repair, patch, and touch-up marred surfaces to specified finish, and to match adjacent surfaces.

E. Broom-clean paved surfaces.

F. Polish transparent and glossy surfaces.

G. Vacuum carpeted and soft surfaces.

H. Wax and polish resilient floor surfaces.

I. Wash and polish ceramic surfaces.

J. Clean machinery and equipment.

K. Clean plumbing fixtures to a sanitary condition. Use non-corrosive, non-abrasive cleaning materials.

L. Replace filters of operating equipment.

M. Clean and polish light fixtures.

N. Clean and polish hardware and metal surfaces.

O. Clean walls and ceilings of dust, dirt, stains, hand marks, paint spots, plaster drops, and like defects.

P. Clean construction site. Sweep paved areas and rake clean landscaped surfaces.

Q. Clean out and flush drains from construction debris. Flood-test prior to occupancy.

R. Remove waste and surplus materials, rubbish, and construction facilities from the site. Do not use Owner's waste removal system or any system belonging to owners of adjacent properties.

S. Keep project clean until it is occupied by the Owner.

T. Schedule final cleaning as accepted by the CONSTRUCTION MANAGER to enable the ARCHITECT and SCHOOL DISTRICT to accept a completely clean project.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 74 00

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section Includes: Procedures for ensuring optimal diversion of construction waste generated by the Work within the limits of the Construction Schedule, Contract Sum, and available materials, equipment, and products.

1. SUBCONTRACTOR shall participate in promoting efforts of THE CLIENT to create a resource-efficient and environmentally sensitive structure and to effect optimum control of solid waste and recoverable resources generated in the Work.
2. Subcontractor shall recycle, salvage, reuse or otherwise divert 75% of the construction waste generated in the Work from the landfill.

B. Related Work: Documentation affecting the work of this Section include, but are not necessarily limited to, the following Scope of Work:

1. Removal, Cleanup and Demobilization
2. Minor Demolition
3. Selective Demolition
4. All Construction Activities, All Divisions

1.02 DEFINITIONS

A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A Class III landfill must have a solid waste facilities permit from the California Integrated Waste Management Board (CIWMB) and is regulated by the Local Enforcement Agency (LEA).

B. Construction and Demolition Waste: Includes all non-hazardous solid resources resulting from construction, remodeling, alterations, repair, and demolition operations.

C. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of landfilling. Includes Class III landfills and inert fills.

D. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring, or others soils engineering operation.

E. Inert Fill: A facility that legally accept inert waste such as asphalt and concrete exclusively for the purpose of disposal.

F. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional Water Board pursuant to Division 7 (Section 13000 et seq.) of the California Water Code and does not contain significant quantities of decomposable solid resources.

G. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.

H. Mixed Debris Recycling Facility: A solid resources processing facility that accepts loads of commingled construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing the non-recyclable residual materials.

I. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

J. On-site Recycling: Materials that are sorted and processed for use in an altered form in the Work, (e.g. concrete is crushed for use as base for a parking lot on the site).

K. Off-site Recycling: Materials hauled to a location and used in an altered form in the manufacture of a new product.

L. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a Solid Waste Facilities permit from the CIWMB or be regulated by the LEA.

M. Re-use: Materials that are recovered for use in the same form. This includes materials are used on-site or off-site. Refers also to Salvage Material, in which materials recovered for re-use and sold or donated to a third party.

N. Source-Separated Materials: Materials that are sorted at the site of generation by individual material type for the purpose of recycling, i.e., loads of concrete that are source-separated for delivery to a base course recycling facility.

O. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.

P. Transfer Station: A facility that can legally accept solid wastes for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling. Transfer stations must be permitted by the CIWMB and regulated by the LEA.

1.03 SUBMITTALS

A. Construction Waste Management Plan:

1. Prior to the Bid, SUBCONTRACTOR shall conduct a site assessment and estimate the types and quantities of materials under the Work that are anticipated to be feasible for on-site processing, source separation for recycling, or re-use, and shall note the procedures intended for a recycling, re-use, or salvage program.
2. Not more than twenty (20) working days after award of Contract and prior to the commencement of the Work, SUBCONTRACTOR shall prepare and submit a written Solid Resources Management Plan including, but not limited to, the following (submit in format provided herein as Attachment A):

a. SUBCONTRACTOR and Project identification information.
b. Procedures to be used.

c. Materials to be re-used and recycled.
d. Estimated quantity of materials.
e. Names and location of re-used and recycling facilities/sites.

B. Required Submittal of Summary of Diversion and Disposal With Each Application for Progress Payment:

1. A summary of recyclables and solid resources generated by the construction and demolition operations. Submit on Document 00 62 23 Construction Waste Diversion Form. Failure to submit the form and its supporting documentation may render the application for progress payment incomplete and delay progress payments. Include manifests, weight tickets, receipts, and invoices specifically identifying the Project and materials sent to:

a. Source Separated Recycling Facilities
b. Mixed Debris Recycling Facilities
c. Class III Landfills
d. Inert Materials accepted at Class III Landfills as daily cover
e. Inert Fills
f. Inert Backfill Sites other than Inert Fills

2. With each submittal of SUBCONTRACTOR'S application for process payment, the SUBCONTRACTOR is required to submit to the LEED Coordinator the attached, "Summary of Solid Waste Diversion and Disposal, " quantifying all materials generated in the Work, disposed in Class III Landfills, or diverted from disposal through recycling. Indicate zero (0) if there is no quantity to report for a type of material. As indicated on the form:

a. Disposal or recycling reporting shall be made either in tons or in cubic yards. If scales are available at disposal or recycling facility, report in tons; otherwise, report in cubic yards.
b. Indicate locations to which materials are delivered for disposal, recycling, accepted as daily cover, or taken for inert backfill.
c. The Summary Form must be accompanied by legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of re-use, recycling, or disposal.
d. Indicate the Project title, Work Order Number; name of the company completing the Summary Form and compiling backup documentation; the printed name, signature, and daytime phone number(s) of the person completing the form, the beginning and ending dates of the period covered on the Summary Form; and the date that the Summary Form is completed.

1.04 RECYCLING, RE-USE, AND SALVAGE REQUIREMENTS

A. Development and Implementation of Recycling Procedures: Based upon Contract Documents, the SUBCONTRACTOR'S Construction Waste Management Plan, estimated quantities of available materials, and availability of recycling facilities, SUBCONTRACTOR shall develop and implement procedures to re-use, salvage, and recycled materials to the greatest extent feasible. Procedures shall include source separated recycling, as well as mixed recycling efforts. Procedures shall include consideration of on-site recycling.

1. On-site or Off-site Recycling Source-Separated Materials: SUBCONTRACTOR shall develop and implement a program to include source separation of solid resources, to the greatest extent feasible, of the following types:

    a. Asphalt
    b. Concrete, concrete block, slump stone (decorative concrete block), and rocks
    c. Dirt
    d. Metal, ferrous and non-ferrous
    e. Wood
    f. Green materials (i.e. tree trimmings)
    g. Other materials, as appropriate, such as red clay brick and corrugated cardboard

    Off-site Recyclables shall be legally transported to a source separated or mixed debris-recycling facility. On-site Recycling program shall produce a quality product to meet the requirements identified in the Contract Documents. On-site recycling Plans shall also estimate the amount to be used in the Work and include a program for off-site recycling of any excess material that cannot be used in the Work. At no time shall the on-site recycling, stock piling of separated or to-be-separated materials cause or create any nuisance or health menace to the site, other public or private properties.

2. Mixed Debris Recycling: Develop and implement a program to transport loads of commingled construction and demolition materials that cannot be feasibly source-separated to a mixed recycling facility.
3. Salvageable Items: Perform a site pre-assessment, identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
4. Disposal Operations:

    a. Using a permitted waste hauler or its own trucking services, SUBCONTRACTOR shall legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility, to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
    b. Do not burn, bury or otherwise dispose of solid waste on the project Jobsite.

5. Hauling:

    a. SUBCONTRACTOR is responsible for arranging collection of materials, by a permitted waste hauler or using its own trucks, to facilities that can legally accept construction and demolition materials for purpose of re-use, recycling, or disposal.
    b. Prior to delivering materials, SUBCONTRACTOR shall familiarize itself with the Specifications for acceptance of construction and demolition materials at recycling facilities.

B. Participate in Re-Use Programs: Implement a re-use program to the greatest extent feasible. Alternatives include:

1. California Materials Exchange (CAL-MAX) Program sponsored by the California Integrated Waste Management Board. CAL-MAX is a free service provided by the California Integrated Waste Management Board, designed to help businesses find markets for materials that traditionally would be discarded. The premise of the CAL-MAX Program is that material discarded by one business may be a resource for another

business. To obtain a current Materials Listings Catalog, call CAL-MAX/California Integrated Waste Management Board at [(916) 255-2369 or (800) 553-2962.]

2. Habitat for Humanity: a non-profit housing organization that rehabilitates and builds housing for low-income families.
3. Other re-use organizations or activities.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 74 19

FORMAT FOR SUBCONTRACTOR'S CONSTRUCTION WASTE MANAGEMENT PLAN

Project Title and Address: **W.O. Number:**

SUBCONTRACTOR'S Name:

Street Address:

CITY, State, Zip:

Phone: **FAX:**

Date Submitted:

These are procedures to be used for re-using, salvaging, or recycling materials. Indicate the procedures (by number), types of materials, and estimated quantities that will be recycled or disposed in the sections below:

1. Hand-wrecking to recover salvageable materials
2. On-site concrete and asphalt crushing for use on-site
3. On-site concrete and asphalt crushing for use off-site
4. Source separation of materials and separately hauling to recyclers
5. Hauling mixed recyclables to a mixed debris recycling facility
6. Other (please describe):

RE-USE/SALVAGE/RECYCLING OF MATERIALS

Type of Material	No. of Procedure to be Used (as above)	Facility to be Used/Location	Estimated Quantities		
			Tons	Cubic Yards	Units
Example: Concrete	***4***	***ABC Recyclers***	***120***		
Asphalt					
Concrete					
Soils (clean)					
Wood/Green					
Scrap Metal					
Salvage Items Describe:					
Other Describe:					
Misc. Construction Debris					

FORMAT FOR SUBCONTRACTOR'S
CONSTRUCTION WASTE MANAGEMENT PLAN

DISPOSAL OF MATERIALS

Project Title and Address: **W.O. Number:**

Type of Materials	Facility to be Used/Location	Estimated Quantities		
		Tons	Cubic Yards	Units
Example: ***Misc. Const. Debris***	***XYZ Disposal***	***60***		
Asphalt				
Concrete				
Soils (clean)				
Wood/Green Materials				
Scrap Metal				
Other (i.e. Cardboard, Red Clay Brick) **Please describe:**				
Misc. Construction Debris				

SECTION 01 77 19 CONTRACT CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

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

B. This section includes administrative and procedural requirements for contract closeout, including but not limited to the following:

1. Inspection procedures.
2. Operation and maintenance manuals.
3. Warranties.
4. Instruction of Owner's personnel.

C. Related Sections include the following:

1. Divisions 2 through 33, for specific closeout and special cleaning requirements for products of those sections.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of substantial completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.
10. Complete final cleaning requirements, including touchup painting.

B. Inspection: Submit a written request for inspection for substantial completion via the CONSTRUCTION MANAGER. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, which must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
2. If a reinspection identifies work that remains uncompleted, the Contractor shall be responsible for the cost of additional inspections by the Architect. The Architect will submit a time and

material invoice to the Owner, who will deduct the amount from the balance due to the Contractor.

3. Results of completed inspection will form the basis of requirements for final completion.

1.03 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 section "Payment Procedures".
2. Submit certified copy of Architect's substantial completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Revise paragraph and subparagraph below to comply with office policy and project requirements.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
2. If a reinspection identifies work that remains uncompleted, the Contractor shall be responsible for the cost of additional inspections by the Architect. The Architect will submit a time and material invoice to the Owner, who will deduct the amount from the balance due to the Contractor.

1.04 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual specification sections and as follows:

1. Operation Data:

a. Emergency instructions and procedures.
b. System, subsystem, and equipment descriptions, including operating standards.
c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
d. Description of controls and sequence of operations.
e. Piping diagrams.

2. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.

h. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy duty, 3-ring, vinyl covered, loose leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," project name, and subject matter of contents.

1.05 WARRANTIES

A. Submittal Time: Submit written warranties to the Construction Manager for designated portions of the work where commencement of warranties, other than date of substantial completion, is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the project manual.

1. Bind warranties and bonds in heavy duty, 3-ring, vinyl covered, loose leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch (115 by 280 mm) paper.
2. Provide heavy paper dividers with plastic covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES", project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS – Not Used

PART 3 - EXECUTION

3.01 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.
2. Provide instruction at mutually agreed upon times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
3. Schedule training with Owner with at least 14 days advanced notice.

B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual specification sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:

1. System design and operational philosophy.
2. Review of documentation.
3. Operations, Adjustments and Troubleshooting.
4. Maintenance and Repairs.

END OF SECTION 01 77 19

SECTION 01 78 39 PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Maintain at project site one copy of:

1. Complete contract documents (prints and reproducibles) as noted below:

a. Specifications and addenda.
b. Reviewed shop drawings and samples.
c. Modifications: Change orders and other written amendments to the contract.
d. Field Test Records.

C. Store record documents in temporary field office, separate from documents used for construction. Replace soiled or illegible documents.

D. Provide files and racks for storage of documents.

E. Maintain documents in clean, dry, and legible condition.

F. Do not use record documents for construction purposes.

G. Make documents available at all times for inspection by Owner and Architect.

H. Drawings shall be same size and format as original construction documents.

1.02 MARKING DEVICES

A. Provide fine ballpoint colored pens for marking.

1.03 RECORDING

A. Label each document (on first sheet or page) “RECORD DRAWING” in 2 inch high printed letters.

B. Keep record documents current. Record in concise and neat manner and on a weekly basis all actual revisions to the work.

1. Do not permanently conceal any work until required information has been recorded.
2. Drawings. Legibly mark to record actual construction:

a. Measured depths of various elements of foundation in relation to main floor level or survey datum.
b. Measured horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
c. Measured locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the work. Identify ducts, dampers, valves, access doors and control equipment wiring.
d. Field changes of dimension and detail.

e. Changes made by change orders and other modifications, including all clarification drawings, instruction bulletins, and other construction correspondence.
f. Details not on original drawings.

C. Specifications and Addenda: Legibly mark and record at each product section description of actual products installed to include the following:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment.
2. Authorized product substitutions or alternates utilized.
3. Changes made by change orders and other modifications.
4. Other matters not originally specified.

D. Shop Drawings and Samples: Maintain as record documents; legibly annotate shop drawings and samples to record changes made after review.

E. Record Drawings:

1. The Contractor shall furnish a set of reproducible structural, mechanical, plumbing, electrical and landscape record drawings upon completion of construction, to the requirements noted above. These record drawings shall be in the same size and format as the original drawings.
2. Structural, mechanical, plumbing, and electrical information shall include circuiting, wiring sizes, equipment/member sizing, etc., drawn in a professional manner similar to that indicated on the construction drawings. The record drawings for each discipline shall represent a complete picture of that entire system, as constructed.

1.04 SUBMITTALS

A. Obtain Inspector's signed certification that record documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.

B. Submit Inspector's certified documents to Architect with claim for final application for payment. Fully complete record documents are a prerequisite to final payment.

C. At completion of project, deliver all record documents to Architect. Architect and consultants will review the completed record drawings, both prints and mylars, and return to the Contractor with required changes annotated.

1. Architect will transfer data from the record drawing prints to the Architect's office originals.

D. Accompany submittal with transmittal letter containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Number and title of each record document
5. Certification that each document, as submitted, is complete and accurate and signature of Contractor or his authorized representative.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 78 39

SECTION 01 81 00.01 SUSTAINABLE DESIGN

PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes general requirements and procedures for special environmental, sustainable, and "green" building practices related to energy conservation and efficiency, indoor air quality, and resource efficiency.
B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following catagories:

1. Sustainable Sites
2. Water Efficiency
3. Energy and Atmosphere
4. Material and Resources
5. Indoor Enviromental Quality

1.02 OBJECTIVES

A. To obtain acceptable Indoor Air Quality (IAQ) for the completed project and minimize the environmental impacts of the construction and operation, the Contractor during the construction phase of this project shall implement the following procedures singly or in combination:

1. Select products that minimize consumption of non-renewable resources, consume reduced amounts of energy and minimize amounts of pollution to produce, and employ recycled and/or recyclable materials. To help government purchasers incorporate environmental considerations into purchasing decisions, it is the intent of this project to conform with EPA's Five Guiding Principles on environmentally preferable purchasing. The five principles are:

    a. Include environmental considerations as part of the normal purchasing process.
    b. Emphasize pollution prevention early in the purchasing process.
    c. Examine multiple environmental attributes throughout a product's or service's life cycle.
    d. Compare relevant environmental impacts when selecting products and services.
    e. Collect and base purchasing decisions on accurate and meaningful information about environmental performance.

2. Control sources for potential IAQ pollutants by controlled selection of materials and processes used in project construction in order to attain superior IAQ.
3. Products and processes that achieve the above objectives to the extent currently possible and practical have been selected and included in these Construction Documents. The Contractor is responsible to maintain and support these objectives in developing means and methods for performing the work of this Contract and in proposing product substitutions and/or changes to specified processes.

1.03 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.
B. Related Sections include the following:

1. Divisions 2 through 48 Sections for Sustainable Design Requirements specific to the Work of each of those Sections.
2. 01 74 19 Construction Waste Management.

1.04 DEFINITIONS

A. Agrifiber Products: Composite panel products derived from agricultural fiber.
B. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.
C. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.
D. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that is was obtained from forests certified by a specified certification program.
E. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.
F. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Section 01 74 19.
G. LEED: The Leadership in Energy & Environmental Design green building rating systems developed and adopted by the U.S. Green Building Council (USGBC). The systems certify levels of environmental achievement based on a point and credit scoring system.
H. LEED NC: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for new construction and major renovations of buildings.
I. LEED EB: The Leadership in Energy & Environmental Design green building rating system developed and adopted by the USGBC for operating and maintaining existing buildings.
J. Light Pollution: Light that extends beyond its source such that the additional light is wasted in an unwanted area or in an area where it inhibits view of the night sky.
K. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock.
L. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
M. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 “Guidelines for the Use of Environmental Marketing Claims”: www.ftc.gov/bcp/grnrule/guides980427.
N. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 250 miles (400 km) from the Project site.
O. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured.
P. Sealant: Any material that fills and seals gaps between other materials.
Q. Type 1 Finishes: Materials and finishes which have a potential for short-term levels of off gassing from chemicals inherent in their manufacturing process, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing.
R. Type 2 Finishes: “Fuzzy” materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals offgassed by Type 1 finishes or may be adversely affected by particulates. These materials become “sinks” for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth.

S. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

1.05 SUBMITTALS

A. General: Additional Sustainable Design submittal requirements are included in other sections of the Specifications.
B. Sustainable Design Submittals:

1. Alternative Transportation: Provide manufacturer's cut sheets for all bike racks installed on site, including the total number of bicycle storage slots provided. Also, provide manufacturer's cut sheets for any alternative-fuel refueling stations installed on site, including fueling capacity information for an 8-hour period.
2. Heat Island Effect:

    a. Site Paving: Provide manufacturer's cut sheets for all impervious paving materials, indicating the Solar Reflectance Index (SRI) of the material. Also, provide cut sheets for all pervious paving materials including color addatives for concrete.
    b. Roofing Materials: Submittals for roofing materials must include manufacturer's cut sheets or product data indicating the Solar Reflectance Index (SRI) of the material.

3. Exterior Lighting Fixtures: Submittals must include cut sheets with manufacturer's data on initial fixture lumens above 90° from nadir for all exterior lighting fixtures, and, for parking lot lighting, verification that the fixtures are classified by the IESNA as "full cutoff" (FCO); OR provide documentation that exterior luminaires are IDA-Approved as Dark-Sky Friendly by the International Dark Sky Association (IDA) Fixture Seal of Approval Program.
4. Irrigation Systems: Provide manufacturer's cut sheets for all permanent landscape irrigation system components.
5. Water Conserving Fixtures: Submittals must include manufacturer's cut sheets for all water-consuming plumbing fixtures and fittings (toilets, urinals, faucets, showerheads, etc.) highlighting maximum flow rates and/or flush rates. Include cut sheets for any automatic faucet-control devices.
6. Process Water Use: Provide manufacturer's cut sheets for all water-consuming commercial equipment (clothes washers, dishwashers, ice machines, etc.), highlighting water consumption performance. Include manufacturer's cut sheets or product data for any cooling towers, highlighting water consumption estimates, water use reduction measures, and corrosion inhibitors.
7. Elimination of CFCs and HCFCs: Provide manufacturer's cut sheets for all cooling equipment with manufacturer's product data, highlighting refrigerants; provide manufacturer's cut sheets for all fire-suppression equipment, highlighting fire-suppression agents; provide manufacturer's cut-sheets for all polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation, highlighting the blowing agent(s).
8. Appliances and Equipment: Provide copies of manufacturer's product data for all Energy Star eligible equipment and appliances that are included in contract as provided by Contractor; including office equipment, computers and printers, electronics, and commercial food service equipment (excluding HVAC and lighting components), verifying compliance with EPA's Energy Star program.
9. On-Site Renewable Energy Systems: Provide cut sheets and manufacturer's product data for all on-site renewable energy generating components and equipment, including documentation of output capacity.
10. Measurement and Verification Systems: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering and trending capability components.

11. Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.
12. Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation.

    a. Cost of each material or product, excluding cost of labor and equipment for installation.
    b. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product.
    c. An electronic spreadsheet that tabulates the Project's total materials cost and combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value) expressed as a percentage of total materials cost. This spreadsheet shall be submitted prior to Contractor's final Certificate and Application for Payment. It should indicate line items for each material; including cost, pre-consumer recycled content, post-consumer recycled content, and combined recycled content value.

13. Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation (excluding MEP systems equipment and components) must include the following documentation:

    a. Cost of each material or product, excluding cost of labor and equipment for installation.
    b. Location of product manufacture and distance from point of manufacture to the Project Site.
    c. Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the Project Site.
    d. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material.
    e. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of extraction, harvest, or recovery for each regional material or product, including, at a minimum, gravel and fill, planting materials, concrete, masonry, and GWB.
    f. An electronic spreadsheet that tabulates the Project's total materials cost and regional materials value, expressed as a percentage of total materials cost. This spreadsheet shall be submitted prior to the Contractor's final Certificate and Application for Payment. It should indicate line items for each material; including cost, location of manufacture, distance from manufacturing plant to the Project Site, location of raw material extraction, and distance from extraction point to the Project Site.

14. Biobased Products:

    a. Rapidly Renewable Products: Submittals must include written documentation from the manufacturer declaring that rapidly renewable materials are made from plants harvested within a ten-year or shorter cycle and must indicate the percentage (by weight) of these rapidly renewable components contained in the candidate products, along with the costs of each of these materials, excluding labor and delivery costs.
    b. Certified Wood: Submittals for all wood-based materials must include a statement indicating the cost of each product containing FSC Certified wood, exclusive of labor and delivery costs certificates of chain-of-custody from manufacturers certifying that specified certified wood products were made from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2 "Principles and Criteria."

15. Outdoor Air Delivery Monitoring: Provide manufacturer's cut sheets highlighting the installed carbon dioxide monitoring system components and sequence of controls shop drawing documentation, including CO2 differential set-points and alarm capabilities.
16. Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data indicating VOC content.

    a. Provide manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.

17. Interior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data indicating VOC content.
18. Exterior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on ambient air quality, must include manufacturer's MSDSs or other manufacturer's Product Data indicating VOC content.
19. Floorcoverings:

    a. Carpet Systems: Submittals for all carpet must include manufacturer's product data verifying that all carpet systems meet or exceed the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
    b. Resilient Flooring: Submittals for all resilient floorcovering must include manufacturer's product data verifying certification under either the Greenguard for Children & Schools or FloorScore indoor emissions testing program.
    c. Engineered Wood Flooring and Bamboo Flooring: Submittals for all engineered wood flooring and bamboo flooring must include manufacturer's product data verifying certification under either the Greenguard or FloorScore indoor emissions testing program.

20. Composite Wood and Agrifiber Binders: Submittals for all composite wood and agrifiber products (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) must include manufacturer's product data verifying that these products contain no urea-formaldehyde resins.
21. Systems Furniture and Seating: Provide manufacturer's product data verifying that all systems furniture and seating products, that are included in contract as provided by Contractor, meet the requirements of one of the following:

    a. Greenguard certification.
    b. SCS Indoor Advantage certification.
    c. SCS Indoor Advantage Gold certification.
    d. BIFMA Standard X7.1-2005, as tested to BIFMA method M7.1¬2005 and as verified by an independent laboratory.
    e. Calculated indoor air concentration limits for furniture systems and seating determined by the U.S. EPA's Environmental Technology Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol as conducted in an independent air quality testing laboratory

22. Entryway Systems: Provide manufacturer's cut sheets for all walk-off systems installed to capture particulates, including permanently installed grates, grilles, slotted systems, direct glue-down walk-off mats, and non-permanent roll-out mats.
23. Air Filtration: Provide manufacturer's cut sheets and product data indicating the following:

    a. Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs).

b. Minimum Efficiency Reporting Value (MERV) for filtration media installed at return air grilles during construction if permanently installed AHUs are used during construction.

24. Mercury in Lighting: Provide manufacturer's cut sheets or product data for all fluorescent or HID lamps indicating mercury content.
25. Lighting Controls: Provide manufacturer's cut sheets and shop drawing documentation indicating all lighting controls systems components.
26. Thermal Comfort Controls: Provide manufacturer's cut sheets and shop drawing documentation indicating all thermal comfort-control systems components.
27. Blended Cement: It is the intent of this specification to reduce CO2 emissions and other environmentally detrimental effects resulting from the production of portland cement by requiring that all concrete mixes, in aggregate, utilize blended cement mixes to displace 40% of the portland cement typically included in conventional construction. Provide the following submittals:

    a. Copies of concrete design mixes for all installed concrete.
    b. Copies of typical regional baseline concrete design mixes for all compressive strengths used on the Project.
    c. Quantities in cubic yards of each installed concrete mix.

28. Gypsum Wall Board: Provide manufacturer's cut sheets or product data verifying that all gypsum wallboard products are moisture and mold-resistant.
29. Fiberglass Insulation: Provide manufacturer's cut sheets or product data verifying that fiberglass batt insulation contains no urea-formaldehyde.
30. Duct Acoustical Insulation: Provide manufacturer's cut sheets or product data verifying that mechanical sound insulation materials in air distribution ducts consists of an impervious, non-porous coatings that prevent dust from accumulating in the insulating materials.

C. Project Materials Cost Data: Provide a spreadsheet in an electronic file indicating the total cost for the Project and the total cost of building materials used for the Project, as follows:

1. Not more than 60 days after the Preconstruction Meeting, the Prime Contractor shall provide to the Architect a preliminary schedule of materials costs for all materials used for the Project organized by specification section. Exclude labor costs and all mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:

    a. Identify each reused or salvaged material, its cost, and its replacement value.
    b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
    c. Identify each regional material, its cost, its manufacturing location, the distance of this location from the Project site, the source location for each raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.
    d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
    e. Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of FSC Certified wood as a percentage of total wood-based materials costs.

2. Provide final versions of the above spreadsheets to the Architect not more than 14 days after Substantial Completion.

D. Construction Waste Management: see Section 01 74 19 “Construction Waste Management” for submittal requirements and provide the following:

1. Submit weight tickets and logs prior to the Contractor’s final Certificate and Application for Payment..

E. Construction Indoor Air Quality (IAQ) Management: see attached Construction IAQ Management Plan for submittal requirements and provide the following:

1. Not more than 14 days after Substantial Completion provide the following:

a. Manufacturer’s cut sheets and product data indicating the Minimum Efficiency Reporting Value (MERV) for all filtration media to be installed, including at return air grilles, during construction if permanently installed AHUs are used during construction.
b. Documentation verifying required replacement of air filtration media and manufacturer’s cut sheets and product data indicating MERV for filtration media in all air handling units (AHUs) after the completion of construction and prior to occupancy if permanently installed AHUs are used during construction.

F. Commissioning: by Owner under separate contract.

1.06 QUALITY ASSURANCE

A. General: Perform the work of this Section as a supplement and in accordance with applicable requirements of Division 1 “Contractor Quality Control Program.”
B. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner, Architect, and all Subcontractors to discuss the Construction Waste Management Plan, Construction Indoor Air Quality (IAQ) Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project’s Sustainable Design Requirements and coordination of the Contractor’s management of these requirements with the Contracting Officer and the Construction Quality Manager.
C. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

PART 2 - PRODUCTS

2.01 PRODUCT ENVIRONMENTAL REQUIREMENTS

A. Site Clearing: Topsoil shall be provided by the Contractor from on-site material which has been stockpiled for reuse. Off-site borrow should only be used when on-site sources are exhausted. Chip and/or compost on site all vegetated material identified for removal.
B. Do not burn rubbish, organic matter, etc. or any material on the site. Dispose of legally in accordance with Specifications Sections 01 74 19.
C. Site Paving: Site impervious paving must be light colored, with a Solar Reflectance Index (SRI) of at least 29.

1. Hardscape with SRI lower then 29, located per drawings, to be 50% max of total hardscape area.

D. Roofing Materials: All roofing systems, other than vegetated roof systems, must comply with the following requirements:

1. Low-Sloped roofing less than or equal to 2:12 slope must have an SRI of at least 78.
2. Steep-Sloped roofing greater than 2:12 slope must have an SRI of at least 29.

E. Exterior Lighting Fixtures:

1. 98% of all exterior luminaires must emit 0% of the total initial designed fixture lumens at an angle above 90° from nadir and/or meet the requirements of the Dark Sky certification program.
2. Exterior lighting cannot exceed 80% of the lighting power densities defined by ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.
3. No lighting of building facades or landscape features is permitted.

F. Herbicides and Pest Control: Herbicides shall not be permitted, and pest control measures shall utilize EPA-registered biopesticides only.

G. Irrigation Systems: Any permanent landscape irrigation systems must be supplied entirely by non-potable water and be comprised of below-grade drip emitters. Controler shall have moisture sensors.

H. Water-Conserving Fixtures: Plumbing fixtures and fittings shall use in aggregate at least 40% less water than the water use baseline calculated for the building after meeting the Energy Policy Act of 1992 fixture performance requirements. Flow and flush rates shall not exceed the following:

1. Toilets: no more than 1.3 gallons per flush, otherwise be dual flush 1.6/0.8 gallons per flush, and have documented bowl evacuation capability per MaP testing of at least 400 grams.
2. Urinals: no more than 0.125 gallons per flush or use.
3. Lavatory Faucets: 0.5 gpm with automatic faucet controls.
4. Kitchen Sink Lavatories: 2.2 gpm.
5. Showerheads: no more than 1.5 gpm.

I. Process Water Use: Employ strategies that in aggregate result in 20% less water use than the process water use baseline for the building after meeting the commercial equipment and HVAC performance requirements as listed in the Table below. For equipment not addressed by EPACT 2005 or the list below, additional equipment performance requirements may be proposed provided documentation supporting the proposed benchmark or industry standard is submitted

1. Clothes Washer: 7.5 gallons/cubic foot/cycle.
2. Dishwasher with Racks: 1.0 gallons/rack.
3. Ice Machine: 20 gallons/100 pounds ice for machines making over 175 pounds of ice per day; 30 gallons/100 pounds ice for machines making less than 175 ice per day. Avoid water-cooled machines.
4. Food Steamer: 2 gallons/hour. Use only boilerless steamers.
5. Pre-Rinse Spray Valves: 1.4 gallons/minute.
6. Kitchen Pot-Washing Sinks: 2.2 gallons/minute.
7. Cooling Towers: 2.3 gallons/ton-hr. water loss.

    a. Use atrazine-based corrosion inhibitors and reducing bleed-off by increasing cycles of concentration (at least 5, or with water quality problems limit to 4).
    b. Install meters on make-up water and discharge blow-down.
    c. Install conductivity controller for blow-down.
    d. Provide overflow alarm connected to central building controls.
    e. Install drift eliminators.
    f. Provide makeup water from sources other than potable water supply.

J. Elimination of CFCs AND HCFCs:

1. Ozone Protection: Base building cooling equipment shall contain no refrigerants other than the following: HCFC-123, HFC-134a, HFC¬245fa, HFC-407c, or HFC 410a.
2. Fire suppression systems may not contain ozone-depleting substances.
3. Extruded polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation shall not be manufactured with hydrochlorofluorocarbon (HCFC) blowing agents.

K. Appliances and Equipment: All Energy Star eligible equipment and appliances, including office equipment, computers and printers, electronics, and commercial food service equipment (excluding HVAC and lighting components), shall be qualified by EPA's Energy Star program.
L. HVAC Distribution Efficiency:

1. All duct systems shall be constructed of galvanized sheet metal, aluminum, or stainless steel as deemed appropriate based on the application requirements. No fiberglass duct board shall be permitted.
2. All medium- and high-pressure ductwork systems shall be pressure-tested in accordance with the current SMACNA standards.
3. All ductwork shall be externally insulated. No interior duct liner shall be permitted.
4. Where possible, all air terminal connections shall be hard-connected with sheet metal ductwork. If flexible ductwork is used, no flexible duct extension shall be more than six feet in length.
5. All HVAC equipment shall be isolated from the ductwork system with flexible duct connectors to minimize the transmittance of vibration.
6. All supply and return air branch ducts shall include the appropriate style of volume damper. Air terminal devices such as grilles, registers, and diffusers shall be balanced at duct branch dampers, not at terminal face.

M. Measurement and Verification: Install controls and monitoring devices as required by division 15 and 16 in order to comply with International Performance Measurement & Verification Protocol (IPMVP), Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003, Option D.
N. Salvaged or Reused materials: There shall be no substitutions for specified salvaged and reused materials and products.
O. Recycled Content of Materials.

1. Provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of 30% of the cost of materials used for the Project, exclusive of all MEP equipment, labor, and delivery costs. The Contractor shall make all attempts to maximize the procurement of materials with recycled content.

    a. The post-consumer recycled content value of a material shall be determined by dividing the weight of post-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
    b. The pre-consumer recycled content value of a material shall be determined by dividing the weight of pre-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
    c. Do not include mechanical and electrical components in the calculations.
    d. Do not include labor and delivery costs in the calculations.
    e. Recycled content of materials shall be defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16 CFR 260.7 (e).
    f. Utilize all on-site existing paving materials that are scheduled for demolition as granulated fill, and include the cost of this material had it been purchased in the calculations for recycled content value.

g. At a minimum, where possible the following materials shall have the minimum recycled content indicated:

Category Minimum	Recycled Content
Compost/mulch	100% post-consumer
Asphaltic Concrete Paving	25% post-consumer
Cast-in-Place Concrete	6% pre-consumer
CMU: Gray Block	20% pre-consumer
Steel Reinforcing Bars	90% combined
Structural Steel Shapes	90% combined
Steel Joists	75% combined
Steel Deck	75% combined
Steel Fabrications	60% combined
Steel Studs	30% combined
Steel Roofing	30% post-consumer
Aluminum Fabrications	35% combined
Rigid Insulation	20% pre-consumer
Batt insulation	30% combined

P. Regional Materials: Provide a minimum of 20 percent of building materials (by cost) that are manufactured and extracted/harvested within a 500 mile radius of the project site, exclusive of labor and delivery costs. The Contractor shall make all attempts to maximize the procurement of materials within this specified 500 mile radius.

Q. Biobased Products:

1. Use only biobased concrete form-release products.
2. Solid Wood Products: All new solid-wood-based materials will be certified as “FSC 100%” by an independent third party in accordance with FSC Forest Stewardship Council “Principles and Criteria” and will have received Chain-of-Custody Certification as certified by an accredited certification group such as Smartwood or Scientific Certification Systems (SCS).
3. Other Wood Products: All other new wood-based materials will be certified by an independent third party in accordance with any of the following standards:

    a. FSC: Forest Stewardship Council “Principles and Criteria” and has received Chain-of-Custody Certification as certified by an accredited certification group such as Smartwood or Scientific Certification Systems (SCS).

4. Preservative-treated lumber with chromated copper arsenate (CCA) treatments is not permitted, and lumber with copper-based treatments (such as ACQ) is permitted only for ground-contact applications.
5. Wood-based materials include but are not limited to the following materials (when made from wood), engineered wood products, or wood-based panel products:

    a. Rough carpentry.
    b. Miscellaneous carpentry.
    c. Heavy timber construction.
    d. Wood decking.
    e. Particleboard.
    f. Plywood.
    g. Metal-plate-connected wood trusses.
    h. Structural glued-laminated timber.
    i. Finish carpentry.
    j. Architectural woodwork.

k. Wood paneling.
l. Wood veneer wall covering.
m. Wood flooring.
n. Wood lockers.
o. Wood cabinets.
p. Wood doors.
q. Non-rented temporary construction, including bracing, concrete formwork, pedestrian barriers, and temporary protection.
r.

R. Brominated Flame Retardants: For new furniture do not utilize cushioned seating with brominated flame retardants.

S. Outdoor Air Delivery Monitoring:

1. All spaces with an occupant density greater than 1 person per 40 square feet must include at least one CO2 monitor located between 3 feet and 6 feet above the finished floor.
2. All spaces with occupant density less than 1 person per 40 square feet must include a direct outdoor airflow monitor, capable of measuring the minimum outdoor airflow rate within 15% accuracy.
3. Monitoring equipment must be configured to generate a building automation system alarm and a visual or audible alert when CO2 concentrations vary by 10% or more from set point.

T. Adhesives and Sealants:

1. All adhesives and sealants used inside the building's thermal envelope must be third-party certified under one of the following programs:

a. Indoor Advantage Plus from Scientific Certification Systems, Inc.
b. Greenguard Children and Schools from Greenguard Environmental Institute.
c. Collaborative for High Performance Schools.

2. All adhesives and sealants must comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24):

a. Concrete Curing Compound: 60 g/L.
b. Concrete Sealer: 10 g/L.
c. Concrete Form Release Agents: 0g/L.
d. Garage Deck Sealer: 50g/L.
e. Wood Glues: 20 g/L.
f. Millwork and Casework Adhesives: 20g/L.
g. Metal to Metal Adhesives: 30 g/L.
h. Adhesives for Porous Materials (Except Wood): 50 g/L.
i. Subfloor Adhesives: 50 g/L.
j. Plastic Foam Adhesives: 50 g/L.
k. Carpet Adhesives: 50 g/L.
l. Carpet Pad Adhesives: 50 g/L.
m. Carpet Seam Sealer: 50g/L.
n. VCT and Sheet Vinyl Adhesives: 50 g/L.
o. Cove Base Adhesives: 50 g/L.
p. Rubber Floor Adhesives: 60 g/L.
q. Wood Flooring Adhesives: 100 g/L.
r. Ceramic Tile Adhesives: 65 g/L.
s. Gypsum Board and Panel Adhesives: 50 g/L.
t. Gypsum Drywall Joint Compound: 20 g/L.

u. Portland Cement Plaster: 20 g/L.
v. Multipurpose Construction Adhesives: 70 g/L.
w. Cast Resin Countertop Silicone Sealant: 20g/L.
x. Plastic Laminate Adhesives: 20 g/L.
y. General Contact Adhesive: 80 g/L.
z. Structural Glazing Adhesives and Compounds: 100 g/L.
aa. Silicone Sealant: 50 g/L.
bb. Pipe Thread Sealant: 50 g/L.
cc. Duct Sealant: 10 g/L.
dd. Plastic Cement Welding Compounds: 250 g/L.
ee. ABS Welding Compounds: 400 g/L.
ff. CPVC Welding Compounds: 270 g/L.
gg. PVC Welding Compounds: 150 g/L.
hh. Adhesive Primer for Plastic: 250 g/L.
ii. Architectural Sealants: 250 g/L.
jj. Single-Ply Roofing Membrane Adhesives: 250 g/L.

3. Interior sealants shall not contain: mercury, butyl rubber, neoprene, SBR (styrene butadiene rubber), or nitrile.
4. Sealants and glazing compounds formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure) fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components shall not be used.
5. Adhesives used to apply laminates, whether shop-applied or field-applied, shall contain no urea-formaldehyde.

U. Paints and Coatings:

1. Interior Paints and Coatings: For interior field-applied applications, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the chemical restrictions (Restricted Components listed below) of Green Seal Standard GS-11, Paints, First Edition, May 20, 1993; Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997; and South Coast Air Quality Management District Rule 1113, Architectural Coatings, rules in effect on January 1, 2004, as follows:

a. Flat Paints and Coatings: Not more than 10 grams of VOC per liter of coating less water and exempt compounds, including pigments.
b. Non-Flat Paints and Coatings Except High Gloss: Not more than 50 grams of VOC per liter of coating less water and exempt compounds, including pigments.
c. High Gloss Paints and Coatings: Not more than 150 grams of VOC per liter of coating less water and exempt compounds, including pigments. High Gloss Coatings are coatings that register a gloss of 70 or above on a 60-degree meter according to ASTM Test Method D 523 as specified in paragraph (e)(6).
d. Water-Based Polychromatic Finish Coatings: Not more than 150 g/L (150 g/L for primer and flat polychromatic paint).
e. Anti-Corrosive Coatings: Not more than 100 grams of VOC per liter of coating less water and exempt compounds.
f. Sanding Sealers: Not more than 50 grams of VOC per liter of coating less water and exempt compounds.
g. Waterproofing Sealers: Not more than 100 grams of VOC per liter of coating less water and exempt compounds.
h. Concrete Slab Sealers: Not more than 10 grams of VOC per liter of coating less water and exempt compounds.

i. Polyurethanes: Not more than 100 grams of VOC per liter of coating less water and exempt compounds.
j. Stains: Not more than 250 grams of VOC per liter of coating less water and exempt compounds.

2. Interior field applied varnishes and lacquers are not permitted.
3. Interior paints shall not contain antimicrobial additives (such as fungicides and biocides).
4. Exterior Paints and Coatings: For exterior applications, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the chemical restrictions (Restricted Components listed below) of Green Seal's Standard GS-11:

a. Flat Paints and Coatings: Not more than 50 grams of VOC per liter of coating less water and exempt compounds, including pigments.
b. Non-Flat Paints and Coatings: Not more than 150 grams of VOC per liter of coating less water and exempt compounds, including pigments.
c. High Gloss Paints and Coatings: Not more than 150 grams of VOC per liter of coating less water and exempt compounds, including pigments. High Gloss Coatings are coatings that register a gloss of 70 or above on a 60-degree meter according to ASTM Test Method D 523 as specified in paragraph (e)(6).
d. Anti-Corrosive Coatings: Not more than 100 grams of VOC per liter of coating less water and exempt compounds.
e. Varnishes and Sanding Sealers: Not more than 275 grams of VOC per liter of coating less water and exempt compounds.
f. Stains: Not more than 250 grams of VOC per liter of coating less water and exempt compounds.

5. Aromatic Compounds: Paints and coatings shall not contain more than 1% (by weight) total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
6. Restricted Components: Paints and coatings shall not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Analine dyes.
d. Antimony.
e. Benzene.
f. Butyl benzyl phthalate.
g. Cadmium.
h. Di (2-ethylhexyl) phthalate.
i. Di-n-butyl phthalate.
j. Di-n-octyl phthalate.
k. 1,2-dichlorobenzene.
l. Diethyl phthalate.
m. Dimethyl phthalate.
n. Ethylbenzene.
o. Formaldehyde.
p. Hexavalent chromium.
q. Isophorone.
r. Lead.
s. Mercury.
t. Methyl ethyl ketone.
u. Methyl isobutyl ketone.
v. Methylene chloride.
w. Naphthalene.

x. Toluene (methylbenzene).
y. 1,1,1-trichloroethane.
z. Vinyl chloride
aa. Xylene.

7. Coordinate with paint manufacturers for implementing a “take-back program” for all unused paint. Set aside scrap and unused paint to be returned to the manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

V. Floorcoverings:

1. Carpet shall achieve an Environmental Performance Score of 0.0200 as determined through an assessment in the Building for Environmental and Economic Sustainability (BEES) software model, either Version 3.0 or 4.0. The parameters of the model must be set in the following way for this assessment:

a. “Environmental vs. Economics Performance Weights” shall be set at 100% Environmental Performance.
b. “Environmental Impact Category Weights” shall be set using the EPA Scientific Advisory Board weights.
c. “Transportation from “Manufacture to Use” shall be set at the lowest distance possible.
d. In the “Nylon Carpet Parameters” dialogue box, set “Carpet Type” as “Carpet Tile” and “Installation Glue” as “Low VOC Glue.”

2. All carpet systems, including adhesives, must meet or exceed the Carpet and Rug Institute Green Label Plus Indoor Air Quality Test Program.
3. Carpet cushion shall not contain brominated flame retardants.
4. Carpet tile applications shall be self-adhering.
5. All resilient floorcovering must be certified under the Greenguard or FloorScore indoor emissions testing programs.
6. Engineered wood flooring and bamboo flooring must be certified under the Greenguard or FloorScore indoor emissions testing programs.

W. Composite Wood and Agrifiber Binders: All composite wood, agrifiber products, and wood doors shall contain no added urea-formaldehyde resins.
X. Systems Furniture and Seating:

1. All systems furniture and seating, when included in contract, shall meet the requirements of one of the following:

a. Greenguard certification.
b. SCS Indoor Advantage certification.
c. SCS Indoor Advantage Gold certification.
d. BIFMA Standard X7.1-2005, as tested to BIFMA method M7.1¬2005 and as verified by an independent laboratory.
e. Calculated indoor air concentration limits for furniture systems and seating determined by the U.S. EPA’s Environmental Technology Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol as conducted in an independent air quality testing laboratory.

2. Systems furniture and seating made with coatings or sealants that contain any of the following solvents are not permitted: naptha, benzene, toluene, xylene, hexavalent chromium.

Y. Entryway Systems: Walk-off systems to capture particulates shall be installed at least 10 feet long in the direction of entry travel at all entryways directly connected to the outdoors that are used as regular entry points by building users. Acceptable entryway systems include:

1. Permanently installed grates, grilles, or slotted systems that allow for cleaning beneath them.
2. Permanently installed direct glue-down walk-off mats.
3. Non-permanent roll-out mats, but only if a service organization is contracted for maintenance on a weekly basis.

Z. Air Filtration: Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better in all air handling units for processing both return and outside air that is delivered to the air supply system. Replace all filtration media after the completion of construction and prior to occupancy.

AA. Mercury in Lighting:

1. Provide only low-mercury fluorescent or HID lamps with mercury content limited to the following:

a. T-5 and T-8 fluorescent lamps: 80 picograms per lumen hour.

2. Measurement Standards: Lumens to be measured according to IES LM9 for linear fluorescent lamps, IES LM66 for compact fluorescent lamps, and LM51 for HID lamps; mercury content to be measured according to U.S. EPA “Total Mercury by Cold Vapor Absorption Method” 7471A.

BB. Lighting Controls: Install and calibrate controls as specified by Division 26 - Electrical in order to comply with LEED IAQ lighting controllability requirements.

CC. Thermal Comfort: Install and calibrate controls as specified in Division 23 - Heating, Ventilation, and Air-Conditioning.

DD. Blended Cement Concrete:

1. Cementitious Materials: Provide composite mix of portland cement and ground granulated blast-furnace slag or fly ash or blended hydraulic cement and limit percentage (by weight) of portland cement (ASTM C150) in aggregate (total weighted average of cementitious material weight for all mixes and pours) to 40% less than standard regional concrete mix designs.
2. Limit percentage (by weight) of standard portland cement (C-150), to the following maximum percentages of the cementitious portion of the mix while maintaining the above-40% required reduction in portland cement across the Project’s total quantity of concrete:

a. Footings: 50%.
b. Slab on Grade: 60%, except for cold-weather pours.
c. Insulated Concrete Form Concrete: 40%.
d. Elevated Slabs: 60%, except for cold-weather pours.
e. Exterior Concrete: 75%.

EE. Gypsum Wallboard: Standard paper-faced gypsum wallboard can be used only in dry climates, where wetting during or after construction is not anticipated. In humid climates, where dampness and condensation are a concern, use only non-paper-faced gypsum wallboard. In wet locations a cementitious wallboard, made of portland or magnesium oxide cement, must be used.

FF. Fiberglass Insulation: Fiberglass batt insulation shall contain no formaldehyde-based binders or shall be third-party certified for conformance with Greenguard Children & Schools or Indoor Advantage Gold.

GG. Duct Acoustical Insulation: Mechanical sound insulation materials within the duct shall consist of an impervious, non-porous coating that prevents dust from accumulating in the insulating materials.

HH. Green Housekeeping:

1. Utilize cleaning products that meet the requirements of the Green Seal GS-37 standard or comply with the requirements and maximum VOC limits of Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Article 2, Regulation for Reducing VOC Emissions from Consumer Products (September 2001).
2. Utilize janitorial paper products and trash bags that meet the minimum percentages of post-consumer recycled content and recovered content requirements of EPA's Comprehensive Procurement Guidelines.

PART 3 - EXECUTION

3.01 CONSTRUCTION WASTE MANAGEMENT

A. Construction Waste Management Plan (CWMP): as defined in Section 01 74 19 "Construction Waste Management," quantifying material diversion by weight in order to recycle, reuse, and/or salvage at least 75% (by weight) of construction, demolition, and land-clearing waste.
B. Clean materials which are contaminated prior to placing in collection containers. Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
C. Utilize any on-site existing paving materials that are scheduled for demolition as granulated fill or subbase material, and include the weight of this material in the calculations for material diverted from landfill disposal.
D. Arrange for materials collection by or materials delivery to the appropriate recycling or reuse facility.
E. Tax credits and other savings obtained or revenue generated for recycled or reused materials accrue to the Contractor. Discuss CWMP procedures and measures as an agenda item at all regular job meetings conducted during the course of work at the site, and record progress in meeting minutes.
F. Discuss CWMP procedures and measures as an agenda item at all regular job meetings conducted during the course of work at the site, and record progress in meeting minutes.
G. Submit progress reports with Applications for Payment in accordance with Section 01 74 19, documenting the status of the CWMP and current diversion percentage rates.

3.02 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

A. Construction IAQ Management Plan (CIAQMP): to prevent indoor air quality problems resulting from construction activities, see attached CIAQMP and at a minimum including the following:

1. Construction activities must meet or exceed the minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995.
2. During construction, protect all absorptive materials stored on-site or installed from moisture damage as described in the Construction IAQ Management Plan (CIAQMP) defined above. Specifically:

    a. Exercise special care at all times in the storage of materials to prevent exposure to moisture.
    b. Avoid installation of gypsum wallboard and other porous materials until the building is weather-tight.
    c. All standing water which accumulates on interior floors shall be removed on the day that it is observed.
    d. Any drywall that has retained more than 20% moisture after 48 hours following exposure to moisture, or that has evidence of mold, must be disposed of in accordance with Specification Section 01 74 19 "Construction Waste Management."

e. The contractor shall identify and remove all porous building materials that become wet or damaged by moisture within 7 calendar days of such exposure.

3. During construction and HVAC system installation, provide the Architect with photographs of IAQ management measures (such as protection of ducts and on-site or installed absorptive materials), including photographs on different occasions depicting implemented SMACNA approaches.
4. Sequence installation of finishes to minimize cross-contamination. Special construction scheduling involves defined and controlled sequencing of finishes applications to ensure dissipation of emissions from finishes that off-gas significant quantities of deleterious material during curing (“Type 1 Finishes”), to separate these effects from the installation of adsorptive materials (“Type 2 Finishes”) that may act as a "sink" for storage and subsequent release of these unwanted substances into building spaces and mechanical systems after project occupancy.

    a. Identify finish materials by type. Type 1 materials include, but are not limited to the following:

        i. Composite wood products, specifically including particleboard from which millwork, wood paneling, doors or furniture may be fabricated.
        ii. Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
        iii. Wood preservatives, finishes, and paint.
        iv. Control and/or expansion joint fillers.
        v. All hard finishes requiring adhesive installation.
        vi. Gypsum board and associated finish processes.

    b. Type 2 finishes include, but are not limited to the following:

        i. Carpet and padding.
        ii. Fabric wallcovering.
        iii. Insulation exposed to the airstream.
        iv. Acoustic ceiling materials.
        v. Fabric covered acoustic wall panels.
        vi. Upholstered furnishings.

    c. Materials that can be categorized as both Type 1 and Type 2 materials shall be considered to be Type 1 materials.
    d. Provide a schedule of construction showing compliance with requirements of this section. Show sequence of finishes applications and allowances for curing times. Within each air zone (defined as a part of any floor area served by a single air handling unit) identify finishes, indicating their type classifications.
    e. As part of the Preconstruction Meeting, discuss the sequence of installations required under this section. The purpose of this agenda item is to assure understanding of the importance of sequencing of finishes to the overall Indoor Air Quality of the facility and to secure preliminary approval of the Contracting Officer for scheduling and installation requirements for on-site work.

B. Air Filtration:

1. Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better in all air handling units for processing both return and outside air that is delivered to the air supply system; replace all filtration media after the completion of construction and prior to occupancy.

2. Install air filtration media that provides a Minimum Efficiency Reporting Value (MERV) of 8 or better for filtration media installed at return air grilles during construction if permanently installed AHUs are used during construction. Inspect weekly and replace as required.

C. Discuss CIAQMP procedures and measures as an agenda item at all regular job meetings conducted during the course of work at the site, and record progress in meeting minutes.

3.03 COMMISSIONING

A. Commissioning: All building energy-related systems and building envelope components to be commissioned by Owner under separate contract in order to verify and ensure that fundamental building elements and systems are installed, constructed, calibrated to operate, and perform according to the Owner's Project Requirements, Basis of Design, and Construction Documents.

3.04 INDOOR AIR QUALITY MANAGEMENT – BEFORE OCCUPANCY

A. Flush-Out:

1. Full Flush Prior to Occupancy: after construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and, perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60° F and relative humidity no higher than 60%.
2. Occupancy Before Full Flush: If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of floor area. Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic feet per minute (cfm) per square foot of outside air or the design minimum outside air rate determined in IEQ Prerequisite 1: Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin a minimum of 3 hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outside air has been delivered to the space

END OF SECTION 01 81 00

01 81 00.02
INDOOR AIR QUALITY
CONSTRUCTION MANAGEMENT PLAN

Project: Imperial Valley College
Owner: Imperial Community College District
Const. Mngr: To Be Determined by Owner
Architect: Sanders, Inc. Architecture/Egineering

1.01 INTENT

A. This plan describes the measures to be taken to provide good indoor air quality (IAQ) during construction and after construction is complete and the occupants have moved into the building. This plan is based on the SMACNA standard "IAQ Guidelines for Occupied Buildings under Construction" and the requirements of the LEED v2009 for New Construction and Major Renovations rating system.

It is not the intent of this document to replace or supersede OSHA regulations as to safe construction workplace practices. It remains the responsibility of the Construction Manager and the individual sub-contractors to maintain safe building and site operations. Additional precautions may be necessary when hazardous materials are present.

The plan will address construction IAQ by recommending procedures in five areas of concern:

1. HVAC system protection
2. Contaminant source control
3. Pathway interruption
4. Housekeeping
5. Scheduling

2.02 MEASURES TO BE PERFORMED

A. HVAC System Protection

1. During construction, provide MERV 8 filters for supply air intake when in use. Provide MERV 8 filters at the return air system openings when in use. Perform frequent maintenance when the HVAC system is being utilized and replace filters with MERV 8 as they become loaded, prior to building flush out, and prior to occupancy.
2. When performing construction activities that produce dust, such as drywall sanding, concrete cutting, masonry work, wood sawing or adding insulation, seal off the supply diffusers and return air system openings completely for the duration of the task.
3. Shut down and seal off the supply diffusers and return air ducts during any demolition operations.
4. Whenever the HVAC system is not used during construction, seal off the supply diffusers and return air system openings to prevent the accumulation of dust and debris in the duct system.
5. Do not use the mechanical rooms to store construction or waste materials. Keep rooms clean and neat.
6. Provide periodic duct inspections during construction; if the ducts become contaminated due to inadequate protection, clean the ducts professionally in accordance with NADCA (National Air Duct Cleaning Association) standards.

7. Photographs shall be taken showing measures in place.

B. Contaminant Source Control

1. Use low VOC products as indicated by the specifications to reduce potential problems.
2. Restrict traffic volume and prohibit idling of motor vehicles where emissions could be drawn into the building.
3. Utilize electric or natural gas alternatives for gasoline and diesel equipment where possible and practical. Use low-sulfur diesel in lieu of regular diesel.
4. Cycle equipment off when not being used or needed.
5. Exhaust pollution sources to the outside with portable fan systems. Prevent exhaust from re-circulating back into the building.
6. Keep containers of wet products closed as much as possible. Cover or seal containers of waste materials that can release odor or dust.
7. Protect stored on-site or installed absorptive building materials from weather and moisture; wrap with plastic and seal tight to prevent moisture absorption.
8. Photographs shall be taken showing measures in place.

C. Pathway Interruption

1. Provide dust curtains or temporary enclosures to prevent dust from migrating to other areas when applicable
2. Locate pollutant sources as far away as possible from supply ducts and area occupied by workers when feasible. Supply and exhaust systems may have to be shut down or isolated during such activity
3. During construction, isolate areas of work to prevent contamination of clean or occupied areas. Pressure differentials may be utilized to prevent contaminated air from entering clean areas
4. Depending on weather, ventilation using 100% outside air will be used to exhaust contaminated air directly to the outside during installation of VOC emitting materials
5. Photographs shall be taken showing measures in place.

D. Housekeeping

1. Provide regular cleaning concentrating on HVAC equipment and building spaces to remove contaminants from the building prior to occupancy
2. All coils, air filters, fans and ductwork shall remain clean during installation and, if required, will be cleaned prior to performing the testing, adjusting and balancing of the systems
3. Suppress and minimize dust with wetting agents or sweeping compounds. Utilize efficient and effective dust collecting methods such as a damp cloth, wet mop, or vacuum with particulate filters or wet scrubber
4. Remove accumulations of water inside the building. Protect porous materials such as insulation and ceiling tile from exposure to moisture
5. Thoroughly clean all interior surfaces prior to replacing filters and running HVAC system for system balancing, commissioning and building flush out
6. Provide photographs of the above activities during construction to document compliance.

E. Scheduling and Construction Activity Sequence

1. Schedule high pollution activities that utilize high VOC level products (including paints, sealers, insulation, adhesives, caulking and cleaners) to take place prior to installing highly absorbent materials (such as ceiling tiles, gypsum wall board, fabric furnishings, carpet and insulation). These materials will act as ‘sinks’ for VOCs, odors and other contaminants, and release them later after occupancy.
2. Provide photographs of the above activities during construction to document compliance.

3.01 PLANNING AND INSPECTION

A. Inspection checklists and photographs of the above activities will be completed monthly to confirm that the IAQ Management Plan is being followed. A report of the monthly inspection and the photographs will be provided to support the documentation for the LEED submission to the USGBC.

END OF DOCUMENT

SECTION 03 31 13 STRUCTURAL CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Structural Concrete, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. All cast-in-place concrete, including footings and slab on grade.
2. Concrete Mix Designs.
3. Equipment bases.
4. Setting anchor bolts, inserts, dowels, and accessories cast in concrete, which are specified under this and other sections.
5. Vapor barrier under interior floor slabs on grade.
6. Grout and drypack.
7. Formwork, shoring, bracing and anchorage.
8. Concrete reinforcement and accessories.

C. Related Sections

1. Section 01 45 24 Testing and Inspection Requirements for School Construction
2. Section 03 35 00 Concrete Floor Finishing

1.02 DEFINITIONS AND REFERENCES

A. Definitions

1. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

B. References

1. ACI 318-2014 Building Code Requirements for Structural Concrete.
2. ASTM A615 – Deformed and Plain Carbon – Steel Bars for Concrete Reinforcement.
3. ASTM C33 – Concrete Aggregates.
4. ASTM C94 – Ready-Mixed Concrete.
5. ASTM C150 – Portland Cement.
6. ASTM C309 – Liquid Membrane – Forming compounds for Curing Concrete.
7. Chapter 19A, California Building Code.

1.03 SUBMITTALS

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

B. Design Mixtures: Provide design mix for each concrete mixture. Design mix shall include data substantiating the reliability of the proposed mix. Submit alternate design mixtures when

characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Each design mixture shall be stamped and signed by a registered professional engineer licensed in the state of California.
2. Indicate amounts of mixing water to be withheld for later addition at project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.04 QUALITY ASSURANCE

A. Specified cement and aggregates shall be from single sources only.

B. Regulatory Requirements: Conform to Chapter 19A, California Building Code.

C. Tests: Testing and analysis of concrete will be performed under provisions of Section 01 45 24, Testing and Inspection Requirements for School Construction.

D. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

E. Evaluation and acceptance of concrete shall conform to ACI 318, Section 26.12. Samples for strength testing shall be taken at least once a day or not less than once for each 50 cubic yards of concrete or not less then once for each 2,000 square feet of surface area for slabs or walls.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Conform to ACI 318, Section 26.11.

B. Plywood Forms: Douglas Fir species; solid one side sound undamaged sheets.

C. Lumber: Douglas Fir species; construction grade with grade stamp clearly visible.

D. Form Ties: Removable metal of adjustable length, cone ends.

2.02 REINFORCING STEEL

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade billet steel deformed bars. Welded bars shall be ASTM A706, 60 ksi yield grade.

B. Welded Steel Wire Fabric: Plain type, ASTM A1064; in flat sheets.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type V, Portland Type, conforming to Section 1903A.1, California Building Code.

B. Aggregates: ASTM C33, conforming to Section 1903A.5, California Building Code.

C. Fly Ash: Shall conform to Section 1903A.6, California Building Code.

D. Water: Provide water per ASTM C1602. Clean and not detrimental to concrete.

2.04 CONCRETE MIX

A. Mix and deliver concrete in accordance with ACI 318 Sections 4.8, 19.3 and 26.4..

1. Selection of Concrete Proportions: Concrete proportions shall be determined in accordance with the provisions of ACI 318, Section 26.4.
2. A registered civil engineer 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 under this provision.
3. Do not exceed 0.45 water-cement ratio, by weight.
4. Concrete shall be mixed by transit mixers only.

B. Provide concrete to the following criteria:

Element	Min 28 day Strength PSI	Max Slump	Max Size Aggregate	Type
Foundation	4,500	4 inch	1 inch	Reg.
Slabs	4,500	4 inch	3/4 inch	Reg.

C. Admixtures may be added to the concrete to control the set, effect water reduction and increase in workability at the contractor's option, or at the request of the Engineer, but in either case at the expense of the contractor. Except as otherwise specified, such admixtures shall be a water reducing normal retarding admixture conforming to ASTM C 494 and may be either a hydroxylated carboxylic acid type or a hydroxylated polymer type, but shall contain no calcium chloride. The required quantities of cement shall be used. The quantity of admixture used and the method of mixing shall be in accordance with the manufacturer's printed instructions.

1. Superplasticizers shall not be used without permission of the Engineer. If used, superplasticizers shall conform to ASTM C-494, Type F or G; batch plant added using second or third generation only.
2. Admixtures shall be subject to the approval of DSA.

2.05 ACCESSORIES

A. Bonding Agent: Polyvinyl Acetate; HIBOND, manufactured by Lambert Corporation, Orlando, FL, LOCK BOND NO. 906, manufactured by MacklanBurg-Duncan Co., City of Industry, CA, or equal.

2.06 REINFORCED VAPOR BARRIER

A. Manufacturer: Reef Industries, Inc. 9209 Almeda Genoa Road, Houston Texas 77075. Phone (800) 231 6074. Web Site www.reefindustries.com.

B. Reinforced Vapor Retarder under wood flooring: Griffolyn Vaporguard, 3-ply laminate, with aluminum core surrounded by (2) layers of multi-axially oriented, high density polyethylene sheets.

C. Reinforced Vapor Retarder under VCT and carpet: Griffolyn Type 85, 5-ply laminate, combing (3) layers of high density polyethylene and (2) high strength non-woven cord grids.

2.07 CURING MATERIALS

A. Water: Clean from a source suitable for domestic consumption.

B. Curing Compound: ASTM C309, SHUR-CURE manufactured by Paul M. Wolff Co. water based membrane forming concrete curing compound. White pigmented.

2.08 DRY PACK AND NON-SHRINK GROUT

A. Drypack: EUCLID Dry Pack Grout or equal 7,000 psi minimum.

B. Non-Shrink Grout: EUCLID Hi-Flow Grout or equal 8,500 psi minimum.

C. Epoxy Grout: Mult-component, premeasured, fast-curing combination of thermosetting resins and inert fillers. EUCLID E3-Xtreme or equal 17,500 psi minimum.

PART 3 - EXECUTION

3.01 FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 318 Section 26.11.

B. Verify lines, levels and measurement before proceeding with formwork.

C. Hand trip sides and bottom of earth forms; remove loose dirt.

D. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

E. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

F. Align joints and make watertight. Keep form joints to a minimum.

G. Obtain approval before framing openings in structural members which are not indicated on Drawings.

3.02 REINFORCED VAPOR BARRIER

A. Install reinforced vapor retarders in accordance with ASTM E 1643 and manufacturer’s written instructions.

3.03 PROTECTION

A. Adequately protect staff, personnel and public from harm and accident during formwork. Conform to California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders.

3.04 REINFORCEMENT

A. Place, support and secure reinforcement against displacement.

3.05 PREPARATION FOR CONCRETE WORK

A. Weather Provisions: Make Provisions for weather conditions in accordance with ACI Specifications ACI 318 , the recommendation of the Testing Laboratory, and acceptable to the Architect

1. Hot Weather Requirements: Concrete to be placed during hot weather shall comply with the requirements of ACI Section 26.5.5.

B. Excavations: Before placing of concrete for foundations, insure that the excavations have been inspected and approved by the Soils Engineer. Remove loose dirt from excavations.

C. Before concrete is placed upon or against concrete that has taken its initial set or has hardened, remove encrustations from the forms and reinforcement, and mechanically roughen hardened concrete to minimum ¼ inch coarseness amplitude.

D. Prepare previously placed concrete by cleaning with sandblasting to remove laitance and expose clean aggregate.

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, epoxy set 12 inch long No. 4 steel dowels at 18 inches oc.

3.06 PLACING CONCRETE

A. Place concrete in accordance with ACI 318 Section 26.5.2.

B. Notify Architect minimum 24 hours prior to commencement of operations. All excavations, forms and reinforcing shall be inspected and approved by the Architect prior to placement.

C. Ensure reinforcement, inserts, embedded parts and accessories are not disturbed during concrete placement.

D. When detailed on the drawings, separate slabs on grade from vertical surfaces with ½ inch thick joint filler.

E. Extend joint filler from bottom of slab to within ½ inch of finished slab surface using one-component polyurethane sealant as specified in Section 07 92 00.

F. Place concrete continuously between predetermined expansion, control and construction joints.

G. Do not interrupt successive placement; do not permit cold joints to occur.

H. Avoid segregation of materials. Perform tamping and vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

I. Provide special mix prepared by the Testing Laboratory and approved by the Architect utilizing smaller aggregates in areas of reinforcing congestion to prevent the formation of rock pockets.

J. Do not allow concrete to fall free from any height which will cause materials to segregate. Maximum height of free fall permitted in any case: 4 feet. Utilize trunks or additional chutes where doubt occurs.

K. Construction Joints: Wash surface of each joint shortly after pouring to expose clean, sound aggregate. Sandblast surface to remove laitance remaining or loose aggregate as approved by the Architect. Conform to ACI 318, Section 26.5.6. Apply bonding agent in accordance with manufacturer's instructions.

3.07 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

B. Provide smooth trowel finish at flat surfaces.

3.08 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.

B. Maintain concrete with minimal moisture loss at above 50 degrees F temperature for period necessary for hydration of cement and hardening of concrete. Dusting with dry cement to absorb excess water is prohibited.

C. Cure only as specified herein and in accordance with ACI 318, Section 26.5.3. Membrane curing compound method not permitted for interior cast-in-place concrete slabs.

D. Moisture Cure: Spray water over floor slab areas and maintain wet for minimum of ten (10) days or spread polyethylene film over floor slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for minimum of ten (10) days. Do not permit traffic over floor slabs during the ten (10) day curing period.

E. Vertical Surfaces: Spray water over surfaces and maintain wet for 10 days.

F. Quality Control: Proper curing of concrete surfaces shall be the responsibility of the Contractor under this section.

3.09 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Sections 01 45 24 Testing and Inspection Requirements for School Construction.

B. Provide free access to work and cooperate with Testing Laboratory.

3.10 PATCHING

A. Clean all exposed concrete surfaces and all adjoining work stained by leakage of concrete. Remove all fins, butts and projections by grinding. Patch voids, rock pockets, holes, cracks and similar imperfections by chipping loose concrete and exposing clean, sound aggregate.

3.11 DEFECTIVE CONCRETE

A. Remove concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect.

C. Do not patch, fill, touch-up, repair or replace exposed concrete except upon express approval of Architect for each individual area.

3.12 MOISTURE TEST FOR CONCRETE FLOORS

A. It shall be the Contractor's responsibility to provide a concrete floor slab meeting the maximum moisture vapor emissions herein specified and the contractor shall exercise care in all aspects of mixing, placing and curing the concrete floor slabs so that a minimum of mitigation treatment will be required.

B. Prior to ordering floor materials that are adhesive applied, contractor shall conduct Calcium-Chloride "Dome" tests to verify that concrete floor slabs are dry with maximum moisture vapor emissions of five lbs. Per 1,000 s.f. in 24 hours and that slabs exhibit negative alkalinity, carbonization or dusting. Apply the moisture test in four (4) different areas of each floor location, with at least one test for each 1,000 s.f. of floor area.

C. Should the moisture emissions exceed five lbs. Per 1,000 s.f. in 24 hours as specified herein at the time of installation of adhesive applied floor coverings, and the Petrographic Analysis, ASTM C856, confirms that the placement of concrete slabs was not in conformance with requirements of this section and that the water cement ratio exceeded 0.45 or the concrete was cured less than 7 days, the General Contractor, at no additional cost to the Owner, shall reduce the moisture emission level to that specified by use of a vapor emission treatment system.

3.13 DRY PACK AND GROUTING

A. Drypacking: Mix materials thoroughly with minimum amount of water. Install drypack by forcing and rodding to fill voids and provide complete bearing under plates. Finish exposed surfaces smooth and cure with damp burlap or liquid curing compound.

B. Non-Shrink Grouting: Mix grout material per manufacturer's instructions. Surfaces to receive the non-shrink grout shall be clean, and shall be moistened thoroughly immediately before placing the mortar. Before grouting, surfaces to be in contact shall be roughened and cleaned thoroughly, loose particles shall be removed and the surface flushed thoroughly with neat cement grout immediately before the grouting mortar is placed. Place fluid grout from one side only and puddle, chain, or pump for complete filling of voids; do not remove the dams or forms until grout attains initial set. Finish exposed surfaces smooth, and cure as recommended by grout manufacturer.

END OF SECTION 03 31 13

SECTION 03 35 00 – CONCRETE FLOOR FINISHING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Concrete Floor Finishing, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Finishing slabs on grade.
2. Surface treatment with concrete hardener and sealer.

1.02 REFERENCES

A. ACI 301 and 302 – Structural Concrete for Buildings and Surface Tolerances.

B. Local AQMD Air Quality Management District.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit Product Data: Provide data on finishing agents, product characteristics, compatibility and limitations.

C. Submit Manufacturer’s Installation Instructions: Indicate criteria for preparation and application.

D. Certify that product meets AQMD, Local Regulations.

1.04 DELIVERY AND STORAGE

A. Deliver and store materials in manufacturer’s packaging including application instructions.

PART 2 - PRODUCTS

2.01 FINISHES

A. Combination Hardener and Sealer: SHUR-SEAL, by Paul M. Wolff Co., Orange, CA.

B. Or equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions.

B. Verify that floor surfaces are acceptable to receive the work of this Section.

3.02 FINISHING FLOORS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While concrete is still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of ¼ inch in one direction.

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with pwer-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid applied or sheet waterproofing, built up or membrane roofing, or sand bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in testure and appearance. Grind smooth any surface defects.

1. Apply trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, this set tile, ceramic or quarry tile set over a cleavage membrane, paint or other thin-film-finish coating.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

3. Grind high spots of all slabs as required to meet minimum flatness and levelness values
4. Concrete exposed to view shall be slip resistant per CBC 11B-302.1

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains.

3.03 FLOOR SURFACE TREATMENT

A. Apply combination hardener and sealer and penetrating sealer to concrete slab surfaces as scheduled or shown on drawings in accordance with manufacturer’s instructions.

1. Sweep areas to be treated with fine bristle broom. Hose floor to remove dust and dirt.
2. Apply material to dry surfaces or damp. Dispose of standing puddles.
3. Uniformly distribute material at the rate of 200 to 300 sf per gallon.

END OF SECTION 03 35 00

SECTION 04 05 13 MORTAR AND GROUT

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Mortar and Grout, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Mortar and grout for masonry.

C. Related Sections:

1. Section 01 45 24 Testing and Inspection Requirements for School Construction.
2. Section 04 22 00 Reinforced Concrete Masonry Units.

1.02 REFERENCES

A. ASTM C150 – Portland Cement.

B. ASTM C207 – Hydrated Lime for Masonry Purposes.

C. ASTM C476 – Grout for Reinforced and Non-Reinforced Masonry.

D. ASTM C1586 Field Test Specimens for Mortar.

E. ASTM C150 – Portland Cement and Blended Hydraulic Cements.

F. ASTM C494 – Chemical Admixtures for Concrete.

G. Chapter 21A, California Building Code.

H. ACI 530-11 – Requirements and Specification for Masonry Structures

1.03 SUBMITTALS

A. Design Mixtures: Provide design mix for each type of grout.

B. Submit manufacturer’s certificate that products meet or exceed specified requirements.

C. Colored mortar samples showing the full range of colors available

1.04 QUALITY ASSURANCE

A. Testing and Inspection: Test mortar and grout in accordance with Section 01 45 24, Testing and Inspection Requirements for School Construction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperatures to minimum 40 degrees F prior to, during and 48 hours after completion of masonry work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type V, Low Alkali.

B. Mortar Aggregate: Section 2103A.2, California Building Code.

C. Hydrated Lime: ASTM C207, Type S.

D. Grout Aggregate: Section 2103A.3.1, California Building Code.

E. Water: Clean and potable.

F. Bonding Agent:

1. WELD-CRETE; Larsen Products Corp., Rockville, MD.
2. SONOCRETE; Sonneborn Building Products, Hayward, CA.
3. THOROBOND; Thoro System Products, Newark, CA.
4. Or equal.

2.02 MORTAR COLOR

A. When colored masonry units are required colored grout shall be required. Color as selected by the Architect.

1. Davis Colors, Los Angeles, CA, or equal.

2.03 MORTAR

A. Mortar shall be Type S per ASTM C 270 and ACI 530 Article 2.1 and 2.6A.

B. Mortar Compressive Strength at 28 days: 2000 psi.

C. Mortar proportions shall be per ASTM C 270 and ACI 530 Article 2.1 and 2.6A.

2.04 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use. No admixtures permitted. Add lime last, in accordance with ASTM C 270 and ACI 530 Article 2.1 and 2.6A.

B. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration. Omit mortar color where surfaces are scheduled to receive plaster or paint.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, retemper by fully mixing with required volume of water, only within one hour of mixing. Dashing or pouring water over mixture not permitted.

E. Use mortar within two hours after mixing at temperatures of 80 degrees F.

2.05 GROUT MIX

A. Grout shall conform to CBC Section 2103A.3 and ACI 530 Article 2.2. A mixture of cement, sand, pea gravel and water which will completely fill all voids in the wall. Conform to ASTM C476.

B. Grout Compressive Strength at 28 days: 2000 psi.

C. Admixture per CBC DSA IR 21-2 Section 2.2.

D. Course Grout per CBC Table Section 2103A.3.

2.06 GROUT MIXING

A. Thoroughly mix grout ingredients in quantities needed for immediate use in acordance with ASTM C476.

B. Do not use anti-freeze compounds to lower the freezing point of grout.

2.07 CALIBRATING

A. Proportion mortar and grout mixes by accurate volume measurements. Maintain at the site, calibrated boxes or containers of such nature that quantities measured can be readily and accurately checked at any time. Proportion by shovel measure not permitted, in accordance with Section 2103A, California Building Code.

PART 3 - EXECUTION

3.01 TESTING AND INSPECTION

A. Request inspection of spaces to be grouted. Masonry work shall be continuously inspected during laying and grouting by the Project Inspector in accordance with Section 1704A.5, California Building Code.

B. Testing shall be in accordance with CBC 2105A.

3.02 INSTALLATION

A. Install mortar and grout in accordance with Section 2104A, California Building Code.

B. When grouting is stopped for one hour or longer, horizontal construciton joints shall be formed by stopping the pour for grout 1 ½" below the top of the uppermost masonry unit.

C. All vertical cells shall be grouted solid in lifts not exceeding 4'-0" in height.

D. Work grout into masonry cores and cavities to eliminate voids. Use coarse grout in cavities 2 inches wide or more and in all filled cell construction.

E. Do not displace reinforcement while placing grout.

F. Remove grout spaces of excess mortar.

3.03 PREPARATION

A. Apply bonding agent to existing surfaces.

B. Plug cleanout holes to prevent leakage of grout materials. Brace masonry for wet grout pressure.

3.04 CURING

A. When atmosphere is extremely dry, dampen the masonry surfaces with a light fog spray for three days during the curing period for the mortar. Use a nozzle regulated fog spray sufficiently to dampen but not of such quantities to cause water to flow down over masonry.

END OF SECTION 04 05 13

SECTION 04 22 00 CONCRETE UNIT MASONRY

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Reinforced Concrete Masonry Units, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Concrete masonry units.
2. Reinforcement, anchorage and accessories.

C. Related Sections

1. Section 01 45 24 Testing and Inspection Requirements School Construction
2. Section 04 05 13 Mortar and Grout

1.02 REFERENCES

A. ASTM A615 – Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

B. ASTM D1751 – Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

C. ASTM C90 – Hollow Load Bearing Concrete Masonry Units.

D. Chapter 21A, California Building Code.

1.03 SUBMITTALS

A. Product data: For each different masonry unit, accessory, and other manufactured product specified.

B. Shop Drawings: Show fabrication and installation details for the following:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, Details and Detailing of Concrete Reinforcement.

C. Samples for Initial Selection and Verification for the following:

1. Unit masonry samples in small scale form showing the full range of colors and textures available for each different exposed masonry unit required.

1.04 QUALITY ASSURANCE

A. Tests and Inspections: Section 01 45 24, Testing and Inspection Requirements for School Construction.

B. Make test prisms in accordance with ASTM C1314.

C. Installer Qualifications

1. Company specializing in performing the work of this Section with minimum five years experience.

D. Mock-Up

1. Provide mock-up of concrete masonry in a location as approved.
2. Erect masonry to 3 x 4 feet panel size. Include specified mortar and accessories and one expansion joint.
3. When accepted, mock-up will demonstrate minimum standard for the work. Mock-up may remain as part of the work.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site, store and protect materials from damage.

1.06 ENVIRONMENTAL REQUIREMENTS

A. No masonry operations permitted when surrounding air temperature is 40º F or lower.

1.07 PRE-INSTALLATION CONFERENCE

A. Convene two weeks prior to commencing work of this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products of the following manufacturer or supplier form the basis for design and quality intended.

1. RCP Block and Brick, Lemon Grove, CA.

B. Equal products of the following may be submitted for approval.

1. Orco Block Co., Inc., Stanton, CA.
2. Or equal

2.02 CONCRETE MASONRY UNITS

A. Masonry Units: ASTM C90, medium weight.

B. Compressive Strength of Masonry Unit: TMS Section 1.4.B.2 Table 2, 2800 psi in accordance with ASTM C90.

C. Compressive Strength of Assembled Masonry: F’m = 2,000 psi.

D. Size: as per drawings.

E. Type: as per drawings.

F. Color: See Exterior Elevations for locations of colored masonry. Color as selected by Architect.

G. Provide units manufactured in one batch production to assure continuity of color.

H. Provide bull nose radius corners for all units with outside corners.

2.03 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade.

B. Welded Reinforcing Steel: ASTM A760, 60 ksi yield grade. Comply with AWS D1.4.

2.04 ACCESSORIES

A. Steel Wire Ties: Minimum 16 gage black annealed type.

B. Expansion Joint Filler: ASTM D1751; close cell bituminous saturated fiberboard, ½ inch thick, FIBER EXPANSION JOINT manufactured by The Burke Co., San Mateo, CA. or equal.

C. Sealant: Two-component Polyurethane, Non-sag.

D. Backer Rod: Closed cell polyethylene; oversized 50 percent to joint width; self-expanding; DENVER FOAM or GREEN ROD, manufactured by the Pecora Corp., Harleysville, PA, or equal.

E. Cleaning Solution: Not harmful to masonry work or adjacent materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other Sections of work are properly sized and located.

C. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Provide temporary bracing during installation of masonry work. Maintain in place.

B. Sandblast concrete foundation clean prior to installation of first masonry course.

3.03 COURSING

A. Establish lines, levels and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Lay concrete masonry units in running bond. Course one unit and one mortar joint to equal 8 inches. Form concave mortar joints.

3.04 PLACING AND BONDING

A. Lay hollow masonry units in full bed of mortar with full head joints, uniformly jointed with other work.

B. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

C. Remove excess mortar as work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform jobsite cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Maximum Variation from Unit to Adjacent Unit: 1/32 inch.

H. Maximum Variation from Plane of Wall: ¼ inch in 10 feet and ½ inch in 20 feet or more.

I. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and ¼ inch in 10 feet ½ inch in 30 feet.

J. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.05 REINFORCEMENT

A. Support and secure reinforcing bars from displacement. Maintain position within ½ inch of dimensioned position.

3.06 GROUTED COMPONENTS

A. Lap splices in reinforcing steel as per drawings.

B. Support and secure reinforcing bars from displacement. Maintain position within ½ inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

3.07 MASONRY CONSTRUCTION

A. Masonry units shall be placed in common bond unless noted otherwise.

B. Reinforced hollow unit masonry shall be built to preserve the unobstructed vertical continuity of the cells. Head joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells. Conform to Section 2104A, California Building Code.

C. Walls and cross webs forming such cells shall be full-bedded in mortar to prevent leakage of grout.

D. Mortar shall be as specified in Section 04 05 13, Mortar and Grout.

E. Bond shall be provided by lapping units in successive vertical courses.

F. Vertical cells shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell measuring not less than 2 inches x 3 inches.

G. At the time of laying, masonry units shall be free of excessive dust and dirt.

H. Grout shall be as specified in Section 04 05 13, Mortar and Grout.

I. Grout shall be workable mix suitable for placing without segregation and shall be thoroughly mixed. Grout shall be placed by pumping or an approved alternate method and shall be placed before initial set or hardening occurs. Grout shall be consolidated by puddling or mechanical vibration during placing, and reconsolidated after excess moisture has been absorbed but before workability is lost.

J. Reinforcing except tie wires shall be embedded in the grout. The spacing between masonry units and reinforcing shall be a minimum of one bar diameter.

K. Horizontal reinforcement shall be placed in bond beam units. The openings through webs for horizontal reinforcement shall be a minimum of 3 inch x 3 inch.

L. Reinforcing shall be in place prior to grouting. Vertical reinforcing bars shall be held in position at the top, bottom and at intervals not farther apart than 160 bar diameters.

3.08 GROUT CONSTRUCTION

A. The vertical cells shall be grouted solid. Grouting shall be done in continuous pour in lifts not exceeding 4’-0” in height for high lift grouting. Lifts shall not exceed one masonry unit in height for low lift grouting. Follow requirements of 2104A.1.3.1.1.1.2 and DSA IR 21-2.13 for high lift grouting. All overhanging mortar and mortar droppings shall be removed prior to grouting.

B. High Lift grout may be used with full compliance to CBC Section 2104A.1.3.1.1 DSA IR 21-2.13. Lifts shall not exceed 8’-0” in height for high lift grout.

A. Conform to Section 2104A, California Building Code.

B. Grouting shall be consolidated so as to completely fill all voids and embed all reinforcing steel.

C. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout not less than 1 ½ inch below the top of the uppermost unit grouted.

D. Horizontal steel shall be fully embedded in grout in an uninterrupted pour.

3.09 EXPANSION JOINTS

A. Install expansion joints per drawings.

B. Install preformed control joint devices in continuous lengths. Seal butt and corner joints in accordance with manufacturer’s instructions.

C. Form expansion joint to full depth of wall, sealant both sides.

3.10 BUILT-IN WORK

A. As work progresses, build in metal frames, anchor bolts and other items furnished by other Sections.

B. Build in items plumb and level.

C. Bed anchors of metal frames in adjacent mortar joints. Fill frame voids solid with grout.

D. Do not build in organic materials subject to deterioration.

3.11 CUTTING AND FITTING

A. Cut and fit for conduit, sleeves, piping, grounds and other inserts. Coordinate with other Sections of work to provide correct size, shape and location. Cut blocks neatly and true.

B. Obtain Architect approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

C. Core holes required for masonry testing shall be patched neatly to restore walls as nearly as possible to their original appearance.

3.12 CURING

A. When atmosphere is dry, dampen the masonry surfaces with a light fog spray for three days during the curing period for the mortar. Use a nozzle regulated fog spray sufficiently to dampen but not of such quantities to cause water to flow down over masonry.

3.13 CLEANING

A. Remove excess mortar and mortar smears.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with an approved cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.14 PROTECTION OF FINISHED WORK

A. Protect finished installation from damage.

B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

3.15 TESTING

A. Compliance with the requirements for the specified compressive strength of masonry shall be in accordance with Section 2105A. California Building Code.

B. Masonry core test shall be provided as required per Section 2105A.4 California Building Code.

END OF SECTION 04 22 00

SECTION 05 12 00 – STRUCTURAL STEEL

PART I – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipmentand performing all operations in connection with structural steel, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited tothe following:

1. Structural steel framing.
2. Steel pipe and tube framing.
3. Shop priming and field touch-up to extent specified.
4. Hoisting of metal floor and roof decking.

C. Related Sections:

1. Metal Fabrications: Section 05 55 00.

D. Product furnished but not installed under this section:

1. Anchor bolts and loose bearing and setting plates: Installed under Division 3.

1.02 REFERENCES

A. Comply with provisions of California Code of Regulations (CCR) Title 24, Part 2, Chapter 22A.

B. ASTM A-572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

C. ASTM A992, Standard Specification for Strutural Steel Alloy.

D. ASTM A36, Standard Specification for Carbon Structural Steel.

E. ASTM A-53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

F. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

G. ASTM A-325, Standard Specification for Structural Bolts, Steel, Heat Treated 120/105 KSI Minimum Tensile Strength.

H. AWS Dl.l, Structural Welding Code -Steel.

1.03 SUBMITTALS

A. Product Data: Submit copies of producer's or manufacturer's data and installation instructions for the following products. Include laboratory test reports and other data required to show compliance with these specifications:

1. Structural steel, including certified copies of mill test reports covering chemical and physical properties.
2. Unfinished bolts and nuts.
3. High strength bolts, including nuts and washers.

B. Shop Drawings:

1. Submit shop drawings covering all structural steel including welding, accessories, and fastenings. Fully detail minor connections and fastenings not shown or specified to meet required conditions. Include detailed sequence plan for shop and field welding that minimizes locked-in stresses and distortion.
2. Make erection diagrams as complete as possible before fIrst submittal. Calculate dimensions using all drawings. Report dimensions not derivable from drawings to Architect for clarification.
3. All welds, both shop and field, shall be indicated by A WS Welding Symbolts. Indicate net weld lengths.

C. Proof of Compliance for Materials: Submit mill test reports.

1.04 QUALITY ASSURANCE

A. Qualify Welding processes and welding operators in accordance with A WS Structural Welding Code.

B. Provide certification that welders employed in work have satisfactorily passed A WS qualification tests within 12 previous months.

1.05 DELIVERY, STORAGE, & HANDLING

A. Delivery of materials to be installed under other sections:

1. Deliver anchor bolts and other anchorage devices to be embedded in concrete or masonry construction to the project site in time to be installed.
2. Provide setting drawings, templates, and directions for the installation of the anchor bolts and other devices.

B. Storage of Materials:

1. Store steel above ground on platforms, skids, or other acceptable supports. Protect steel from corrosion.
2. Welding Electrodes: Deliver to the site in unbroken packages bearing the manufacturer's name and label identifying the contents.
3. Store other materials in a watertight and dry place until ready for incorporation into the work.

1.06 PROJECT CONDITIONS

A. Site Measurements: Take field measurements as required. Report discrepancies between drawings and field dimensions.

B. Protection of Floors: Use Caution to protect floor slab and adjacent work from damage. Do not overload floors. Use rubber tired equipment to handle and move steel. Do not place steel members directly on floor; use pads of timber or like material for cushioning.

C. Temporary Flooring: Provide necessary temporary planking, scaffolding, and flooring for erection of structural steel or support of erection machinery. Conform use of temporary floors or steel decking to code.

D. Connection of Steel Decking Temporary Flooring: Temporarily weld steel decking to supports where used as a working platform. Distribute concentrated loadings from welding machines and other heavy machinery with planking or equal. Replace decking damaged by use as a working platform.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: New tested stock complying with reference specifications herein specified.

B. Structural Steel: ASTM A-36, ASTM A-572, ASTM A992, Grade 50

C. Steel Tubes: ASTM A500, Grade B.

D. Steel pipe: ASTM A53, Grade B.

E. Fastening Materials:

1. Machine Bolts: ASTM A307, Grade A.
2. High Strength Bolts, together with their nuts and washers: ASTM A325, Type lor 2 fastener requirements. Provide with identification markings and manufacturer's identification symbol on each item. High strength bolts may be "Tension Set Type" and shall be one of the following:

    a. TS Bolt F9T by Cold Forming Specialties, Inc.
    b. Load Indicator Bolt by Bethlehem Steel Corp.
    c. LeJeune Tension Control Bolt by Consolidated Nut & Bolt Co.

3. Electrodes: A WS D5 .1, E70XX Series as required for intended use. A WS Designation E70T -4 shall not be used.

F. Anchor Bolts: ASTM F1554, Grade 36, Headed Type unless otherwise indicated.

G. Shop Primer: Tacmac 99QD or aO09, Tust-Oleum 678 or 7086 metal primer or other; all in compliance with SCAQMD regulations.

H. Non-shrink Grout: As specified in Section 03 31 13.

I. Miscellaneous Materials: As necessary to complete this work.

2.02 MATERIAL TESTING

A. Tests of Structural Steel: Comply with CBC Section 2213A..

1. Identified Structural Steel: Tests are waived for steel identified by heat number, accompanied by mill analysis and mill reports, and properly tagged with Identification Certificate so as to be readily identified for conformance with ASTM A6 and CBC Section 2203A.
2. Unidentified Steel: If structural steel cannot be identified or its source is questionable, it shall be tested to meet the minimum chemical and mechanical requirements of the ASTM standard

appropriate for the specified steel. Additional tests may be required when deemed necessary by the Architect, Structural Engineer, or DSA.

2.03 FABRICATION

A. Workmanship: According to the approved submittals, reference standards as applicable, and requirements herein. Fabricate and form the work to meet actual installation conditions verified at the site.

B. Before being fabricated or worked, material shall be thoroughly wire brushed, cleaned of loose mill scale and rust, and straightened by methods that will not injure steel.

1. After punching or working the component parts of a member, remove twists, bends, and open joints.

C. Fabricate all structural steel in accordance with AISC specification.

D. Punch or drill holes. Do not burn holes.

E. Shop Paint:

1. Minimum cleaning requirements: In accordance with SSPC-SP-3.
2. After surfaces are properly cleaned, provide one coat of shop paint to attain a minimum dry film thickness of two mils.
3. Block out at connections and omit shop paint.
4. Omit shop paint at concrete-encased steel and steel that receives spray applied fireproofing.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify governing dimensions and conditions at project site before commencing any work.

B. Verify the location and elevation of all anchor bolts and concrete surfaces supporting column bases. Tolerances for anchor bolts and concrete surfaces:

1. Elevation of concrete surfaces: +3/8 inch.
2. Elevation top of anchor bolts: + I inch, minus 3/8 inch.
3. Out-of-position of anchor bolts: + 1/8 inch.

3.02 ERECTION

A. Erect all structural steel in accordance with AISC specification.

B. Erection Tolerances: In accordance with the AISC Code of Standard Practice for Steel Buildings. Tolerances shall be compensating, not cumulative.

C. Field Assembly:

1. Members and sections of sizes, weights, shapes, and true arrangements shown, closely fitted, and finished true to line and in precise position necessary to allow accurate erection and proper joining of parts in the field. Drifting to enlarge unfair holes will not be allowed.
2. Do not heat rolled sections, except for minor details.

D. Contact:

1. Component parts of built-up members shall be well pinned and rigidly maintained in close contact using clamps or temporary bolting during welding.
2. Compression joints depending upon contact bearing shall have bearing surfaces accurately milled perpendicular to their axis.

E. Punching, Drilling, and Reaming:
1. Material may be punched 1/16 inch larger than the nominal diameter of the bolt, wherever the thickness of the metal is equal to or less than the diameter of the bolt plus 1/8 inch.
2. Where the metal is thicker than the diameter of the bolt plus 1/8 inch, the holes shall be drilled or sub-punched and reamed.
3. The diameter for sub-punched holes, and the drill for sub-drilled holes, shall be 1/16 inch smaller than the nominal diameter of the bolt to be drilled.
4. Finished holes shall be precisely located to insure passage of bolts through assembled materials without drifting. Enlargement of holes necessary to receive bolts shall be done by reaming. Poor matching of holes shall be sufficient cause for rejection.

F. Bolting:

1. Where structural joints are made using high strength bolts, hardened washers and nuts tightened to a high tension, the materials, method of installation and tension control, types of wrenches to be used, and inspection methods shall conform to Specifications for Structural Joints using High-Strength bolts, established by the Research Council on structural connections.

    a. High strength bolts used shall have a suitable identifying mark placed on top of the head before leaving the factory.
    b. Hardened washers shall be installed in accordance with AISC Specifications.
    c. Contact bearing surface of bolted parts and bolt threads shall be free of scale, slag, burrs, and pits, or dirt, paint, or other foreign material and/or any defects which would prevent solid seating of parts.
    d. Bolt lengths shall be grip plus I-I/2 inches.
    e. If bolting is done using Coronet load indicators, inspections may be done on aperiodic basis, but each connector in every connection will be visually examined, and a minimum of 10% of connectors in each joint checked with a Coronet gap gage.
    f. Testing laboratory will certify to Owner in writing at completion of work, that high strength bolting has been done in accordance with contract requirements and applicable standards.

2. Common Bolts: Unfinished bolts may be used for all connections that are so indicated on the drawings, using bolts of the sizes called for with the nuts drawn tight. The edge distances shall be at least those indicated in the reference standard referred to above.

G. Structural steel shall be carefully planned and laid out so that a minimum of cutting will be necessary:

1. Erect the work plumb, square and true to line and level, and in precise positions as shown.
2. Provide temporary bracing and guys wherever necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation. Leave in place as long as necessary for safeguarding all parts of the work.

H. Temporary Connections: As erection progresses, the work shall be securely bolted up as necessary to maintain the steel in proper position while field bolting and welding is being done, and as necessary to take care of dead loads, winds and erection stresses.

I. Set column base plates in exact position, both as to alignment, level, and elevation, and support on steel wedges, or equivalent, until the grout thereunder has thoroughly set.

1. The center of each base shell be true to the column center within 1/16 inch and adjust its elevation to plus or minus 0.0025 ft. (1/32 inch). Plates shall be exactly level on both axes.

J. Gas Cutting:
1. Use of a cutting torch is allowed where the metal being cut is not carrying stress during the operation, and provided stresses will not be transmitted through a flame-cut surface.
2. Make gas cuts smooth and regular in contour. To determine the effective width of members so cut, deduct 1/8 inch from width of the gas cut edges. Make the radius of re-entrant gas cut fillets as large as practicable, but in no case less than 1 inch.

3.03 WELDING

A. Welding and Welded Joints: Detail and execute in accordance with the requirements of the A WS standards, the Structural Welding Code, A WS DI.l , and CBC Chapter 22A, and as modified by the drawings. In the event of conflict, the drawings take precedence. Perform structural welding by one of the following processes:

1. All welding to be Shielded Metal Arc Welding Process.

B. In addition, welding and welded joints shall comply with CBC Chapter 22A.

3.04 ANCHOR BOLTS

A. Furnish to the project site when and as required to maintain project progress, all anchor bolts to be embedded in concrete and masonry for securing of structural steel in proper position.

B. Provide the necessary drawings and templates for setting of such anchor bolts.

C. Setting of anchor bolts in hardened concrete, necessitated through error or oversight, and in existing concrete shall be as acceptable to the Architect in suitable drilled holes solidly grouted in place, or embedded in an acceptable structural epoxy.

3.05 DRYPACKING OF BASES AND PLATES

A. Maintain bases and bearing plates in proper location and in proper level while they are being grouted.

3.06 TESTING AND INSPECTION

A. Testing laboratory will inspect all shop and field welding and high strength bolting.

1. Inspection of welding operations shall be made by a qualified Welding Inspector approved by DSA.
2. Inspection ofhigh strength bolt installation shall be made by a Special Inspector approved by DSA.
3. Testing of high strength bolts, nuts, and washers shall be made in compliance with CBC Chapter 22A, 2213A.1.
4. Base metal thicker than 1-1/2 inch, when subjected to through-thickness weld shrinkage strains, shall be ultrasonically tested in accordance with CBC Chapter 22A.

B. Inspection: According to the reference standards. The inspector shall visually inspect welds, shall be present to inspect and approve all groove, milti-pass, and penetration welding perfonned in the fabricator's shop or at the site, and shall inspect all erection including the drypacking under base plates.

C. Tests of Welding and Bolting: The testing laboratory shall inspect all shop and field welding to conform to requirements of code and certify, in writing after completion of the work, that all welding has been performed in accordance with the drawings, specifications, and code.

END OF SECTION 05 12 00

SECTION 05 31 00 STEEL DECKING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Steel Decking, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Metal decking.
2. Closures, filler pieces, flashing, trim and accessories.
3. Cutting and reinforcing openings in metal decking.

C. Related Sections:

1. Structural steel support and hoisting metal decking: Section 05 12 00.

1.02 REFERENCES

A.	AISI S100 – 2012	North American Specification for Design of Cold-Formed Steel Structural Members
B.	AWS-B3.0	Welding Procedures and Performance Qualifications.
C.	AWS-D1.1	Structural Welding Code - Steel.
D.	AWS-D1.3	Structural Welding Code – Sheet Steel
E.	SDI	Steel Deck Institutions Publication No. 28. ANSI / RD1.0-06
F.	UL	Underwriters Laboratory – UL 209.
G.	TT-P-664	Primer Coating, Alkyd, Corrosion Inhibiting Lead and Chromate Free, VOC Compliant.

1.03 SUBMITTALS

A. Product Data: Submittals shall be provided for each type of panel, accessory, and product specified.

B. Shop Drawings:

1. Indicate the type of decking, finish, gauge of metal, where located, arrangement of sheets, necessary fabrication to incorporate openings and flashing.
2. Where shop drawings of the supporting members are required, the deck shop drawings shall be prepared from reviewed shop drawings of the supporting member.

C. Certification: Submit manufacturer’s calculations and supporting data, stating that each metal decking proposed for use complies with the contract documents and applicable code requirements. Obtain Architect’s review prior to fabrication and installation of metal decking.

1.04 QUALITY ASSURANCE

A. Qualification of Welders: Properly certified for the type of work involved in compliance with applicable code requirements and the testing laboratory.

1. Welders shall demonstrate their ability to produce welds of proper size and penetration at each project. Welding inspection shall conform to the requirements of CBC Chapter 1705A.2.5.
2. Metal decking shall be identified per CBC chapter 22A, 2210A.1.1, and as tested in accordance with requirements of CBC Chapter 17A, 1705A.2.5. Furnish deck manufacturer's certified mill analyses and test reports for each heat covering decking having Fy of 33 ksi or less. In addition, for decking having Fy greater than 33 ksi, testing laboratory shall perform one tension and elongation test and one bend or flattening test for each gauge.

B. Provide periodic inspection per CBC.

C. Requirements of Regulatory Agencies:

1. Fire Rating: Be responsible for obtaining UL and building department approval of the decking, when used as part of the assembly indicated on drawings in which fire-resistive construction ratings are required.

D. Performance Requirements: Compute the properties of deck sections on the basis of the effective design width as limited by the provisions of the AISI Specifications for the Design of Cold-formed Steel Structural Members. Provide not less than the deck section properties shown, including section modulus and moment of inertia per foot of width.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protection: Steel panels shall be protected from corrosion, deformation, and other damage during delivery, storage, and handling. Special care shall be exercised not to damage the material or overload the deck during the entire construction period.

B. Storage: Steel panels shall be stacked on platforms or pallets and slope to provide drainage. Panels shall be protected with a waterproof covering and ventilated to avoid condensation

.

C. The deck shall not be used as a working platform until the units have been welded in position and shall not be used for storage of material without authorization by the Architect. All damaged material shall be removed and restoration made with new material by the CONTRACTOR at no additional cost to the OWNER.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Deck:

1. All decking shall be galvanized.
2. Refer to drawings for metal decking requirements.

B. Flexible Closure Strips for Deck: Vulcanized, closed-cell, expanded chloroprene elastomer, complying with ASTM D1056, Grade SCE #41.

1. Brittleness Temperature: Minus 40 degrees F, ASTM D1462.
2. Flammability Resistance: Self-extinguishing, ASTM D1692.

C. Metal Flashing and Closures: As indicated on the drawings, but not less than 22 gauge minimum for metal flashing and 14 gauge minimum for metal closures, ASTM A526 with A525, G90 zinc coating.

D. Miscellaneous Steel Shapes (reinforcement for openings): ASTM A36.

1. Shop Prime Coat: Metal primer complying with AQMD rule 1113.

E. Galvanized Repair Paint: High zinc-dust content paint for repair of damaged galvanized surfaces.

2.02 FABRICATION

A. Provide decking in lengths to span over three or more supports, wherever possible.

PART 3 - EXECUTION

3.01 OPENINGS

A. Cut and reinforce units to provide openings which are located and dimensioned on the structural drawings.

B. Provide openings, holes and sleeves through decking which are required for related work and which are not indicated on structural drawings. Coordinate sizes, locations and reinforcements. Sleeves will be furnished with the items requiring same.

3.02 ERECTION

A. Erect metal decking in accordance with the decking manufacturer’s recommendations and the requirements of the drawings and these specifications.

B. Place metal decking on the supporting steel framework with staggered end joints and adjust to final position before permanently fastening in place.

1. Each unit shall be brought to proper bearing on the supporting members.
2. Place the units in straight alignment for entire length of run of cells and with close registration of the cells of one unit with those of abutting unit.

C. Fasten decking to the steel framework at ends of units and at intermediate and parallel supports as indicated on drawings. Welding shall comply with AWS D1.3 requirements and CCR, Title 24, Section 2210A and 1705A.2.5.

D. Fasten the side laps between supports as designated on the drawings.

E. Perform all field cutting parallel with the cells in the area between the cells, taking care to leave sufficient horizontal material to permit satisfactory welding to the supporting steel

F. Accessories:

1. Provide perimeter closures and flashings at wall ends of all units, open ends and sides of panels and at columns.

2. Provide reinforcing angles or channels, where a deck is cut parallel to rib to make a tight fit along the cut.
3. Provide all flashings, metal closure pieces, transition pieces, and reinforcement as required and as shown on drawings to make decking complete and ready to receive concrete.

END OF SECTION 05 31 00

SECTION 05 41 00 STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install load-bearing metal framing and blocking as described in Contract Documents.

B. Related Requirements:
   1. Section 05 05 03: Galvanizing repair.
   2. Section 09 22 16: 'Non-Structural Metal Framing'.
   3. Section 09 29 00: 'Gypsum Board'.

1.2 REFERENCES

A. Association Publications:
   1. International Code Council (ICC):
      a. ICC-ES Evaluation Reports, www.icc-es.org.

B. Reference Standards:
   1. ASTM International:
      a. ASTM A653/A653M-11, ‘Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.'
      b. ASTM A924/A924M-10a, ‘Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.'
      c. ASTM C955-11c, ‘Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.'
      d. ASTM C1007-11a, ‘Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Schedule pre-installation conference after submittals have been reviewed and returned by Architect, but before beginning metal framing work.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide technical product data and installation instructions.
   2. Shop Drawings:
      a. Placing, fabrication, blocking, and erection drawings before commencing work.
      b. Show special components and installations not fully dimensioned or detailed in Manufacturer's Product data.

B. Informational Submittals:
   1. Test and Evaluation Reports:
      a. ICC Evaluation Report.
   2. Manufacturers' Instructions:
      a. Provide recommendations for each component of system.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. ICC approved.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Type One Acceptable Manufacturers:
      a. Any member of Steel Stud Manufacturer's Association.
      b. Equal as approved by Architect before bidding. See Section 01 62 00.

B. Design Criteria:
   1. Fabricate framing members and accessories in accordance with ASTM C955 from metal meeting requirements of ASTM A653/A653M, SQ (Structural Quality) - Grade 50 Class 2 minimum or ASTM A924/A924M with G-60 coating.

C. Materials:
   1. Wall Framing:
      a. Studs: C-shaped steel studs, punched, and with stiffened 1-5/8 inch flanges. Metal thickness and section properties as shown on Drawings.
      b. Tracks: U-shaped steel track, unpunched and with straight, 1-1/2 inch wide flanges. Metal thickness to match studs.
   2. Floor Framing:
      a. Joists: C-shaped steel joists, unpunched, and with stiffened 1-5/8 inch flanges. Metal thickness and section properties as shown on Drawings.
      b. Tracks: U-shaped steel track, unpunched and with straight, 1-5/8 inch wide flanges. Metal thickness to match joists.
   3. Framing Accessories:
      a. Provide accessories of Manufacturer's standard thickness and configuration, unless indicated otherwise.
      b. Accessories include, but are not limited to, supplementary framing, bracing, bridging and solid blocking, web stiffeners, end clips, gusset plates, girts, joist hangers and end closures, hole reinforcing plates, and backer plates, all as needed to provide complete metal framing system.

2.2 ACCESSORIES

A. Fasteners:
   1. Corrosion-resistant coated, self-drilling, self-threading steel drill screws.
   2. Size and quantity as shown on Drawings.

B. Sill Sealer:
   1. Closed cell polyethylene foam, 1/4 inch by width of sill plate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface with Other Work:
   1. Coordinate with other Sections to provide blocking necessary for their work.
   2. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties.

B. General:
   1. Install metal framing in accordance with ASTM C1007, Manufacturer's printed recommendations, and Contract Document requirements, whichever is most stringent on an item-by-item basis.
   2. Notify Architect of conflicts in these requirements.

C. Erection Tolerances:
   1. 1/4 inch in 20 feet, non-cumulative in length of wall.
   2. 1/8 inch in 10 feet with 1/4 inch maximum in height of wall.
   3. Distances between parallel walls shall be 1/4 inch maximum along length and height of wall.
   4. Space individual framing members plus or minus 1/8 inch maximum from required location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

D. Wall Framing:
   1. Securely anchor tracks to supporting structures.
   2. Provide complete uniform and level bearing support for bottom track.
   3. Securely anchor abutting pieces of track to common structural element or butt weld or splice.
   4. Securely attach studs to flanges or webs of both upper and lower tracks, and plumb and align.
   5. Install jack studs at door heads and elsewhere as required to furnish structural support and securely attach to supporting members.
   6. Provide temporary bracing until erection is completed.
   7. Install wall stud bridging in manner to provide resistance to both minor axis bending and rotation. Space bridging rows equally not to exceed 48 inch.
   8. Furnish and install insulation equal to that specified in Division 07 in doubled jamb studs and doubled header members that will not be accessible to insulation installer.
   9. Wrap multiple, adjacent framing members with duct tape or otherwise secure to eliminate 'chattering.'
   10. Use grommets at framing penetrations where unsecured items pass through.

E. Joists:
   1. Install perimeter joist track. Align and securely anchor track to supporting structure at corners and ends, and at required spacing.
   2. Install joists bearing on supporting frame, level, straight, and plumb. Fasten to both flanges of joist track.
   3. Space joists 2 inches maximum from abutting walls, unless indicated otherwise.
   4. Frame openings as shown on Drawings..
   5. Install joist reinforcement at interior supports with single length of joist section directly over interior support, with joists lapped an amount equal to joist reinforcement.
   6. Install web stiffeners to transfer axial loads of walls above.
   7. Install bridging at both ends of joists and at intervals required by Contract Documents.
   8. Secure joists to load bearing interior walls to prevent lateral movement of bottom flange.

9. Install accessories as required by Manufacturer to provide complete and stable joist framing system.

3.2 PROTECTION

A. Repair galvanizing as specified in Section 05 05 03.

END OF SECTION 05 41 00

SECTION 05 51 33 VERTICAL METAL LADDERS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Ladders, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide exterior roof access ladder.
2. Provide interior roof access ladder.

1.02 SUBMITTALS

A. For each type of roof accessory required , submit the following as per Section 01 33 00, Submittal Procedures:

1. Product Data.
2. Shop Drawings.
3. Coordination Drawings showing other items on roof.
4. Finish Samples.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers: Products of the following manufacturer or supplier form the basis for design and quality intended.

1. ALACO Ladder Company, 5167 “G” Street, Chino CA 91710
Phone: 888 310 7040 Fax: 909 591 7565

B. Exterior Ladder:

1. Exterior Model: ALACO No. 563-C Parapet Return
2. Exterior Anchorage: All wall mounted as per details on drawings.

C. Exterior Ladder Materials:

1. Aluminum: 6061-T6
2. Rungs: 1 1/8” round serrated, 3600 lb. shear strength.
3. Channels: 2 7/8” side rails

D. Interior Ladder:

1. Interior Model: ALACO Model 560
2. Interior Ladder Anchorage: Anchored to floor and wall.

E. Interior Ladder Materials:

1. Aluminum: 6061-T6
2. Rungs: 1 1/8” round serrated, 3600 lb. shear strength.
3. Channels: 2 7/8” side rails

F. Interior Ladder Size:

1. Width: 20-1/4”

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's written instructions.

B. Anchor ladder as per drawings or manufacturers instructions.

3.02 CLEANING AND PROTECTION

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 05 51 33

SECTION 05 55 00 METAL FABRICATIONS

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Section includes metal fabrications, including:

1. Steel angles for sills, curbs, ledges, closures and lintel.
2. Elevator threshold angles and pit screens.
3. Concrete-filled pipe guards.
4. Steel bar gates and fencing.
5. Handrails
6. Mechanical chase in slab on grade
7. Steel plate and steel blocking welded to steel studs for attachment of handrails, brackets, grab bars, fixtures, benches, and other items as required.
8. Miscellaneous plates, angles and attachment for anchorage of work of this and other sections.

C. Related Sections:

1. Structural Steel: Section 05 12 00.
2. Finish field painting of material fabrications: Section 09 91 00.
3. Sheet Metal Flashing and Trim: Section 07 62 00.
4. Non-Structural Metal Framing: Section 09 22 16.

D. Definition: Miscellaneous metal 10 gauge and heavier are included under this section except as otherwise specified in other sections.

1.02 SUBMITTALS

A. Shop Drawings: submit shop drawings fully detailing work of the section, including accessories, fastenings, and welding. Include minor connections and fastenings not indicated or specified to meet required conditions; indicate in detail on shop drawings.

B. Product Data – Manufacturer’s Literature: Brochure describing items, specifications and installation instructions for manufactured items.

1.03 QUALITY ASSURANCE

A. Reference Standards – comply with the following:

1. AIS, Design, Fabrications and Erection of Structural Steel for Buildings.
2. AISI, Specifications for the Design of Cold-formed Steel Structural Members.
3. AWS D.1.1, Structural Welding Code – Steel.
4. ASTM A6, General Requirements for the Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.
5. CBC Chapter 22A.
6. Comply with CFC Chapter 35, Welding and Hot Works

B. Regulatory Requirements

1. Handrail gripping surfaces and any surfaces adjacent to the shall be free of sharp or abrasive elements and shall have rounded edges.
2. Handrails shall not rotate within their fittings.
3. Top of gripping surfaces of handrails shall be 34" minimum and 38" maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above such surfaces.
4. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1 ½" minimum. Handrail may be located in a recess if the recess is 3" maximum deep and 18" minimum clear above the top of the handrail.
5. Handrail graipping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of the handrail gripping surfaces shall not be obstructed for more than 20% of their length. Where provided, horizontal projections shall occur 1 ½" minimum below the bottom of the handrail gripping surface.
6. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1 ¼" minimum and 2" maximum.
7. Handrail gripping surfaces with a non-circular cross section shall have an outside dimension of 4" minimum and 6 ¼" maximum, and a cross-sectional dimension of 2 ¼" maximum.
8. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.
9. Handrails shall not rotate within their fittings.
10. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with CBC Section 11B-505.10. Such extensions are not required for continuous handrails at the inside turn of switchback or dogkegs stairs and ramps.
11. The orientation of at least one handrail shall be in the direction of the stair run, perpendicular to the direction of the stair nosing, and shall not reduce the minimum required width of the stair. CBC Section 11B-505.2.1.
12. A 2" minimum high curb or barrier shall be provided to prevent the passage of a 4" diameter sphere rolling off the edges of the ramp or landing surface. Such a curb or barrier shall be continuous and uninterrupted along the length of a ramp. CBC Section 11B-405.9.2.

1.04 PRODUCT DELIVERY AND HANDLING:

A. Protect items from damage during shipping, handling and storage. Work showing dents, creases, deformations, weathering or other defects is not acceptable. Deliver welding electrodes to site in unopened packages bearing manufacturer's name and product identification.

1.05 JOB CONDITIONS:

A. Verify field measurements prior to fabrication of items. Use caution to protect concrete floor surfaces and adjacent work from damage.

PART 2 – PRODUCTS

2.01 BASIC MATERIALS

A. Structural Steel Plates, Shapes, Bars and Sheets:

1. Structural Sizes, Shapes and Plates: ASTM A36, except for plates to be bent or cold-formed.
2. Plates to be Bent or Cold-Formed: ASTM A283, Grade C.
3. Bars and Bar-Size Shapes: ASTM A663, of ASTM A36.
4. Sheets: ASTM A653, coating class G90.
5. Hot-Rolled Carbon Steel Bars and Bar-Size Shapes: ASTM A575, Grade as selected by the fabricator.

B. Steel Pipe: ASTM A53, Type E of S, Grade B – use Grade A for pipe required to be bent.

C. Steel Tubing: ASTM A500, Grade B.

D. Malleable Iron Castings: ASTM A47.

E. Anchors – Inserts:

1. Threaded Type: ASTM A47 or ASTM A27; hot-dip galvanized in accordance with ASTM A153.
2. Slotted Type: ASTM A283; hot-dip galvanized in accordance with ASTM A123.

F. Fasteners: Zinc-coated, galvanized for exterior use or when used in exterior walls, in accordance with ASTM A153. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.

1. Standard Bolts and Nuts: Regular hexagon type, ASTM A307, Grade A.
2. Lab Bolts: Square head type, FS FF-B561.
3. Machine Screws: Cadmium-plated steel, FS FF-S-92.
4. Wood Screws: Flat head carbon steel, FS FF-S-111.
5. Plain Washers: Round, general assembly grade carbon steel, FS FF-W-92.
6. Lock Washers: Helical spring type carbon steel, FS FF-W-84.
7. Other Fastener Type: As required for the condition of use.

G. Welding Electrodes: Appropriate type for the metal to be welded. Comply with AWS D1.1.

H. Prime Paint: 1009 Metal Primer bye Tnemec Co., Inc., 7086 Metal Primer by Rust-Oleum Corp. or equivalent meeting SCAQMD requirements.

I. Galvanizing: ASTM A123, hot-dip, 2 oz. per sq. ft. coating on actual surface with minimum 1.08 oz. coating on any specimen. Bonderize as required for finish painting. Galvanize exterior steel and as shown on drawings.

J. Galvanizing repair material: All States Galvanizing Powder, Drygalv by American Solder and Flux, or equal hot applied repair material, or anodic zinc-rich galvanizing repair paint conforming to Mil Spec DOD-P-21035.

K. Setting compound: Hallemite Inc. “Por-Rok” for interior dry conditions, “Super Por-Rok” for exterior and wet conditions.

L. Miscellaneous Materials: Ad hereinafter specified and as necessary to complete this work.

2.02 GENERAL FABRICATION REQUIREMENTS

A. Conform to approved submittals, Section 1.03 “Quality Assurance” above as applicable to the work, and requirements herein. Fabricate and form the work to meet actual installation conditions as verified at the site. Obtain necessary templates and information and provide holes and drilling indicated or required for securing work of other sections to metal fabrications.

B. Fabricate items to design shown. Furnish members in longest lengths commercially available within the limits shown and specified. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items. Provide opening, cut-outs, and tapped holes for attachment and

clearances required for other work. Prepare members for the installation and fitting of hardware. Provide reinforcement to support cut edges where required. Fabricate surfaces and edges free form sharp edges, burrs and projections which may cause injury.

C. Welding: Conform to AWS D1.1, as modified by referenced AISC Standards, and as indicated or noted on drawings. Unless otherwise indicated or specified, weld joints by shielded electric-arc method. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignments. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces. Grind exposed welds subject to contact to smooth surfaces free of holes, slag, or other defects, flush with adjoining surfaces. No finishing treatment is required for concealed welds and other exposed welds except as specified. Cut out defective welding and replace.

D. Joining: Miter or butt members at corners. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.

E. Anchors: Where metal fabrications are shown to be preset in concrete, weld 1-1/4 by 1/8 inch steel trap anchors, 6 inches long with one inch hooked end, to back of member at 2 feet on center, unless otherwise shown. Where metal fabrications are shown to be built into masonry use 1-1/4 by 1/8 inch steel strap anchors, 10 inches long with 2 inch hooked end, welded to back of member at 2 feet on center, unless otherwise shown.

F. Cutting and Fitting: Accurately cut, machine and fit joints, corners, copes, and miters. Fit removable members to be easily removed. Design and construct field connections as indicated on approved submittals. Fit pieces together as required. Joints shall be firm when assembled. Conceal joining, fitting and welding on exposed work. Do not show rivets and screws on the exposed face. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

G. Miscellaneous Items: Fabricate items not specifically mentioned according to the drawings, approved shop drawings, and as required to complete the entire work. Galvanize exterior items and shop prime interior items unless otherwise shown or specified.

H. Provide metal fabrications indicated, specified, and required to complete the work, including anchors and supports. Include parts necessary to complete metal fabrication work whether or not specifically indicated.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to radius of approximately 1/32” unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

J. For fabrication of metal work which will be exposed to view in finished work, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, mill scale, rolled trade names and roughness.

K. Close fit exposed joints to hairline joints. Cut off exposed bolts and screws flush with adjacent metal. Cut, drill punch and tap as required for installation and attachment of other work to metal work.

L. Form metal work with anchorage when built into concrete or masonry or provide with suitable anchors, expansion shields, or other anchoring devices indicated or required. Provide such metal work in ample time for setting and securing in place.

M. Make threaded connections up tight so threads are entirely concealed. Provide Phillips flat head countersunk bolts and screws in exposed work and elsewhere required, unless otherwise indicated.

N. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports which are not a part of the structural steel framework, as required to complete this work.
2. Fabricate miscellaneous units to the sizes, shapes and profiles shown, or if not shown, of the necessary dimensions to receive adjacent grating, plates, doors or other work to be retained by the framing.
3. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connections.
4. Equip units with integrally welded anchor straps for casting into poured concrete wherever possible.
5. Except as otherwise shown, space anchors 2 feet o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.
6. Galvanize exterior miscellaneous frames and supports.

O. Galvanizing: Provide the hot-dip process in accordance with ASTM A123. Galvanize specified items after fabrication is completed and produce coating free of roughness, whiskers, unsightly spangles, icicles, runs, barbs, sags, droplets, and other surface blemishes.

P. Shop Painting:

1. Shop paint metal work specified in this section except those members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, galvanized and stainless steel surfaces.
2. Remove loose mill scale, loose rust, oil, grease, and other deleterious materials before applying shop coat.
3. Immediately after surface preparation, brush or spray primer paint. Apply in accordance with the manufacturer's instructions at a rate to provide a uniform dry film thickness of 1.0 mil for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
4. Apply one shop coat of primer paint to fabricated metal items, except apply two coats of paint to surfaces which are inaccessible after assembly or erection.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine building construction that is to receive this work. Do not proceed with installation until conditions are suitable.

3.02 GENERAL INSTALLATION REQUIREMENTS

A. Grouting: Provide grouting for work of this section as shown, specified, and required. Use non-shrink grout and conform to manufacturer's directions.

B. Galvanizing Repair: Wire brush welds and damaged coating to clean bright metal. Apply one coat of galvanizing repair paint where surfaces are concealed or are to be finish painted. Use the specified hot-applied galvanizing repair compound where surfaces remain exposed and unpainted.

C. Shop Prime Coat Repair: Do not apply metal primer in wet weather unless steel is protected from dampness and is dry. Clean field welds, field bolts, and damaged shop primer after erection and apply a spot coat of the same primer used for the shop coat.

D. Fasteners: Provide fasteners and connectors of approved types as required for the installations, whether or not indicated. Provide galvanized fasteners for galvanized items and for exterior use. Fasten metal work to solid masonry with expansion bolts and to hollow masonry with toggle bolts. Provide screws threaded full length to screw head.

E. Protection of Dissimilar Materials: Protect aluminum from contact with dissimilar materials by painting the contact surfaces of each with two heavy coats of bituminous paint, or by suitable isolation gaskets, as approved and as applicable for each condition.

F. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.

G. Items set into concrete or masonry. Provide temporary bracing for such items until concrete or masonry is set. Place in accordance with setting drawings and instructions. Build strap anchors, into masonry as work progresses. Set frames flush with finish floor or wall surface and, where applicable, flush with side of opening.

H. Fastening: Field weld in accordance with AWS. Design and finish as specified for shop welding. Use continuous weld unless specified otherwise. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.

I. Spot prime abraded and damaged areas of zinc coating as specified and abraded damaged areas of shop prime coat with same kind of paint used for shop priming.

3.03 INSTALLATION OF CHANNEL AND ANGLE FRAMES

A. Secure clip angles at bottom of door frames to concrete slab with expansion bolts as shown. Level and plumb frame; brace in position required. At masonry, set frames in walls so anchors are built-in as the work progresses unless shown otherwise. Set frame in formwork for frames cast into concrete. Where frames are set in prepared openings, bolt to wall with spacers and expansion bolts.

3.04 BUILT-IN ANCHORAGE

A. Provide bolts, eyebolts, dowels, anchors, plates, Unistruts, inserts and other miscellaneous steel fastenings that are to be installed in concrete forms.

3.05 SCHEDULE OF ITEMS

A. Pipe Railings: Railings and supports shall withstand a concentrated load of not less than 200 pounds applied at any point, downward or horizontally and uniformly distributed load of not less than 50 pounds per lineal foot applied downward or horizontally. Fabricate of steel pipe, not lighter than Schedule 40, with joints mitered at angles and coped at intersections unless otherwise shown, and continuously welded, welds ground smooth and flush. Provide cast malleable steel brackets with mounting plates for railings on walls. Return exposed rail ends to within 1/2" of walls unless otherwise shown. Provide removable sections where indicated.

1. Exterior Post Anchors: Fabricate or pipe sleeves with closed ends or plates as shown. Where inserts interfere with reinforcing bars, provide flanged fittings welded or threaded to posts for

securing to concrete with expansion bolts. Provide heavy pattern sliding flange base plate with set screws at base of pipe or tube posts. Base plates are not required on pipe sleeves where ornamental railings occur.

2. Finish:

   a. Interior: Shop prime coat.
   b. Exterior: Hot dip galvanize after fabrications.

B. Handrails: Close free ends of rails with flush metal caps welded in place except where flanges for securing to walls with bolts are shown. Make provisions for attaching handrail brackets to wall, posts, and handrail as shown.

1. Elevator Entrance Wall Openings: Fabricate of channels shapes, plates, and angles as shown, and as specified above. Weld or bolt head to jamb as shown. Weld clip angles to bottom of frame and top of jamb members extended to structure above for framed construction. Provide holes for anchors. Weld to jamb members.
2. Provide supports for guide rail bracket attachment in pit, at each floor and top of hoistway. Provide intermediate rail bracket supports to maintain a maximum spacing between brackets of not more than 12’-10” vertically. Supports shall be within 12” of the clear hoistway rail and located on centerline of the car rail.
3. Elevator Threshold Angles: Sizes and connections shown.
4. Screen: Fabricate of 1-1/2” diamond mesh 10-gauge woven wire fabric, with frames of 1” steel channels and shapes, frame joints full welded and ground smooth or mortised and tenoned and peen riveted, mesh wires extended through holes in frames, clinched, and spot welded at 6” intervals.

C. Steel channel and angle frames for doors, duct openings, scuttles, mechanical equipment, louvers and other frames as shown and detailed of structural shapes shall be neatly fabricated to the exact size required and in accordance with approved shop drawings. Corners shall be neatly joined, welded and ground smooth. Concealed anchors for securing to concrete or masonry shall be welded on the back. Wherever required, steel frames shall be prepared to receive the necessary hardware. Provide galvanized sheet metal guards behind hardware attachment points. Where mechanical equipment such as fans, blowers, etc., and sheet metal are shown or specified to be attached to steel frames, the drilling, tapping, and attachment will be done as part of the work of the section in which the items are specified. Frames shall be galvanized where embedded in concrete or masonry.

D. Pipe Bollards: Provide bollards of 8” diameter steel pipe welded to steel baseplates, and with top edges ground smooth. Galvanize after fabrication. Securely anchor to substrate as indicated. Anchor chain to eye bolts welded to bollards. Fill with 2,000 psi concrete domed to shed water.

E. Removable Pipe Bollards: Provide sleeves with steel baseplates. Top of sleeve shall be inside threaded for plug. Provide removable pipe bollards with edges smooth and with top fitted with welded cap. If inside diameter of sleeve and outside diameter of bollard allow too loose a fit, weld a sleeve to bottom of bollard of diameter to provide snug, but removable fit. Galvanize after fabrication. Provide chains in lengths as required to reach from bollard to bollard with some slack. Provide 2 eye bolts welded to each bollard for attachment of chains. Chains will be secured with padlocks furnished by Owner. Provide brass or cast iron plug for each sleeve with special tool for plug removal.

F. Steel Backing Plates:

1. Backing plates in connection with studs and furring necessary for engaging and fastening of wall hung items shall be provided in locations shown and as necessary. Backing plates shall be securely welded to steel studs supporting members in the required position.
2. Finish: Shop prime coat.

G. Mechanical Chase: Fabricate and install as shown on drawings. Provide welded-on anchor devices. Shop prime.

H. Steel gates and fencing: Fabricate and install as shown on drawings. Hot dip galvanize and shop prime.

I. Other items as shown and in accordance with reviewed drawings.

END OF SECTION 05 55 00

SECTION 07 21 16 THERMAL BLANKET INSULATION

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Building Insulation, as indicated on the drawings, specified herein, or reasonably required to complete the work.

C. Section includes: Batt insulation for thermal and acoustical purposes.

1. Insulate at roof line
2. Insulate at furred exterior walls
3. Sound attenuation at interior walls

D. Related Sections:

1. Insulation of Pipes and Ducts: Division 15.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

B. Deliver materials to project site in manufacturer's original packaging. Store materials off ground. Protect against weater, condensation, and damage. Immediately remove damaged material from project site.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Owens-Corning Fiberglass Corp. (OCF)

B. Johns Manville Corp. (JM)

C. U.S. Gypsum (USG)

2.02 MATERIALS

A. Thermal Insulation: ASTM C665, Type 1, incombustible fiberglass batts or blankets, JM Fiber Glass Commercial Insulation, Non-Faced. Material shall be of sufficient thickness to provide insulation R-value as shown.

1. Thermal Restistance: R-19 for walls and R-38 for ceiling

B. Acoustic Insulation: ASTM C665, Type 1, incombustible fiberglass batts or blankets, USG "Thermafiber SAFB" or equal, 3-1/2" thick unless otherwise shown, Sound Control Batts.

C. Miscellaneous Materials: Metal clips, retainer plates, zinc coated wires, adhesives or other devices for anchoring insulation to framing shall be types as recommended by insulation manufacturer and acceptable to the architect.

D. Materials shall not exceed flame spread of 25 or smoke density of 450 when tested in accordance with ASTM E84.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas which receive insulation to insure protection against inclement weather during and after installation.

B. Examine space allocated for insulation for proper depth to receive material.

C. Correct unsuitable conditions before proceeding with insulation.

3.02 INSTALLATION

A. Fit installation snugly between framing.

B. Maintain integrity of insulation over entire area to be insulated.

C. Insulate small areas between closely spaced framing members.

D. Carefully cut and fit insulation around pipes, conduits, and other obstructions.

E. Do not compress insulation in excess of 10 percent.

F. Extend insulation’s full thickness over entire surface to be insulated.

G. Thermal and Acoustic Insulation: Install between framing with a friction fit. Provide wires as required to prevent sagging. Place vapor barrier (facing) of thermal insulation towards inside of building.

H. Safing Insulation: Install between structure members with friction fit and retainer plates.

END OF SECTION 07 21 16

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Johns Manville is providing this specification to the user as a courtesy to utilize in their determination of the optimal system for their project's specific needs. By utilizing the general information provided herein, the user agrees such information will not be relied upon as a substitute for professional engineering design and/or documentation required by building code, contract or applicable law. The information in this specification must be reviewed/approved by a project designer before use. The user of this information assumes sole responsibility for its use of this specification. Additional information, such as Data Sheets, SDS, Application Guides and other literature on the Johns Manville products used in this specification, can be found https://www.jm.com/en/commercial-roofing/sbs-roofing-systems/.

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SECTION 075216

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. SBS-modified bituminous membrane roofing.

B. Cover board.

C. Roof insulation.

1.2 RELATED SECTIONS

A. Division 05 Section "Steel Decking" for steel roof deck.

B. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking.

C. Division 07 Section "Sheet Metal Flashing and Trim" for flashings and counter flashings.

D. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:

1. ASTM D 1079 "Standard Terminology Relating to Roofing and Waterproofing."
2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
3. Roof Consultants Institute "Glossary of Building Envelope Terms."

B. Sheet Metal Terminology and Techniques: SMACNA “Architectural Sheet Metal Manual.”

1.4 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Installer shall comply with current code requirements based on authority having jurisdiction.

D. Wind Uplift Performance: Roofing system shall meet the intent of systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; UL 790, for application and roof slopes indicated.

1.5 SUBMITTALS

A. Product Data: Manufacturer’s data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system details and details of attachment to other Work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening and adhesive patterns.

C. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturers product who is eligible to receive manufacturers special warranty.

D. Maintenance Data: Refer to Johns Manville’s latest published documents on www.JM.com.

E. Guarantees: Provide manufacturer’s current guarantee specimen.

F. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by the membrane manufacturer indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product who is eligible to receive the specified manufacturer's guarantee.

B. Manufacturer Qualifications: Qualified manufacturer that has UL listing or accredited testing agency for roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

D. Test Reports:

1. Roof drain and leader test or submit plumber’s verification.

E. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system shall be labeled by the single source roofing manufacturer issuing the guarantee.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

A. Provide manufacturer's system guarantee equal to Johns Manville's Peak Advantage No Dollar Limit Roofing System Guarantee.

1. Single-source special guarantee includes roofing plies, base flashings, liquid applied flashing, roofing membrane accessories, roofing membrane, roof insulation, fasteners, adhesives, cover board,

walkway products, and other approved single-source components of roofing system marketed by the manufacturer.

2. Guarantee Period: 20 years from date of Substantial Completion.

B. Installer's Guarantee: Submit roofing Installer's guarantee, signed by Installer, covering Work of this Section, including all components of roofing system, for the following guarantee period:

1. Guarantee Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BASE PLY AND CAP-SHEET MATERIALS

A. Roofing Membrane Sheet: SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified.

1. ASTM D 6164, Grade S, Type I polyester-reinforced, Basis of design: DynaLastic 180 S or approved equal.

B. Roofing Membrane Cap Sheet: SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.

1. ASTM D 6164, Grade G, Type **I**, polyester-reinforced, Basis of design: DynaLastic 180 FR CR G or approved equal.

2.2 FLASHING SHEET MATERIALS

A. Backer Sheet: ASTM D 4601, Type II, asphalt-impregnated and coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides. Basis of design: PermaPly 28

B. Flashing Sheet: SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.

1. ASTM D 6164, Grade G, Type I], polyester-reinforced, Basis of design: DynaLastic 250 FR CR G or approved equal.

C. Liquid Applied Flashing: A liquid and fabric reinforced flashing system created with a stitch bonded polyester scrim and a two-component, moisture cured, elastomeric, liquid applied flashing material, consisting of an asphalt extended urethane base material and an activator. Basis of design: PermaFlash System

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Roofing Asphalt: ASTM D 312-15, Type IV.

C. Asphalt Primer: ASTM D 41.

D. Asphalt Roofing Cement: ASTM D 4586, type I, asbestos free, of consistency required by roofing system manufacturer for application. Basis of design: MBR Utility Cement or approved equal.

E. Cold-Applied Flashing Adhesive: Roofing system manufacturer's asphalt-based, two-part, elastomeric, liquid-applied, cold-applied adhesive specially formulated for compatibility and use with flashing applications. Basis of design: MBR Flashing Cement or approved equal.

F. Mastic Sealant: As required.

G. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and provided by the roofing system manufacturer.

H. Roofing Granules: Ceramic-coated roofing granules matching specified cap sheet, provided by roofing system manufacturer. CR Roofing Granules

I. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.4 WALKWAYS

A. Walkway Pads: Mineral-granule-surfaced, reinforced modified asphalt composition, slip-resisting pads, manufactured as a traffic pad for foot traffic provided by roofing system manufacturer, with a pad size of 32-inch x 32-inch.

2.5 COVER BOARD

A. Perlite Board: ASTM C 728, Type 1; composed of expanded perlite, cellulosic fibers, binders and waterproofing agents with top surface seal-coated. Basis of design: RetroPlus Roof Board

2.6 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. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade[2 (20 psi)**,** Basis of design: ENRGY 3 or approved equal.
   1. Provide insulation package with minimum thickness of 6-inches not including coverboard.
   2. Provide insulation package in multiple layers.
   3. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.
      a. Determined in accordance with CAN/ULC S770 at 75ºF (24ºC)

2.7 TAPERED INSULATION-CRICKETS

A. Tapered Insulation: ASTM C 1289, Type II, Class 1**,** Grade 2 (20 psi)**,** provide factory-tapered insulation boards fabricated to slope of 1/2 inch per 12 inches**,** unless otherwise indicated. Basis of design: Tapered ENRGY 3

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide saddles, crickets, tapered edge strips, and other insulations shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of design: Tapered Fesco Edge Strip.

C. 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 furnished by roofing system manufacturer.

D. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate. Basis of design: JM Two-Part Urethane Insulation Adhesive - Canister (UIA) or approved equal.

E. Insulation Cant Strips: ASTM C 728, perlite insulation board. Basis of design: FesCant Plus

F. Wood Nailer Strips: Comply with requirements in Division 06 Section **"**Miscellaneous Rough Carpentry**."**

2.9 EDGE METAL COMPONENTS

A. Coping System: Fabricated coping consisting of a base piece and a snap-on cap. Color as approved by Owner

B. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.

1. General:

a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

b. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

2. Steel Decks:

a. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
b. Verify that decking is visibly dry and free of moisture.
c. Verify that the decking is smooth and free of large cracks, holes, or sharp changes in elevation of the surface.
d. When applicable perform pull test with the specific fastener being used on the project to confirm the fastener resistance meets the requirements for that particular system.

3. Ensure general rigidity and proper slope for drainage.
4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner's Representative and shall be corrected prior to installation of roofing system.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

C. If applicable, prime surface of deck with primer at a rate recommended by roofing manufacturer and allow primer to dry.

D. Proceed with each step of installation only after unsatisfactory conditions have been corrected.

3.3 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Loose Laid Insulation with Top Insulation Layer Mechanically Fastened: Loose lay insulation with staggered joints and secure top layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type to deck type.

1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.

3.4 COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.

1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.

D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.

1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

E. Adhered Cover Board: Adhere cover board to substrate as follows:

1. Install in a solid mopping of hot roofing asphalt according to roofing system manufacturer’s instruction.

3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24), contact the membrane manufacturer for installation instructions regarding installation direction and backnailing

D. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
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. Asphalt Heating: Heat roofing asphalt to temperature recommended by roofing manufacturer to flux modified membrane. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.

F. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.6 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install one smooth modified bituminous roofing membrane sheet, and the SBS Modified surface membrane according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, with the following installation method:

1. Unroll roofing membrane sheets and allow them to relax.
2. Adhere smooth modified bituminous roofing membrane sheet, and the SBS Modified surface membrane to the coverboard in a solid mopping of hot roofing asphalt applied at temperatures recommended by roofing system manufacturer.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.
2. As required, apply roofing granules to cover exuded bead at laps while bead is hot.

C. Install roofing membrane sheets so side and end laps shed water.

3.7 FLASHING 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**: Adhere backer sheet to substrate in a solid mopping of hot roofing asphalt.
3. **Flashing Sheet Application**: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt. Apply hot roofing asphalt to back of flashing sheet as required by roofing system manufacturer.

B. Extend base flashing up walls or parapets 8 inches (200 mm) above roofing membrane. Refer to manufacturer's standard flashing details.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing with a strip of glass-fiber fabric set in MBR Flashing cement.

D. Roof Drains: Set 30-by-30-inch (760-by-760-mm) 4 lb lead flashing sheet in a bed of MBR Flashing Cement on completed roofing membrane. Cover metal flashing with roofing membrane cap-sheet stripping and extend a minimum of 4 inches (100 mm) beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

E. Flash all penetrations using liquid applied flashing system.

3.8 EDGE METAL INSTALLATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Provide edge details as indicated on the Drawings. Install in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual."

C. Join individual sections in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual".

3.9 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.

1. Sweep away loose aggregate surfacing and set walkway pads in additional flood coat of hot roofing asphalt.

3.10 FIELD QUALITY CONTROL

A. Owner may engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect.

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.

3.11 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

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 075216

SECTION 07 54 19 FULLY-ADHERED PVC MEMBRANE ROOFING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Fully Adhered PVC Membrane Roofing, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide fully-adhered Fleece Backed 80 mil nominal reinforced PVC thermoplastic single ply system, over a light-weight insulating concrete substrate, utilizing heat-welded seams and prefabricated flashing accessories, PVC-coated sheet metal flashings where recommended by manufacturer and required for proper termination.
2. Provide adhesives and fasteners.
3. Provide PVC coated sheet metal flashing as required for a complete water tight membrane.
4. Provide pre-formed heady duty PVC walkway pads as supplied by roofing manufacturer, to all rooftop equipment.
5. Provide primer for the surface of the lightweight insulating concrete with a light coating of water based latex adhesive at 300 sq ft per gal. Allow to dry prior to installation of roof system.

C. Related Sections:

1. Section 07 62 00 – Sheet Metal Flashing and Trim
2. Section 22 00 00 – Plumbing, Roof Drains

1.02 SUBMITTALS

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

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.

C. Samples for Verification on the following products:

1. 12-by-12 inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.

D. Installer Certificates: Signed by roofing system manufacturer certifying that installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in “Performance Requirements” Article.

1. Submit evidence of meeting performance requirements.

F. Qualification Data: For installer and manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
H. Research/Evaluation Reports: For components of membrane roofing system.

I. Maintenance Data: For roofing system to include in maintenance manuals.

1.03 QUALITY ASSURANCE

A. This roofing system shall be applied only by a roofing contractor authorized by the manufacturer prior to bid. The roofing contractor shall have at least five (5) years of experience with the submitted manufacturer.

B. Upon completion of the installation and the delivery to the manufacturer by the Applicator of a certification that all work has been done in strict accordance with the contract specifications and the manufacturer's requirements, an inspection shall be made by a Technical Representative of the manufacturer to review the installed roof system.

C. There shall be no deviation made from the project specifications or the approved shop drawings without prior written approval by the Architect and the manufacturer.

D. All work pertaining to the installation of the membrane and flashings shall only be completed by applicator personnel trained and authorized by the manufacturer in those procedures.

E. Provide a copy of the roofing system manufacturer's inspection report of completed roofing installation.

F. Regulatory Requirements: The applicator shall submit evidence that the proposed roof system meets the requirements of the applicable building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

1. Factory Mutual Research Corporation (FM) – Norwood, MA

a. Class 1-240

2. Underwriters Laboratories, Inc. – Northbrook, IL

a. Class A assembly

G. Coordination:

1. Hold roofing pre-construction conference at project site not more than one week prior to beginning roofing.
2. Attendance is mandatory for roofing sub-contractor, roofing foreman, and roofing manufacturer's representative.

1.04 DELIVERY, STORAGE, AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions which may affect the ease of membrane weldability.

D. All adhesives shall be stored at temperatures between 40º F (5º C) and 80º F (27º C).

E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

F. All materials which are determined to be damaged by the Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

1.05 PROJECT CONDITIONS

A. Weather limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur the applicator shall provide the necessary equipment to dry the surface prior to application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. The applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membrane. The applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.

G. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over felt or plywood over insulation board shall be provided for all new and existing roof areas which receive rooftop traffic during construction.

H. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air and/or similar methods.

I. The applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

J. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off-site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State, and Federal requirements.

K. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the applicator and properly transported to a legal dumping area authorized to receive such material.

L. The applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

M. Flammable adhesives shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

N. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.

O. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition, in writing, for correction at the Owner's expense (letter copy to the manufacturer).

P. Site cleanup, including both interior and exterior building areas which have been affected by construction, shall be completed to the Owner's satisfaction.

Q. The applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.

R. The adhered membrane shall not be installed under the following conditions without consulting the manufacturer technical department for precautionary steps:

1. The roof assembly permits interior air to pressurize the membrane underside.
2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
3. The wall/deck intersection permits air entry into the wall flashing area.

S. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

T. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

1.06 WARRANTIES

A. Manufacturer's System Warranty (only products purchased from the manufacturer are covered under System Warranty).

1. Upon successful completion of the work to the manufacturer's satisfaction and receipt of final payment, a twenty (20) year Full System, Non-Prorated, No Dollar Limit (NDL) Warranty shall be issued, including the labor and all components that comprise a roof system. Ponding water on the roof, without time limit, shall not be excluded from the warranty.

B. Applicator/Roofing Contractor Warranty

1. The applicator shall supply the Owner with a separate two-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the applicator warranty term, defective or otherwise not in accordance with the contract documents, the

applicator shall repair that defect at no cost to the Owner. The applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

C. Owner Responsibility: The Owner shall notify both the manufacturer and the applicator of any leaks as they occur during the time period when both warranties are in effect.

PART 2 - PRODUCTS

2.01 GENERAL

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:

1. SP8PA Johns Manville Fully-Adhered PVC Roof System or equal.
2. Alternate manufacturers meeting quality assurance requirements and having products with equal or better properties may be acceptable subject to approval.

2.02 MATERIALS

A. Adhesives: PVC Membrane Adhesives.

1. Field Membrane: Latex PVC Membrane adhesive. Supplied and guaranteed by primary roofing membrane manufacturer.
2. Parapet: California State approved low VOC Solvent-Based PVC Membrane Adhesive. Supplied and guaranteed by primary roofing membrane manufacturer.

B. Membrane Roofing:

1. Cover areas with fully-adhered roof system. Seams shall be completed only by heat-welding in strict compliance with manufacturer's published recommendations. Flashings shall be / or equal to Johns Manville PVC Membrane or PVC-Clad Metal as required and illustrated in Johns Manville's published specifications.
2. Membrane: 80 mil white polyester reinforced PVC with a polyester fleece heat-laminated on the underside. Color: White. Comply with ASTMD-4434, Type III. Johns Manville PVC 80 Fleece Membrane or equal.
3. Field seams shall be heat welded.

C. Base Flashing:

1. Flashings shall be / or equal to Johns Manville PVC reinforced 80 mil field membrane along with the appropriate manufacturers accessories. Pre-formed inside and outside corners are required.
2. Pipe Boots shall be Johns Manville PVC Vent Pipe Boots or equal.
3. Adhesives and miscellaneous sealants should be used as called for in the manufacturer's specifications.

D. Roof Walk: Preformed, heavy-duty PVC walkway pads as supplied by roofing manufacturer.

E. Pitch Pans / Filler: Johns Manville pre-formed UltraGard PVC Pitch Pans and Pourable Sealer.

F. Expansion Joints: Construct per manufacturer's published details using a polypropylene rod that measures 1-inch larger than the maximum joint opening.

G. Roof Drains: Drain flashing shall be a target made of field-welding two pieces of JM SR-60 PVC membrane solidly to each other, and then installed per published JM flashing details for roof drains.

H. All other materials not specifically described, but required for a complete and proper installation of roofing, shall be selected by approved manufacturer and subject to approval of Architect/Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Make sure that all counterflashing receivers, curbs, etc., are constructed in such a manner as to provide a minimum 8-inch base flashing height measured from the finished roof's surface to the top of the base flashing membrane.

E. Spray or roll a light covering of Latex PVC Membrane Adhesive applied at 1 gal. for every 300 sq. ft. over entire surface of substrate. Allow to dry prior to membrane application.

3.03 MEMBRANE INSTALLATION

A. At end of each day's work, protect installed roofing by closing off edge of system with water cut-off.

B. Remove water cut-off sealants completely and clean prior to resuming roofing application.

C. Allow field sheets to relax for a minimum of 30 minutes before securing membrane.

D. Starting at low edge of roof, begin applying the sheets in adhesive per manufacturer's requirements. Field laps shall be constructed to that a minimum 1.5-inch lap can be continuously heat-welded. Edges where the reinforcing membrane has been cut shall be covered with Seam Sealant the same day.

E. Roll membrane into adhesive using a carpet-wrapped turf roller, taking care not to change direction of roller while on field membrane to avoid wrinkling and membrane damage.

F. At all intersections with vertical walls, curbs, etc., and at all penetrations (drains, pipes, etc.) secure the membrane using No. 15 Johns Manville High Load Fasteners with (2) 3/8-inch round, barbed galvanized steel discs. UltraGard High Load Plates. Cover fasteners with a heat-welded membrane as prescribed above.

G. Johns Manville fully-adhered PVC system specification shall be an integral part of this specification.

H. Quality Control of Seams: All seams must be checked for integrity with a blunt-ended probe. Any openings or "fishmouths" shall be repaired with a hand-held hot air tool fitted with a narrow nozzle tip and with a roller. Each day, several sections of seams welded that day shall be pulled apart by the roofing contractor to test the quality of welds. Should the welds be deficient (i.e., the weld pulls apart rather than the sheet coming apart), a more thorough examination of the work performed must be carried out and necessary repairs made.

3.04 FLASHING INSTALLATION

A. Preparation: Inspect walls, curb heights, counterflashings, etc., and check for conformance with minimum base flashing height of eight (8) inches. Non-conforming areas must be corrected prior to installation of flashing.

B. All metal edging, scuppers and overflows must be constructed with PVC-clad metal. All PVC-clad metal shall be fabricated to form hemmed edges to prevent sharp metal edges from cutting the membrane, except when in conjunction with wood nailers.

C. Membrane flashings shall be fully-adhered using approved PVC Membrane Adhesive. All wall and curb flashings shall be secured at their top edge in strict accordance with Johns Manville Flashing Specifications.

D. Any substrates that have asphalt contamination shall be isolated from the new roof system using PVC-coated metal base flashing or Invinsa cover board.

E. Install flashing in accordance with roofing manufacturer's specification.

F. All pipes shall be flashed with Johns Manville's Vent Pipe Flashing Boots or equal.

3.05 WALKWAY INSTALLATION

A. Walkway: Install PVC Walkway material over clean, dry surfaces. Lay out areas where material is to be installed with most of the material oriented so that it is placed between field seams. Heat weld a 1.5-inch perimeter of the pad. Check seams for voids that might prevent watertightness.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation and submit report to Architect.

1. Have an authorized representative of manufacturer supplying the roofing system perform two (2) In-Progress Inspections and provide written confirmation.
2. Additionally, authorized representative of manufacturer supplying the roofing system shall perform a Final Inspection in the presence of the Owner's representative and provide written confirmation.

C. Repair or remove and replace components of membrane 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.

3.07 PROTECTING AND CLEANING

A. Protect membrane 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 membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane 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 54 19

SECTION 07 62 00 SHEET METAL FLASING AND TRIM

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Sheet Metal, as indicated on the drawings, specified herein, or reasonably required to complete the work.

C. Section includes flashing and sheet metal, including but not limited to the following:

1. Sheet metal flashings in connection with roofing.
2. Miscellaneous metal flashing and counterflashing as required
3. Coping caps.
4. Sheet metal covers on equipment platforms.
5. Shop priming and field touch-up.
6. Caulking.

D. Related Sections:

1. Roof Accessories: Section 07 63 00.
2. Metal Fabrications: Section 05 55 00.

1.02 SUBMITTALS

A. Shop Drawings and Data: For specially fabricated items, show layout dimensions, details and methods at joined and formed sections. Provide catalog cuts for manufactured items.

1.03 QUALITY ASSURANCE

A. Comply with the Architectural Sheet Metal Manual published by SMACNA for conditions not indicated or specified and for general fabrication of sheet metal items.

PART 2 - PRODUCTS

2.01 BASIC MATERIALS

A. Sheet Metal:

1. Galvanized Sheet Steel: ASTM A653, coating class G90. Minimum gauge, unless otherwise specified, 24 gauge. All exposed sheet metal shall have a factory applied finish selected from standard colors.

B. Sheet Lead:

1. Federal Spec QQ-L-201f. Lead Sheet. Minimum thickness: 4 lbs/sf or 1/16”. Use 50/50 solder and neutralize flux at all soldered joints. Use bituminous protection coating when placed adjacent to uncured concrete.

C. Sheet Metal Fasteners:

1. Rivets, nails, sheet metal screws, machine screws, self-tapping screws, and stove bolts, of types and size best adapted to the conditions of use. Use galvanized, cadmium-plated or 300 series stainless steel.
2. Pop rivets, closed-end type, by USM Corp., may be used for metal to metal connections where future disassembly is not required.

D. Solder: ASTM B32.

E. Flux: Raw muriatic acid.

F. Sealant: Single-component nonsag polyurethane or silicone, as specified in Section 07 9200.

G. Felt: ASTM D226, 15-pound type.

H. Primer: Approved brand of zinc-dust zinc-oxide primer per Section 09 91 00 with manufacturer's pretreatment materials.

2.02 FABRICATION

A. Workmanship:

1. Select methods of fabrication, assembly and installation. Fabricate in accordance with the best trade practices with joints and corners accurately machined, filed and fitted, and rigidly framed together and connected. Match components to produce perfect continuity of line and design
2. Make joints and connections in exterior face of metal watertight.
3. Make hairline joints in face of metal in contact except where shown or required for expansion of fitting.
4. Conceal fastenings except as otherwise shown. Conceal reinforcement within the finished assembly.
5. Seal reglets with removable filler to prevent intrusion of foreign substances.

B. Soldering:

1. Clean material and tin prior to soldering. Solder with heavy coppers of blunt design, properly tinned before use.
2. Solder slowly with well heated coppers. Heat the seams thoroughly and completely fill with solder. Exposed soldering with finish surfaces shall be neatly made full flowing and smooth.
3. Wash acid flux with soda solution after soldering and remove soldering flux on exposed and painted surfaces.

C. Expansion and Contraction:

1. Provide for thermal expansion and contraction, and building movement in completed work, without overstressing the material, breaking connections or producing wrinkles and distortion in finished surfaces. Make water and weather tight.
2. Where subject to thermal expansion and contraction, attach members with clips to permit movement without damage or provide slotted or oversize holes with washers only, as acceptable.
3. Make lock seam work flat and true to line and sweat full of solder except where installed to permit expansion and contraction.

a. Flat lock seams and lap seams, where soldered, shall lap according to pitch, but in no case less than three inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrates are smooth and clean to extent needed for sheet metal work.

B. Verify that reglets, nails, cants, and blocking to receive sheet metal are installed and free of concrete and soil.

C. Correct unsuitable conditions prior to installation.

3.02 PREPARATION

A. Before installing sheet metal, verify shapes and dimensions of surface to be covered.

3.03 INSTALLATION

A. Install metal items as indicated, according to approved submittals, and as required to complete the entire work. Securely fasten and assemble, and make watertight and weather tight.

B. Coordination: Coordinate sheet metal items in connection with roofing for proper installation and furnish in sufficient time to avoid delay in roofing construction. Install roofing sheet metal simultaneously with roofing.

C. Caulking: Provide sealant caulking as indicated and as required to seal and complete work of this section. Conform to Section 07 92 00.

D. Protection from contact with dissimilar materials:

1. Metal surfaces: Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.
2. Wood or other absorptive materials: Paint surfaces that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

E. Expansion and contraction: Provide expansion and contraction joints at not more than 30-foot intervals. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, an additional joint shall be provided. Space joints evenly.

3.04 SPECIFIC ITEMS

A. Coping Caps:

1. Fabricate from 24 gauge galvanized sheet steel, continuous cleats. Use materials with factory finish to be selected from standard colors.
2. Provide loose lock seams not to exceed 24 feet o.c. to allow for expansion.
3. Intermediate and End Joints: Lock-seam and solder.
4. Expansion Joint Locks: Fill with sealant.

B. Drip Flashings: Provide at heads of windows, window sills, and doors. Use material compatible with window and frame materials. Coordinate installation of flashing with that of windows and doors. Provide hemmed, exposed edges in 1-piece lengths. Color shall match frame color and finish.

END OF SECTION 07 62 00

SECTION 07 63 00 ROOF ACCESSORIES

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Roof Hatch, as indicated on the drawings, specified herein, or reasonably required to complete the work.

C. Related Sections:

1. Fully-Adhered PVC Membrane Roofing: Section 07 54 19.
2. Finish Painting: Section 09 91 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND TYPES

A. Roof hatch shall be sized at 36” by 48”, and have a single side-hinged, spring-assisted door. The hatch installation shall include a safety railing system as described below.

B. Acceptable Roof Hatch Manufacturers:

1. Dur-Red.
2. Or equal

C. Acceptable Safety Railing System Manufacturers:

1. KeeHatch Railing System (877-723-3766)
2. Nystrom Safety Railing System (800-547-2635)

2.02 FABRICATION

A. Cover – Galvanized Steel, Prime Painted: 14 gauge with three inch beaded flange, neatly welded. One inch thick glass fiber insulation in cover, fully covered and protected by a 22 gauge liner.

B. Curb: Eight inch minimum, in-height, fabricated from 14 gauge galvanized steel, prime painted. Form curb with a 3-1/2” flange.

1. Equip with an integral metal cap flashing, same gauge and material as curb, continuously weld at corners to insure water tightness. One inch thick rigid fiberboard insulation at exterior of the curb.

C. Roof Hatch: Completely assembled with heavy pintle hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasps inside and outside, and neoprene draft seals.

1. Equip cover with an automatic hold-open arm complete with red vinyl grip handle to permit easy, one-hand release.

2. Hardware Finish: Zinc-coated in accordance with manufacturer's standards.

D. Safety Railing System: Shall comply with OSHA Standards #1910.23 and 1910.27. Railing system shall consist of a top-rail, mid-rail, and chain or swinging gate, with the hatch curb acting as the toe plate. Railing system shall extend to a height of at least 42 inches from the finished roof deck and be free of sharp edges and snag points. Product label shall include easy reading "NO HOISTING" warning along with manufacturer's identification and patent label. Provide seven year manufacturer's warranty.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install hatch assemblies over roof openings.

B. Attach to building structure in compliance with manufacturer's installation instructions. Flash to produce a water and weather tight installation.

END OF SECTION 07 63 00

SECTION 07 84 00 FIRESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Firestopping, as indicated on the drawings, specified herein, or reasonably required to complete the work.

C. General Description of the work of this section:

1. Only tested firestop systems shall be used in specific locations as follows:

a. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
b. Safing slot gaps between edge of floor slabs and curtain walls.
c. Openings between structurally separate sections of wall or floors.
d. Gaps between the top of walls and ceilings or roof assemblies.
e. Expansion joints in walls and floors.
f. Openings and penetrations in fire-rated partitions or walls containing fire doors.
g. Openings around structural members which penetrate floors or walls.

D. Related Sections

1. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

a. Section 03 31 13 – Structural Concrete
b. Section 04 05 13 – Mortar and Grout
c. Section 04 22 00 – Concrete Unit Masonry
d. Section 07 92 00 – Joint Sealers
e. Section 09 24 00 – Portland Cement Plaster
f. Section 09 29 00 – Gypsum Board
g. Section 21 13 13 – Wet-Pipe Sprinkler Systems
h. Section 22 00 00 – Plumbing
i. Section 23 00 00 – Heating, Ventilating, and Air Conditioning
j. Section 26 05 00 – Common Work Results for Electrical
k. Section 28 31 00 – Fire Detection and Alarm

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.03 REFERENCES

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Test Requirements: UL 1479, “Fire Tests of Through-Penetration Firestops”

C. Test Requirements: UL 2079, “Tests for Fire Resistance of Building Joint Systems”

D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:

a. Firestop Devices (XHJI)
b. Fire Resistance Ratings (BXRH)
c. Through-Penetration Firestop Systems (XHEZ)
d. Fill, Voids, or Cavity Material (XHHW)
e. Forming Materials (XHKU)
f. Joint Systems (XHBN)
g. Perimeter Fire Containment Systems (XHDG)

2. Alternate Systems: “Omega Point Laboratories Directory” (updated annually).

E. Test Requirements: ASTM E 1966, “Standard Test Method for Fire Resistive Joint Systems”

F. Test Requirements: ASTM E 2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”

G. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops”

H. ASTM E 84, “Standard Test Method for Surface Burning Characteristics of Building Materials”

I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

J. California Building Code

K. NFPA 101 - Life Safety Code

L. NFPA 70 - National Electric Code

1.04 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

B. Manufacturer's engineering judgment identification number and drawing details when no UL system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

C. Submit material safety data sheets provided with product delivered to job-site.

1.05 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation

procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.07 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

PART 2 - PRODUCTS

2.01 FIRESTOPPING, GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:

1. Hilti, Inc., Tulsa, Oklahoma, 800-879-8000/www.us.hilti.com
2. Provide products from the above acceptable manufacturer; no substitutions will be accepted.

2.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Cast-in place firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and cable bundles penetrating concrete floors, the following products are acceptable:

1. Hilti CP 680 Cast-In Place Firestop Device

    a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.

2. Hilti CP 681 Tub Box Kit for use with tub installations.
3. Hilti CP 682 Cast-In Place Firestop Device for use with noncombustible penetrants.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 604 Self-leveling Firestop Sealant
3. Hilti CP 620 Fire Foam
4. Hilti CP 606 Flexible Firestop Sealant

5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti CP 601s Elastomeric Firestop Sealant
2. Hilti CP 606 Flexible Firestop Sealant
3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti CP 777 Speed Plugs
2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 620 Fire Foam
3. Hilti CP 601s Elastomeric Firestop Sealant
4. Hilti CP 606 Flexible Firestop Sealant

I. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti CP 618 Firestop Putty Stick
2. Hilti CP 658T Firestop Plug

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Firestop Putty Pad

K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 643N Firestop Collar
2. Hilti CP 644 Firestop Collar
3. Hilti CP 645/648 Wrap Strips

L. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti CP 637 Firestop Mortar
2. Hilti FS 657 FIRE BLOCK
3. Hilti CP 620 Fire Foam
4. Hilti CP 675T Firestop Board

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 675T Firestop Board

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-Leveling Firestop Sealant

O. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 658T Firestop Plug

P. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

Q. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 ADJUSTING AND CLEAINING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION 07 84 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Joint Sealants, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Exterior joints
2. Interior joints

1.02 SUBMITTALS

A. In addition to Product Data, submit the following:

1. Samples of each type and color of joint sealant required.
2. Test reports for joint sealants evidencing compliance with requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. Use sealants from the following types, as indicated on drawings or as appropriate to the joint being sealed. Refer to schedule for additional for additional approved applications.

1. Type 1: One-part moisture curing Polyurethane sealant. FS TT-S-230C, Class A Type II, non-sag.

a. DYNATROL I, manufactured by Pecora Corporation, Harleysville, PA.
b. SIKAFLEX-1a, manufactured by Sika Corporation, Lyndhurst, NJ.

2. Type 2: Multi-part Polyurethane Base. FS TT-S-227E, Class A, Type II, non-sag.

a. DYNATROL II, manufactured by Pecora Corporation, Harleysville, PA.
b. SIKAFLEX-2c, manufactured by Sika Corporation, Lyndhurst, NJ.

3. Type 3: One-part moisture curing Polyurethane sealant. FS TT-S-230C, Class A, Type I, self-leveling.

a. UREXPAN NR-201, manufactured by Pecora Corporation, Harleysville, PA.
b. VULKEM 45, manufacturered by Mameco International Inc., Cleveland, OH.

4. Type 4: Multi-part Polyurethane Base. FS TT-S-227, Class A, Type I, self-leveling.

a. DYNATRED or UREXPAN NR-200, manufactured by Pecora Corporation, Harleysville, PA.
b. SIKAFLEX-2c S/L, manufactured by Sika Corporation, Lyndhurst, NJ.

5. Type 5: One part Silicone Sealant. FS TT-S-1543a, Type S, Class A, non-sag.

    a. 863 ACETOXY Silicone Sealant, manufactured by Pecora Corporation, Harleysville, PA.
    b. SCS 1200, manufactured by General Electric Co., Waterford, NY.

6. Type 6: One-part, non-sag, acrylic latex sealing compound, ASTM C834, AC-20, manufactured by Pecora Corporation, Harleysville, PA.

    a. ACRYLIC LATEX No. 834 manufactured by Tremco, Beachwood, OH.

7. Type 7: One-part, non-sag, butyl rubber base acoustical sealant, ASTM C834, BA-98, manufactured by Pecora Corporation, Harleysville, PA.

    a. SHEETROCK ACOUSTICAL SEALANT, manufactured by USG, Chicago, IL.

8. Type 8: One or two part silicone sealant, FS TT 1543A, non-sag, neutral cure 756HP or 795 silicone building sealant, 791 perimeter sealant, manufactured by Dow Corning Corporation, Midland, MI.

9. Type 9: One part structrual glazing silicone sealant, FS TTS 1543A, Type 5, non-sag, neutral cure 795 silicone building sealant or 995 structural adhesive, manufactured by Dow Corning Corporation, Midland, MI.

10. Type 10: One part mildew resistant fungicidal silicone sealant, FS TTS 1543C, Type 5, non-sag, neutral cure 786 mildew resistant silicone sealant, manufactured by Dow Corning Corporation, Midland, MI.

11. Or approved equal.

B. Accessories:

1. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
2. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
3. Joint Backing: ASTM D1056; round closed cell polyethylene foam rod; oversized 25% larger than joint width.

    a. DENVERFOAM or GREENROD, manufactured by Pecora Corporation, Harleysville, PA.
    b. SONOFOAM BACKER ROD, manufactured by Sonneborn Building Products, Minneapolis, MN.

4. Bond Breaker: Pressure sensative tape recommended by sealant manufacturer to suit application. Apply to bottom of joints which are too shallow to receive foam backer rod.

C. Manufacturers:

1. Silicone Sealants:

    a. Bostik Inc.
    b. Dow Corning.
    c. GE Silicones.
    d. NUCO Industries, Inc.
    e. Ohio Sealants, Inc.

f. Pecora Corporation.
g. Polymeric Systems, Inc.
h. Sonneborn Building Products Div., ChemRex Inc.
i. Tremco.

2. Urethane Sealants:

a. Bostik Inc.
b. Mameco International.
c. W.R. Meadows, Inc.
d. Pacific Polymers, Inc.
e. Pecora Corporation.
f. Polymeric Systems, Inc.
g. Sika Corporation.
h. Sonneborn Building Products Div., ChemRex Inc.
i. Tremco.

D. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

E. Colors: Provide colors indicated for exposed joint sealants or, if not indicated, as selected by Architect from manufacturer's full range for this characteristic.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Comply with joint sealant manufacturer's instructions for products and applications indicated.

B. Sealant Installation Standard: Comply with ASTM C 1193.

C. Acoustical Sealant Application Standard: Comply with ASTM C 919 for use of joint sealants in acoustical applications.

D. Joint Sealant Schedule:

1. Exterior Joints

a. Joints between metal frames and concreter or masonry: Sealant Type 1, 8, 9.
b. Joints between impervious metals: Sealant Type 1, 8, 9.
c. Vertical expansion and control joints: Sealant Type 2, 8.
d. Joints in sheet metal flashings: Sealant Type 2, 8.
e. Perimeters of window frames, door frames, louvers and similar openings, and where metal, wood or other materialsabut or join masonry, concreteror each other: Sealant Type 1, 8.
f. Horizontal expansion, control and abutment joins in sedewalks, concre floors: Sealant Type.
g. Joints where a self-leveling sealant cannot be used because of slope: Sealant Type 2.
h. Glass glazing, cap beads (on glass), to metal and surfaces made of a silica substance: Sealant Type 5, 8, 9.

2. Interior Joints

a. Vertical expansion and control joints: Sealant Type 1.
b. Joints between impervious metals: Sealant Type 1.
c. Horizontal expansion, control, isolation and abutment joints: Sealant Type 3 or 4.
d. Window and door perimeters: Sealant Type 1.
e. Gypsum Board Joints: Sealant Type 1.
f. For sink, tug or bath areas including countertop joints: Sealant Type 5, 10.
g. Other interior joints as indicated or shown: Sealant Type 1.
h. Intersection ofwall surface and cap strip at resiliant flooring integral cove: Sealant Type 1.
i. Intersection of metal thresholds and floor substrate, wher building components are mechanically anchored and required sealing: Sealant Type 6.
j. Perimeter of sound-rated walls, at intersection of gypsum board and abutting surfaces, both sides of wall: Sealant Type 7.

END OF SECTION 07 92 00

SECTION 08 11 13 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Steel Doors and Frames, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide hollow metal doors.
2. Provide hollow metal door frames.

1.02 REFERENCES

A. SDI – Steel Door Institute

B. HMMA – Hollow Metal Manufacture's Association

C. SDI 100 – Recommended Specifications for Standard Steel Doors and Frames

D. SDI 105 – Recommended Erection Standards for Steel Frames

E. SDI 111 – Recommended Standard Details for Steel Doors and Frames

F. SDI 117 – Manufacturing Tolerances Standard Steel Doors and Frames

G. HMMA 810 – Hollow Metal Doors

H. HMMA 820 – Hollow Metal Frames

I. HMMA 830 – Hardware Preparation and locations for Hollow Metal Doors and Frames

J. HMMA 840 – Installation and Storage of Hollow Metal Doors and Frames

K. NFPA 80 – Fire Doors and Windows

1.03 SUBMITTALS: Submit as per Section 01 33 00.

A. Submit shop drawings for frames indicating frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcements for hardware and finish.

B. Submit shop drawings for doors indicating core material, location of cutouts for hardware, reiforcements for hardware and finish.

C. Submit product date.

D. Submit manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Frames and doors to conform to SDI and HMMA standards except where exceeded by this specification.

B. Manufacturer: Company specializing in manufacturing the products specified in this section having minimum five years experience.

1.05 DELIVERY, STORAGE AND PROTECTION

A. Deliver and protect doors and frames with manufacturer's shipping safeguards.

B. Attach spreader bars on welded frames to preclude warping or bending during delivery and storage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Curries.
2. Stiles.
3. Ceco Door Products.
4. Steelcraft.

2.02 FIRE-RATED DOOR ASSEMBLIES

A. NFPA 80, identical to assemblies tested per ASTM E 152, and labeled and listed by UL

2.03 WELDED FRAMES

A. Type: Combination buck frame and integral stop and flat trim, double rabbit profiles as indicated on the drawings. Cold rolled steel as per ASTM A336.

B. Exterior Frames: 14 gauge

C. Interior Frames: 16 gauge

D. Provide profiles as per drawings.

E. Anchors: Provide (2) anchors at head for openings up to 48 inches, maximum 30" on center. Provide (3) anchors per jamb for doors up to 84" in height, additional anchors at maximum 30" on center for higher doors.

1. Provide appropriate type of anchors consistent with type of wall construction for each installation and in conformance with HMMA 820 and SDI 111.

F. Floor Attachment: Provide metal anchor with provision for expansion anchor attachment to concrete floor.

G. Hardware Attachement: Mortise, reinforce, drill and tap at factory to receive specified hardware. Install minimum 10 gage reinforcing welded to frame for typical surface mounted hardware. Install minimum 7 gage reinforcing for hinges in accordance with HMMA 820. Tap to templates.

H. Galvanized: A-60.

2.04 WELDED FRAME FABRICATION

A. Fabricate exterior welded steel frames as saw mitered and full inside welded unit type or machine-mitered and full welded unit type, in accordance with HMMA 820. Weld and grind smooth. No intermittent welds or plate splices permitted at intersections.
B. Fabricate interior welded steel frames as machine mitered face-welded unit type in accordance with HMMA 820. Weld and grind smooth.

C. Where cross mullions or T intersections occur, frames shall be fabricated as butted and face-welded assembly joints, in accordance with HMMA 820.

D. Machine mitered faces and butt-joined integral stops permitted with continuous welds.

E. Fabricate frames with hardware reiforcements plates welded in place.

F. Fabricate frames to accept anchors as described in HMMA 820 and SDI 111 for type of wall construction.

2.05 EXTERIOR DOORS

A. SDI 100 Level / Model: 3/2

B. Door Thickness: 1 3/4”

C. Face Skin: 16 gauge face sheets

D. Material: Galvanized A-60

E. Door Edges: 1/8” bevel on lock side

F. Edge Construction: Continuous weld and ground smooth the full height of door, seamless.

G. Core: Polyurethane

H. Top Channel: 16 Gauge minimum. Provide flush top channel.

I. Bottom Channel: 16 Gauge minimum.

J. Size: As per drawings.

K. Hinge Rail and Reinforcement: Full height channel, 14 gauge extruded to 10 gauge equivalent at tapped holes.

L. Lock Rail: Full height channel, 14 gauge.

M. Closer Reinforcement: 12 gauge.

2.06 INTERIOR DOORS

A. SDI 100 Level / Model: 3/2

B. Door Thickness: 1 3/4”

C. Face Skin: 16 gauge face sheets

D. Material: Galvanized A-60

E. Door Edges: 1/8” bevel on lock side

F. Edge Construction: Continuous weld and ground smooth the full height of door, seamless.

G. Core: Polyurethane

H. Top Channel: 16 Gauge minimum. Provide flush top channel.

I. Bottom Channel: 16 Gauge minimum.

J. Size: As per drawings.

K. Hinge Rail and Reinforcement: Full height channel, 14 gauge extruded to 10 gauge equivalent at tapped holes.

L. Lock Rail: Full height channel, 14 gauge.

M. Closer Reinforcement: 12 gauge.

2.07 DOOR FABRICATION

A. Fabricate doors from cold rolled steel conforming to ASTM A366 or ASTM A527.

B. Non-handed doors are not permitted.

C. Hinge fillers are not permitted.

D. Fabricate doors with cutouts sized for hardware and openings as indicated.

E. Reinforce, drill and tap doors to receive mortise hinges, locks, latches, flush bolts and closures. Use reinforcing gauges as listed in Table V of SDI 100.

2.08 PROTECTIVE COATING

A. Frames: Pretreat and shop prime with modified alkyd, air dried conforming to ANSI-A224.1, approved primer. Series P10-1009, Gray, TNEMEC or equal.

B. Doors: Pretreat and shop prime with modified alkyd, air dried conforming to ANSI-A224.1, approved primer. Series P10-1009, Gray, TNEMEC or equal.

2.09 VISION LIGHT FRAMES

A. Provided under Section 08 81 00.

PART 3 - EXECUTION

3.01 GENERAL

A. Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

3.02 FRAME INSTALLATION

A. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.

1. Install frames in accordance with HMMA 840 and SDI 105.
2. Conform to standard of tolerances as required in HMMA 840 and SDI 117
3. Coordinate anchor placement with type of wall construction.
4. Install fire-rated frames according to NFPA 80, product UL listing and manufacturers recomendations.

3.03 DOOR INSTALLATION

A. Fit hollow-metal doors accurately in frames.

1. Install Doors in accordance with SDI 100.
2. Fire-Rated Doors: Install fire rated doors according to NFPA 80, product UL listing and manufacturers recommendations. Install with clearances specified in NFPA 80.
3. Smoke-Control Doors: Comply with NFPA 105.

END OF SECTION 08 11 13

SECTION 08 31 13 ACCESS DOORS AND PANELS

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Access Door and Panels, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. The access panels for the entire work, and pertains to all sections for which access panels are furnished or required, unless specified otherwise.

C. Related Sections:

1. Painting: Section 09 91 00.

2. Furnishing of access panels required for communication systems, fire sprinklers, electrical, plumbing, air conditioning and other work: Division 21, 22, 23 and 26.

1.02 SUBMITTALS

A. Provide complete shop drawings and manufacturer's brochures for review. Provide complete list of access panels required for project showing location, size, surface on which installed and type of panel for wall application.

B. Layout Drawings: Determine required access panels in finished surfaces, whether furnished under this section or as part of the work of Divisions 15 and 16. Provide layout drawings, using contract drawings as background, and show dimensioned locations of proposed access panels, the size of each panel, and installation detail for each panel. Obtain approval of locations prior to framing openings for panels.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide access panels in finish construction, where indicated on the architectural drawings, and wherever required for access to concealed mechanical and electrical equipment.

B. Those panels required for access to equipment, but not shown on architectural drawings, shall be furnished as part of the work requiring the access. All access panels furnished under all sections of the specifications shall conform to the following requirements.

2.02 MATERIALS

A. All materials shall conform to the following requirements and shall be of new stock, free from defects and imperfections, of recent manufacture and unused.

1. Where two or more identical articles or pieces of equipment are required, they shall be of the same manufacture.
2. Where model numbers are indicated, if specified models are discontinued, the Contractor shall furnish the manufacturer's updated model.

B. Access panels shall be steel, primed, to be of size required, a minimum of 12 inch by 12 inch size, or as indicated on drawings, and other sections of these specifications and, as manufactured by Inryco/Milcor, Karp or equal.

	Inryco/Milcor	Karp
Ceramic Tile	MS	214M-SS
Plaster	K	214PL
Drywall	DW	KDW
Acoustic Tile	M	DSC 214M-PC

C. Access panel indicated or required for access to mechanical, electrical or other equipment shall match those specified above.

D. Access panel in fire rated partitions and ceilings shall bear UL labels indicating the same rating as partition or ceiling.

2.03 FINISHES: Access panels in painted walls shall be furnished with factory-applied prime coat, unless otherwise indicated. Access panels in tile walls shall be stainless steel, unless otherwise indicated.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install access panels in accordance with manufacturer's recommendations. Provide channel framing for panels, and securely attach panels to frames. Align panels so that finish surface of panels is in same plane as finish materials. Panels shall be plumb and level.

B. At sound-rated construction, seal door flanges with Pamko S-88 smoke seal at perimeter. Seal entire assembly to gypsum board with acoustical sealant.

C. Check access panels at completion of work for proper opening and closing, and, if damaged, repair or replace.

END OF SECTION 08 31 13

SECTION 08 33 13 COILING COUNTER DOORS

PART 1 – GENERAL

1.01 SUMMARY

A. The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with overhead coiling doors, as indicted on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide manual operated, automatic closing Counter-Shutter Fire Door.

1.02 REFERENCES

A. ASTM A 240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

B. ASTM A 276: Standard Specification for Stainless Steel Bars and Shapes.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

1. Product Data: manufacturer’s literature and cut sheets.
2. Manufacturer’s operation, troubleshooting, and maintenance instructions.

1.04 WARRANTY

A. Provide one year written warranty against deficiencies due to defects in materials or workmanship. Installer agrees to repair or replace any defects in materials or workmanship.

1.05 QUALITY ASSURANCE

A. Manufacturer: Rolling doors shall be manufactured by a firm with a minimum of five years experience.

B. Fire-Rated Assemblies: Provide all doors with fire resistance rating required to comply with governing regulations which are inspected, tested, listed and labeled by UL, complying with NFPA 80 for class of opening. Provide UL label permanently fasted to each fire door assembly. Door shall be tested under UL10B and ULC10B, and provided with a 3/4-hr rating.

C. Single-Source Responsibility: Manufacturer shall provide doors, tracks, motors, and accessories for each type of door. Secondary components shall come from a source acceptable to the manufacturer of the primary components.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Fire-Rated Doors

1. Alpine Overhead Doors, Inc.

a. http://www.alpinedoors.com

2.02 FIRE-RATED DOORS

A. Model: Smoke FIRE-SHUT, smoke sealed counter shutter fire door.

1. Mounting: Interior face mounted on prepared opening.
2. Construction:

a. Curtain: Slats constructed of interlocking, roll-formed 1¼" baby flat slats of ASTM 240 Stainless Steel 300 series with #4 satin finish.
b. Bottom Bar: Tubular bar of ASTM 240 Stainless Steel 300 series with #4 satin finish.
c. Guides: ASTM 276 Stainless Steel 300 Series with #4 finish satin.
d. Door Support Brackets and Mounting Plates: ASTM 240 Stainless Steel 300 Series with mill finish #2B.
e. Counterbalance: Heat-treated helical torsion springs encased in a steel pipe and designed to include an overload factor of 25% to ensure minimum effort to operate. Sealed and prelubricated high speed ball bearing at rotating support points. Torsion spring charge wheel for applying spring torque and for future adjustments. A 312 Stainless Steel 300 Series with mill finish.
f. Hood: ASTM 240 Stainless Steel 300 Series with #4 satin finish.

3. Operation: Manual push-up, not to exceed 25 lbs.
4. Release Devices:

a. Redi-Release Release Device: Electric fail-safe device used in conjunction with fusible link and connected to building fire alarm system.
b. Average closing speed: No less than 6" per second and not more than 24" per second as per NFPA 80 Section 6, paragraph 4.1.5.
c. Closing speed controlled by integral oscillating governor.

5. Lock Device: Curtain will be locked at bottom bar with concealed slide bolt and cylindrical lock.
6. Fire Rating: 3/4 hour, automatic and self-closing UL Class (C).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to shop drawings, manufacturer's written instructions, and as specified.

1. Verify that dimensions are correct and project conditions are in accordance with manufacturer's installation instructions; do not proceed with installation until unacceptable conditions have been corrected.

B. Install flat faced curtains with the finish side to the Corridor.

C. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

D. Preparation for opening and installation of fire-rated doors to be in strict compliance with NPFA-80.

3.02 TESTING AND DEMONSTRATION

A. Testing: Field test doors for regular operation and automatic closing. For fire-rated doors proper authorities having jurisdiction must witness test and sign Drop Test Form.

B. Demonstration: Instruct the Owner's personnel in correct operation and maintenance of units.

3.03 PROTECTING AND CLEANING

A. Clean units in accordance with manufacturer's instructions.

B. Restore slight blemishes in finishes in accordance with manufacturer's instructions to match original finish. Remove and provide new units where repairs are not acceptable to the Architect.

END OF SECTION 08 33 13

SECTION 08 62 00 TUBULAR DAYLIGHITNG DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 07 54 19 - Fully-Adhered PVC Membrane Roofing.

B. Section 07 62 00 - Sheet Metal Flashing and Trim.

C. Section 26 05 00 - Common Work Results for Electrical.

D. Section 26 50 00 - Lighting.

1.3 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.

B. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007.

D. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

E. ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006.

F. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.

G. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.

H. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position; 2006.

I. ASTM D-1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).

J. UL 181 - Factory Made Air Ducts and Air Connectors

K. UL 790 - Standard for Tests for Fire Resistance of Roof Covering Materials; 2004.

L. ICC-ES AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

1.4 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
   3. Uniform Load Test:
      a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
      b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
   4. Fire Testing:
      a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2016 CBC California Building Code.
      b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
      c. Smoke Density - Rating no greater than 450 per ASTM E 84 in way intended for use. Classification C.
      d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
      e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC 1 per ASTM D 635.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

D. Verification Samples: As requested by Architect.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

F. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of Daylight Credits available for the products specified.
   2. Data on Energy Optimization Performance Credits for the products specified.
   3. Data on Regional Credits which may me available for the project location.
   4. Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.
   5. Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

B. Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Solatube International, Inc., which is located at: 2210 Oak Ridge Way ; Vista, CA 92081; Toll Free Tel: 888-765-2882; www.solatube.com Contact Sun West Distributors; 760-432-0729; www.sunwestdistributors.com

B. Substitutions: Not permitted.

2.2 TUBULAR DAYLIGHTING DEVICES

A. Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICBO/ICC AC-16.

B. SolaMaster Series: Solatube Model 750 DS-O Open Ceiling, 21 inch (530 mm) Daylighting System:
1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
   a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibited, impact modified acrylic blend.
2. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
3. Metal Roof Flashing: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
   a. Base Material: 1060 Aluminum Alloy, corrosion resistant conforming to ASTM B209, 0.059 inch (1.5 mm) thick.
4. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
5. Tube Ring Seal: Attached to the base of the dome ring; butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration
6. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.
7. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).
   a. General:

1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 93 percent.
2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.

b. Top Tube Angle Adapter, Type TA:
1) Reflective 30 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long.

c. Extension Tube:
1) Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) long

8. Diffuser Assemblies for Tubes Not Penetrating Ceilings (Open Ceiling): Solatube Model 750 DS-O. 21 inch (530 mm) diameter diffuser attached directly to bottom of tube.
a. Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
b. Diffuser Seal: Open cell foam, acrylic adhesive backed, 0.75 in (19 mm) wide by 0.125 in (3.2 mm) thick.
c. Diffuser Trim Ring: Injection molded acrylic. Nominal wall thickness 0.172 inches (4.4 mm)

9. Accessories:
a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
b. Open ceiling trim ring: Type R, Aluminum. Nominal thickness of 0.018 inch (0.5 mm).
c. Local Dimmer Control: Provided with dimmer switch and cable.
1) Daylight Dimmer: Type D Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.
2) Switch: Type SW, Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.
3) Cable: Type CA, Two conductor low voltage cable (500 ft.) for multiple unit DC connection.

C. SolaMaster Series: Solatube Model 750 DS-C Penetrating Ceiling, 21 inch (530 mm) Daylighting System:
1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibited, impact modified acrylic blend.
2. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
3. Metal Roof Flashing: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
a. Base Material: 1060 Aluminum Alloy, corrosion resistant conforming to ASTM B209, 0.059 inch (1.5 mm) thick.
4. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
5. Dome Seal: Adhesive backed weatherstrip 0.63 inch (16 mm) tall by 0.28 inch (7 mm).
6. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).

a. General:
1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 93 percent.
2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
b. Top Tube Angle Adapter and Bottom Top Tube Angle Adapter Kit, Type AK:
1) Reflective 30 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long
c. Extension Tube:
1) Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) long

7. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
a. Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.
b. Natural Effect Lens made of acrylic, classified as CC2, Class C, 0.060 inch (1.5 mm) thick, with open cell foam seal to minimize condensation and bug, dirt, and air-infiltration per ASTM E283.
8. Accessories:
a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
b. Local Dimmer Control: Provided with dimmer switch and cable.
1) Daylight Dimmer: Type D Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.
2) Switch: Type SW, Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.
3) Cable: Type CA, Two conductor low voltage cable (500 ft.) for multiple unit DC connection.

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Coordinate all roof penetrations, tube runs, and diffuser terminations and confirm that they are compatible with the related architectural layouts prior to making roof penetrations. Contact the Architect immediately in the event of a discrepancy.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. Installer shall be factory trained and certified by the manufacturer prior to commencement of installation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 08 62 00

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Door Hardware, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide door hardware.

1.02 SUBMITTALS

A. Submit hardware schedule organized by hardware set numbers in accordance with Division One, Section 01 33 00.

1. Submit manufacturers' catalog cut sheets of all hardware items scheduled.
2. Furnish templates to each fabricator of doors and frames as required for hardware preparation.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements

3. Door Hardware:

a. Mounting height of latching hardware shall be 34" to 44" above finish floor per CBC Section 11B-404.2.7
b. Doors/doorways as part of an accessible route shall comply with CBC Sections 11B-404.
c. The clear opening width for a door shall be 32" minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3
d. Handles, pulls, latches, locks, and operable parts on accessible doors shall compy with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, punching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operationg hardware shall be exposed and usable from both sides.
e. The force for pushing or pulling open a door shall be as follows: CBC Section 11B-404.2.9.

i. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 pounds maximum.
ii. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed 15 pounds.
iii. These forces do not apply to the force required to retract latch bolts or diesengage other devices that hold the door in a closed position.

iv. The force required for activationg any operable parts, such as lever hardware, or disngaging other devices shall be 5 pounds maximum to comply with CBC Section 11B-309.4

f. Door closing speed shall be as follows: CBC Section 11B-404.2.8

i. Closer shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minium
ii. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

g. Thresholds shall compy with CBC Section 1010.1.7 and 11B-404.2.5
h. Floor stops shall not be located in the path and 4" maximum from walls. DSA policy 99-08.
i. Hardware shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA / AC (External) revised 4/28/09. Such conditions must be clearly demonstrated and indicated in the specifications:

i. Such hardware has a dogging feature.
ii. It is dogged during the time the facility is open.
iii. Such "dogging" operation is performed only by employees as their job function (non-public use).

j. Pair of doors: limit swing of one leaf to 90 degrees so tha a clear floor space is provided beyond the arc of the swing for the wall-mounted tactile sign. CBC Section 11B-703.4.2.1.
k. All Hardware shall meet the requirements of CBC Sections 11B-404.2.7, 11B-404.2.9 and 1008.1.9.

4. Exit Devices:

a. Panic hardware shall comply with CBC Section 1010.1.10, (consider that if the device is mounted lower than 36" AFF, the clear opening may be restricted to less than the 32" required clear opening). Panic Bar shall be mounted above 36" to 44" above finished floor surface.
b. The unlatching force shall not exceed 5 lbs applied in the direction of travel.
c. Panic hardware shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA / AC (External) revised 4/28/09. Such conditions must be clearly demonstrated and indicated in the specifications:

i. Such hardware has a dogging feature.
ii. It is dogged during the time the facility is open.
iii. Such "dogging" operation is performed only by employees as their job function (non-public use).

B. Keying Schedule:

1. Submit (3) copies of detailed keying schedule with schematic layout to Contractor.
2. Keying schedule shall specify number of each door opening and associated key identification number stamped on each key. The number of each opening shall match the door and building number on the architectural floor plans.

C. Samples: If requested by the Architect, submit physical sample of each item of hardware proposed in work. Samples will be returned on the request of Contractor.

D. It shall be the responsibility of the hardware supplier to examine the plans and specifications and furnish proper hardware for all openings. If there are any omissions in hardware groups, they shall be called to the attention of the Architect prior to bid opening and the omission will be corrected with an addendum. Hardware supplier shall be responsible to provide all hardware for a complete job.

E. Doors and Frames: Hollow metal doors and frames shall be manufacturered to templates. Provide backing / reinforcement as required for each hardware item. If required physical hardware items shall be furnished to related manufacturers.

1.04 DELIVERY, STORAGE AND HANDLING

A. Packaging: Each unit of hardware shall be indivudually packaged in the manufacturer's original containers.

B. Wrapping: Wrap and cushion each item to prevent scratches and dents during delivery and storage.

C. Markings: Each package shall be clearly marked on the outside, identfying the contents with specific opening number corresponding to those listed in the hardware schedule. Include door and item number for each product.

1.05 WARRANTY

A. All door hardware shall be supplied with a one year warranty against defects in materials and workmanship, commencing with substantial completion of job. Contractor shall provide adjustment to all finish hardware one year after completion of project. The one year adjustment shall be performed by a finish hardware manufacturer's representative.

PART 2 - PRODUCTS

2.01 GENERAL

A. All doors and gates with locking hardware shall be openable from the inside without the use of a key or any special knowledge or effort.

B. All locks at all passage doors shall have lever type hardware or approved control devices for access compliance.

C. All hardware exposed to the exterior shall be set with non-removable fastenings, sex bolts, special head screws or similar fastenings.

D. Fire rated openings: Provide hardware for fire rated openings in compliance with the California Code of Regulations (CCR) Title 24, Part 2, California Building Code and NFPA Standard No. 80.

E. Keying:

1. Keying System: SCHLAGE PRIMUS HIGH SECURITY SYSTEM, EVEREST Keyway. No other keying system will be accepted. The PRIMUS system shall support a great grandmaster, grandmaster and master keying system.

2. Contractor shall provide construction key cores for the course of construction. Contractor shall remove construciton cores and install permanent cores when building is substantially complete.
3. All keys shall be stamped “DO NOT DUPLICATE”. All keys shall be stamped with identification number to match keying schedule.
4. All cores shall be full size interchangable with Schlage Logo.
5. All cylinders and keys shall be properly tagged to indicate their intended location and to enable the Owner, with a minimum of effort, to establish key control.
6. Provide complete bitting list of key cuts.
7. Supply keys in the following quantities:

    a. Great Grand Master: four
    b. GrandMaster: four
    c. Master: four
    d. Four keys per lock

F. Key Cabinet: Provide LUND 1204 KEY CABINET.

PART 3 - EXECUTION

3.01 INSPECTION

A. Hardware Supplier’s Inspection: Before final inspection of the work under this contract and acceptance of the project, the hardware supplier shall inspect all items supplied under this section for conformance to the specifications, proper functioning, appearance, finish and installation. Check operation and adjustment of all hardware items. Hardware supplier shall notify in writing any deficiences to the Architect and Contractor.

3.02 INSTALLATION

A. Installation of finish hardware is specified under ofther sections. However, the following requirements apply to the work as follows:

1. Hardware shall be installed by a Qualified Mechanic skilled in the application of institutional grade builders hardware.
2. Install all hardware in full compliance with manufacturer’s instructions.
3. When cutting and fitting is required to install hardware onto or into surfaces which are to be painted or finished, install each item completely and then remove during application of paint. After completion of painting application, reinstall each item.
4. Install hardware after application of paint.
5. Provide adequate backing in stud walls as required for proper attachment of each hardware item.

B. Hardware Mounting Locations: As recommended by the Door and Hardware Institute, unless indicated otherwise. All lever hardware to be mounted between 34 inches and 44 inches.

C. Thresholds: Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant. Remove excess sealant and clean adjacent surfaces. Cut and fit threshold to jamb with hairline joints.

3.03 GENERAL

A. Instruct Owner's personnel in proper maintenance and adjustment of each hardware item.

B. Furnish to Owner all keys and extra keys orgonized neatly in key cabinet furnished for this project.

C. Hardware Schedule: Provide hardware for each door as in the following list of hardware sets:

AD300 ELECTRONIC LOCK LISTED AS REFERENCE FOR DOOR PREP ONLY, LOCK SHALL BE PROVIDED BY DIVISION 28

Quantity	Description	Model Number	Finish	Manufacturer
HARDWARE HEADING 1 – Card Access				
Exterior HM, Steel Frame and Steel Door				
Refer to Section 28 13 00 Access Control				
1	Electronic Lock	AD-300-MS-50-MT-RHO-626-JD	626	Schlage
1	Permanent Core	20-740 XP	626	Schlage
1	Closer	4040, Parallel Arm	689	LCN
1	Hinging	Continuous, XY		
1	Power Transfer	EPT-10	626	Von Duprin
1	Wall type Holder	WS40	626	Ives
3	Door Silencer	1337-A	rubber	Quality
1	Threshold	276 A (machine screws and anchors)	Alum.	Pemko
1	Weatherstrip	2891 AS (silicone seal)	Alum.	Pemko
1	Door bottom sweep	315 CN (neoprene seal)	Alum.	Pemko
HARDWARE HEADING 2				
Card Access				
Exterior HM, multi-use toilet rooms				
Single Door				
1	Electric Strike	6212 FSE DS CON 12/16/24/28		
1	Storeroom Lock	L9080T LLLA 06A	626	Schlage
1	Hinging	Continuous 224HD EPT	628	Ives
1	Multi-Tech Reader	MT11		
1	Power Supply	PS904-4R	LGR	VON
1	Pull Plate	8302 10”, 4”x16”	630	Ives
1	Rim Cylinder	20-710 Everest D		Schlage
1	Mortise Cylinder	20-757 Everest D		Schlage
1	Closer	4040, Parallel Arm	689	LCN
1	Wall type Holder	WS40	626	Ives
3	Door Silencer	1337-A	rubber	Quality
1	Threshold	276 A (machine screws and anchors)	Alum.	Pemko
1	Weatherstrip	2891 AS (silicone seal)	Alum.	Pemko
1	Door bottom sweep	315 CN (neoprene seal)	Alum.	Pemko

AD300 ELECTRONIC LOCK LISTED AS REFERENCE FOR DOOR PREP ONLY, LOCK SHALL BE PROVIDED BY DIVISION 28

HARDWARE HEADING 3
Card Access
Interior HM, office, storage
Single Door

1	Electronic Lock	AD-300-MS-50-MT-RHO-626-JD	626	Schlage
1	Permanent Core	20-740 XP	626	Schlage
1	Closer	4040, Parallel Arm	689	LCN
1	Hinging	Continuous, XY		
1	Power Transfer	EPT-10	626	Von Duprin
1	Wall type Holder	WS40	626	Ives
3	Door Silencer	1337-A	rubber	Quality

AD300 ELECTRONIC LOCK LISTED AS REFERENCE FOR DOOR PREP ONLY, LOCK SHALL BE PROVIDED BY DIVISION 28

END OF SECTION 08 71 00

SECTION 08 81 00 GLAZING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Glazing, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide glazing at aluminum framed storefronts.
2. Provide glazing at aluminum framed windows.
3. Provide glazing at hollow metal framed door sidelites.
4. Provide glazing in vision light doors.
5. Provide fire rated glazing where indicated on drawings.

1.02 REFERENCES

A. All glazing shall meet the minimum requirements of the CBC, Chapter 24.

B. All glazing in hazardous locations as per CBC, Section 2406.3 shall require safety glazing materials and comply with Sections 2406.1.1 through 2406.1.4.

C. Fire-Rated Assemblies shall comply with:

1. ASTM E 119: Fire Tests of Building Construction and Materials.
2. NFPA 80: Fire Doors and Windows.
3. UL 263: Fire tests of Building Construction and Materials.

D. Tempered / Heat-Treated Glass shall comply with ASTM C 1048; Type I; Quality q3.

E. Laminated glass shall comply with ASTM C 1172.

1.03 SUBMITTALS

A. Submit as per Section 01 33 00.

1. Submit product data on glass type specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
2. Setting blocks and glazing tape.

B. Submit (3) 12”x12” samples of each type of material specified illustrating color, tint and design.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with FGMA Glazing Manuel and FGMA Sealant Manual.

B. All tint shall be integral part of glazing, vinyl coated tint not allowed.

1.05 WARRANTY

A. Provide ten year manufacturer's warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Insulated and Laminated Glazing

1. PPG Industries, Inc.

a. http://www.ppg.com

B. Fire-Rated Glazing

1. Windows/Sidelites/Transoms: Pilkington distributed by Technical Glass Products.

a. http://www.pilkington.com
b. http://www.fireglass.com
c. Acceptable Substitution: Vetrotech Saint-Gobain, http://www.vetrotech.com

2. Security Vision Lite Glazing: Vetrotech Saint-Gobain.

a. http://www.vetrotech.com

C. Security Vision Lite Frames

1. Air Louvers, Inc.

a. http://www.airlouvers.com

2.02 STANDARD GLAZING

A. Insulated Glass

1. Product: PPG Commercial One-Inch Insulating Glass Unit.
2. Construction: 1" total thickness: 1/4" tempered glass + 1/2" airspace + 1/4" tempered glass.
3. Low-e Coating: Solarban 70XL (on surface 3).
4. Tint: Bronze (on surface 2).
5. Locations: Exterior Doors and Windows, see door and window schedules.

B. Laminated Glass

1. Product: PPG Monolithic Laminated Glass.
2. Construction: 1/2" total thickness: 1/4" float glass + 0.060" clear PVB + 1/4" float glass.
3. Low-e Coating: None.
4. Tint: None (clear glass).
5. Locations: Interior Doors and Windows, see door and window schedules.

C. Security Vision Lites

1. Product

a. Frame: Air Louvers, Inc. model VLF-S10.
b. Glazing: PPG Monolithic Laminated Glass.

2. Construction: 1/2” total thickness: 1/4” float glass + 0.060” clear PVB + 1/4” float glass.
3. Low-e Coating: None.
4. Tint: None (clear glass).
5. Locations: Interior Doors, see door schedule.

2.03 FIRE-RATED GLAZING

A. Windows/Sidelites/Transoms

1. Product: Pilkington Pyrostop
2. Construction

a. 45-Min: 3/4” thick wireless multi-laminate high visible light transmission glass.
b. 60-Min: 7/8” thick wireless multi-laminate high visible light transmission glass.

3. Low-e Coating: None.
4. Tint: None (clear glass).
5. Fire Rating: 45-Min or 60-Min; with hose stream test, see door and window schedules.
6. Locations: Interior Doors and Windows, see door and window schedules.

B. Security Vision Lites

1. Product

a. Frame: Air Louvers, Inc. model VLF-S10.
b. Glazing: Vetrotech Saint-Gobain SSG Keralite FR-L.

2. Construction: 5/16” thick wireless laminated clear glass ceramic.
3. Low-e Coating: None.
4. Tint: None (clear glass).
5. Fire Rating: 20-Min or 60-Min; with hose stream test, see door schedule.
6. Locations: Interior Doors, see door schedule.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation.

C. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

D. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.02 PROTECTING AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter.

1. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

B. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08 81 00

SECTION 09 22 16 – NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Non-Structural Metal Framing, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Provide metal stud framing at interior partition walls and furred walls.
2. Provide metal stud framing at exterior furred walls.
3. Provide metal ceiling joists and soffits.
4. Provide framing accessories.

1.02 REFERENCES

A. ASTM C 645 – 98 Standard Specification for Nonstructural Steel Framing Members.

1.03 SUBMITTALS

A. Submit product data describing standard framing member materials and finish, product criteria, load charts, limitations and accessories.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: ICC Approved.

B. Manufacturer: Company specializing in non-bearing metal studs with minimum 5 years experience.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Stud Framing Materials:

1. Studs: ASTM C 645, minimum yield 33 ksi, hot dip galvanized or electro galvanized sheet steel, C type, 16 gage thick, 6” minimum width.
2. Track: Formed Sheet Steel; channel shaped; same width as studs; tight fit; 16 gage thick; solid web; long leg at ceilings
3. Fasteners: ASTM C954 self drilling, self tapping screws, Type S-12 pan head, ½” long.
4. Stiffeners: 3/4", .3 lbs per lin. ft., cold or hot rolled channel, 16 gage.
5. Anchorage Devices: Drilled expansion anchors, minimum 3/8” diameter x 2 ¼” embedment.

B. Ceiling Framing Materials:

1. Joist: ASTM C 645, minimum yield 33 ksi, hot dip galvanized or electro galvanized sheet steel, C type, 18 gage thick, 6” minimum width.
2. Track: Formed Sheet Steel; oversized channel; same width as studs; tight fit; 16 gage thick.

3. Fasteners: ASTM C954 self drilling, self tapping screws, Type S-12 pan head, ½" long.
4. Mid Span Support: As per contract documents.
5. Anchorage Devices: As per contract documents.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Perform work in accordance with ASTM C754.

B. Install prefabricated slip track at top of wall. Attach to supporting structure above.

C. Align and fasten top and bottom runners at maximum 32" O.C.

D. Construct corners and intersections as per contract documents.

E. Stud splicing not permissible.

F. Provide all backing as required.

G. Wall Tolerances:

1. Maximum Variation from true position: 1/8"
2. Maximum variation of any member from plane: 1/8"
3. Maximum variation between parallel walls: 1/8"

END OF SECTION 09 22 16

SECTION 09 24 00 PORTLAND CEMENT PLASTER

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Portland Cement Plaster, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Metal furring and lathing.
2. Portland cement plaster system

1.02 SUBMITTALS

A. Product Data for each product specified and samples for each type of finish indicated.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Comply with the minimum requirements of Section 2510 and 2512 of The California Building Code, minimum requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during and after application of plaster.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metal Lath

1. Plaster walls with solid plywood substrate: Expanded diamond mesh, self furred, (dimpled, ¼" offset), 3.4 lbs. per sq. yd., galvanized, manufactured by Western Metal Lath and Steel Framing.

B. Metal Accessories

1. Casing Bead: 7/8", 26 gauge, manufactured by Western Metal Lath and Steel Framing.
2. Base Screed: Casing Bead with weep holes: 7/8", 26 gauge, manufactured by Western Metal Lath and Steel Framing.
3. Corner: welded wire, Wescorner, manufactured by Western Metal Lath and Steel Framing.
4. Control Joint: 7/8", 28 gauge, No. XJ15-3, manufactured by Western Metal Lath and Steel Framing

C. Paper Backing: Asphalt-impregnated paper complying with Federal Standard UU-B-790a, Type I, Grade D (vapor permeable), Style 2, Jumbo Tex, manufactured by Fortifiber Corporation.

D. Base-Coat Cements: White or gray, as required.

1. Portland cement, ASTM C 150, Type I.

E. Base-Coat Aggregate: ASTM C 897, sand.

F. Finish Coat: Material and color as indicated below:

1. Acrylic-Based Finish Coat: Factory-mixed formulation of acrylic emulsion, colorfast mineral pigments, and fine aggregates specifically recommended by acrylic-based finish manufacturer for use over portland cement plaster base coats.
2. Acrylic Color: as selected by Architect
3. Acrylic Texture: Fine sand float finish

G. Water: Potable water shall be used for mixing

H. Mixing: Mechanically mix proportioned cementitious and aggregate materials with water to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Lathing and Furring: Install lath and furring indicated to comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with ASTM C 1063.

B. Isolation: Where lathing and metal support systems abut building structure horizontally and where partition or wall abuts overhead structure, sufficiently isolate from structural movement to prevent transfer of loading from building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.

1. Frame both sides of control joints independently and do not bridge joints with furring and lath or accessories.

C. Metal Lath: Install metal lath at all plaster finishes. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with ASTM C 1063.

1. Plaster walls with solid plywood substrate: Expanded diamond-mesh lath, 3.4-lb/sq. yd. minimum weight.
2. Metal lath shall stand away from the support ¼ inch.

D. Paper backing shall be installed at all wall surfaces. Install two layers of building paper over all solid plywood substrate. Punctures or breaks shall be entirely covered with a second layer before application of metal lath.

E. Preparing Solid Surfaces for Plastering: Clean plaster bases and substrates for direct application of plaster, removing loose material and substances that may impair the Work.

1. Etch concrete and concrete unit masonry surfaces indicated for direct plaster application to obtain adequate suction and mechanical bond of plaster (where dash coat, bonding agent, or additive is not used).
2. Apply bonding agent on concrete and concrete unit masonry surfaces indicated for direct plaster application; comply with manufacturer's written instructions for application.
3. Apply dash coat on concrete surfaces indicated for direct plaster application. Moist-cure dash coat for at least 24 hours after application and before plastering.
4. Install temporary grounds and screeds to ensure accurate rodding of plaster to true surfaces; coordinate with scratch-coat work.

5. Surface Conditioning: Immediately before plastering, dampen surfaces indicated for direct plaster application, except where a bonding agent has been applied. Moisten to obtain optimum suction for plastering.

F. Installation of Plastering Accessories: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated. Install accessories of type indicated at following locations:

1. External Corners: Install corner reinforcement at external corners.
2. Casing bead: Install casing beads at all places where plaster abuts dissimilar material, or as per details.
3. Control Joints: Install at locations indicated on plans.

G. Plaster Application: Apply plaster in accordance with Section 2507 and 2512 of the California Building Code.

1. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other. Do not use materials that are frozen, caked, lumpy, dirty, or contaminated by foreign materials. Do not use excessive water in mixing and applying plaster materials.
2. Base Coat Application: Apply in accordance with Section 2507 and 2512 of the California Building Code.

   a. Base Coat 1 (scratch): Apply with sufficient material and pressure to completely embed into metal lath and develop a thickness of 3/8” and shall be scratched horizontally to form a key.
   b. Base Coat 2 (brown): The second coat shall be brought out to proper thickness, rodded and floated sufficiently rough to provide adequate bond for the finish coat.

3. Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed at any location on surface.
4. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor.
5. Corners: Make internal corners and angles square; finish external corners flush with cornerbeads on interior work, square and true with plaster faces on exterior work.
6. Thickness: Apply in accordance with Section 2512 of The California Building Code and ASTM C 926. Total of 7/8”.
7. Number of Coats: Apply plaster in 2 or 3 coats as indicated below or as shown.

   a. Three Coats: Over the following plaster base:

      1) Metal lath.

   b. Two Coats: Over the following bases:

      1) Concrete unit masonry.

H. Base Coat Proportions: The proportion of aggregate to cementitious materials shall be as set forth in Table 2507.2 of The California Building Code.

1. Measuring Ingredients: Proportion and measure ingredients by means of calibrated boxes or containers of such nature that quantities measured can be readily and accurately checked at any time. Proportioning by shovel is not acceptable.
2. Mixing Plaster: Mix plaster by machine for a minimum of 2 minutes. Mix no more plaster than can be properly placed within ½ hour after mixing.

I. Moist-cure plaster base and finish coats to comply with the minimum requirements Table 2507.2 of The California Building Code. Keep scratch and brown coat moist. Continued water spraying shall be maintained, including weekends and holidays.

1. Cure time between base coat 1 (scratch) and base coat 2 (brown) shall be 7 days.
2. Cure time between base coat 2 (brown) and finish coat shall be 14 days.

J. Finish Coats: As follows:

1. Float Finish: Apply finish coat to a minimum thickness of 1/8 inch to completely cover base coat, uniformly floated to a true even plane with fine-textured float sand finish.

K. Finish Coat Sample: The Contractor shall execute a 8’ x 8’ sample of each type of finish in texture and color as required, for approval by the Architect before proceeding with finish coats. Finish work shall match approved sample.

L. Cutting and Patching: Repair cracks and indented surfaces. Point-up finish plaster surfaces around items that are built into or penetrate plaster surfaces. Repair or replace work to eliminate blisters, buckles, check cracking, dry outs, efflorescence, excessive pinholes, and similar defects. Repair or replace work as necessary to comply with required visual effects.

M. Cleaning and Protecting: Remove plaster from other surfaces not to be plastered. When plastering is completed, remove unused materials, containers, equipment, and plaster debris. Protect plaster work from damage or deterioration until Substantial Completion.

END OF SECTION 09 24 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Gypsum Board Assemblies, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Gypsum Board at ceilings.
2. Gypsum Board at walls.
3. Taped and sanded joint treatment.
4. Texture

1.02 SUBMITTALS

A. Submit product data for gypsum board, joint tape and fasteners as per Section 01 33 00.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Gypsum Wallboard: ASTM C 36, United States Gypsum Company, Sheetrock brand Gypsum Panels, 5/8” Type X, tapered edge.

B. Gypsum Wallboard Joint Treatment Materials: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

1. Joint Tape: Sheetrock Joint Tape, cross fibered paper.
2. Joint Compound: United States Gypsum Company, Sheetrock All Purpose Joint Compound Ready Mixed.

C. Gypsum Board Accessories:

1. Corner Bead: United States Gypsum Company, Sheetrock Brand Paper Faced Metal ¾” Bullnose.

PART 3 - EXECUTION

3.01 INSPECTION

A. Commencement of work constitutes acceptance of substrate. All framing members shall be true and straight. Any framing or furring member that varies more than 1/8” from the plane of adjacent framing or furring members shall be corrected under the rough carpentry section before gypsum wallboard is installed. Inspect all substrate and report all conditions which will jeopardize smooth satisfactory finish.

B. Tolerances: Maximum variation from true flatness shall be 1/8” in 10 feet in any direction.

3.02 INSTALLATION

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216 and Section 2508 of The California Building Code.

B. Installing Gypsum Board Trim Accessories: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.

1. Install cornerbead at external corners.
2. Install edge trim where edge of gypsum panels would otherwise be exposed.

C. Finishing Gypsum Board Assemblies: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

1. Prefill open joints and damaged areas using All Purpose Joint Compound.
2. Apply joint tape over gypsum board joints, including over trim accessories with flanges. Embed joint tape in joint compound.
3. Apply two coats of joint compound or finishing compound over all joints and dimples from fasteners. Sand between coats as required.

D. Apply Gypsum Board Texture Finishes as follows:

1. Provide texture as per finish schedule.

E. Ceilings: Provide minimum 5/8” gypsum board at ceilings.

F. Walls: Provide minimum 5/8” gypsum board full height of all walls, to bottom chord of truss, unless noted otherwise.

END OF SECTION 09 29 00

SECTION 09 30 13 CERAMIC TILE

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Ceramic Tile, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Provide ceramic tile at toilet rooms.
2. Provide metal lath and mortar bed.

1.02 REFERENCES

A. Handbook for Ceramic Tile Installation

1.03 SUBMITTALS

A. In addition to Product Data for each type of tile and setting material indicated, submit the following:

1. Samples of each type and composition of tile and for each color and texture required.
2. Product data indicating manufacturer’s specifications instructions for using mortar and grout.

1.04 STATIC COEFFICIENT OF FRICTION

A. Ceramic Tile Flooring shall be stable, firm and slip resistant. CBC Section 11B-302.1.

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.

1.05 ADDITIONAL MATERIAL

A. Contractor shall provide 3 % additional tile and trim pieces of each type, color and size used for this project. Deliver to Owner in securely packaged and labeled boxes.

PART 2 - PRODUCTS

2.01 GENERAL

A. Tile Products Manufacturers: Dal-Tile Corporation, or Equal.

B. Tile-Setting and Grouting Materials Manufacturers:

1. Laticrete International, Inc.
2. Custom Building Products

C. ANSI Ceramic Tile Standard: Provide tile that complies with Standard Grade requirements of ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

E. INTERIOR FLOOR TILE

1. Field Tile: DALTILE Colorbody Porcelain, Valais

    a. Composition: Porcelain
    b. Module Size: 6” x 6”
    c. Nominal Thickness: 3/8”
    d. Color: Biscotti VL82

2. Field Tile: DALTILE Colorbody Porcelain, Terra Antica

    a. Composition: Porcelain
    b. Module Size: 6” x 6”
    c. Nominal Thickness: 3/8”
    d. Color: Celeste / Grigio TA04

3. Floor Accent Tile: DALTILE Colorbody Porcelain, Era and Terra Antica

    a. Composition: Porcelain
    b. Module Size: Random Mix, 12” wide border
    c. Nominal Thickness: 3/8”
    d. Color: 15% Era - Olos P713, 60% Terra Antica - Rosso TA02, 10% Terra Antica - Oro TA01, 5% Terra Antica - Celeste/Grigio TA04

F. INTERIOR WALL TILE

1. Wall Tile: DALTILE Colorbody Porcelain, Terra Antica

    a. Composition: Porcelain
    b. Module Size: 12” x 12”
    c. Nominal Thickness: 3/8”
    d. Color: Oro TA01

2. Wall Tile: DALTILE Colorbody Porcelain, Valais

    a. Composition: Porcelain
    b. Module Size: 12” x 12”
    c. Nominal Thickness: 3/8”
    d. Color: Carmelo VL81

3. Wall Accent: DALTILE Colorbody Porcelain, Terra Antica

    a. Composition: Porcelain
    b. Module Size: 6” x 12”, (3) tile wide
    c. Nominal Thickness: 3/8”
    d. Color: Oro TA01

4. Wall Accent: DALTILE Colorbody Porcelain, Valais

    e. Composition: Porcelain
    f. Module Size: 6” x 6”
    g. Nominal Thickness: 3/8”
    h. Color: Biscotti VL82

G. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:

1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Provide radius at all inside corners, provide bullnose at all outside corners, provide cove base at all wall tile that abuts floor tile.

H. Accessories: Provide materials complying with ANSI A108.1A and as specified below:

1. Waterproofing / Anti-fracture Membrane for Thin-Set Tile Installations: Provide products that comply with ANSI A118.10.

    a. Waterproofing / Anti-fracture Membrane: LATICRETE 9235. Membrane to be thin, cold applied, single component liquid, load bearing and non-toxic.

2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82, except for minimum wire size.
3. Expanded Metal Lath: Provide diamond-mesh lath complying with ASTM C 847 for requirements indicated below:

    a. Configuration over Studs and Furring: Flat.
    b. Configuration over Solid Surfaces: Self-furring.
    c. Weight: 3.4 lb/sq. yd.

I. Setting Bed Materials:

1. Portland Cement: ASTM C150, Type 1
2. Lime: ASTM C 207, Type S
3. Sand: ASTM C 144
4. Water: Potable
5. Paper Backing for Walls: Asphalt-impregnated paper complying with Federal Standard UU-B-790a, Type I, Grade D (vapor permeable), Style 2, Jumbo Tex, manufactured by Fortifiber Corporation.

J. Setting Bed:

1. Setting Bed Mix for Floors: One part Portland Cement, 6 parts damp sand, up to 1/10 part hydrated lime by volume.
2. Scratch and Leveling Coat for Walls: 1 part Portland Cement, 5 parts damp sand, ½ part hydrated lime.
3. Admixture: Mix in accordance with manufacturer’s directions.

K. Thin Bed Setting Material: Provide materials complying with ANSI A118.4.

1. LatiCrete 254 Platinum

L. Grouting and Sealing Materials, as follows:

1. Walls

a. LATICRETE LATAPOXY 2000 Industrial Grout
b. LATICRETE Latasil 9118 Primer

2. Floors

a. Laticrete LATAPOXY 2000 Industrial Grout
b. LATICRETE Latasil 9118 Primer

2.02 PORCELAIN TILE SCHEDULE

A. Gang Toilet Rooms

1. Floor Field: Terra Antica, Celeste / Grigio TA04
2. Floor Accent: Era, Olos P713 and Terra Antica, Rosso TA02, Oro TA01, Celeste / Grigio TA04 random mix
3. Wall Field: Terra Antica, Oro TA01
4. Wall Accent: Terra Antica, Oro TA01

B. Single Use Toilet Rooms

1. Floor Field: Valais, Biscotti VL82
2. Wall Field: Valais, Carmelo VL81
3. Wall Accent: Valais, Biscotti

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.

1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

B. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

C. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated.

D. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated.

1. Interior wall tile: W241-03

2. Interior Floor tile at toilet rooms: F111-03
3. Interior Floor tile:F113-03

E. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

G. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints where adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

H. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

I. Mixing:

1. Mix Latex Portland Cement Mortar in accordance with manufacturer’s instructions.
2. The proper mortar consistency is such that when applied with the recommended notched trowel to the backing, the ridges formed in the mortar will not flow or slump.

J. Installation of Setting Beds at Floors:

1. Install setting bed in accordance with TCA Handbook for Ceramic Tile Installation.
2. Place wire reinforcing and setting bed over the cleavage membrane. Lap reinforcing at least one full mesh and support so that reinforcing is approximately in the middle of the setting bed.
3. Firmly tap setting bed to levels required.

K. Installation of Setting Beds at Walls: Install metal lath and scratch coat to walls to comply with ANSI A108.1A, Section 4.1.

1. Install paper and metal lath in accordance with TCA Handbook for Ceramic Tile Installation.
2. Install scratch and leveling coat in accordance with TCA Handbook for Ceramic Tile Installation.
3. Apply setting bed over surfaces to a minimum thickness of 7/8 inch, ¾ inch over solid substrate.
4. Allow setting bed to cure in accordance with ANSI A108.1

L. Mortar Application:

1. Clean surface thoroughly. Dampen if dry, but do not saturate.
2. Apply mortar with flat side of trial, comb mortar using a notched trial to obtain even setting bed. Tile shall not be applied to skinned over mortar.

M. Floor Tile Installation: Install tile to comply with requirements indicated, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.

1. Joint Widths: Install tile on floors with the following joint widths:

    a. Porcelain Tile: ¼”

2. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards.
3. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
4. Sound tile after setting. Replace hollow sounding units.
5. Provide water proofing / anti-fracture membrane on all floors

N. Wall Tile Installation: Install types of tile designated for wall installations to comply with requirements indicated, including those referencing TCA installation methods and ANSI setting-bed standards.

1. Joint Widths: Install tile on walls with the following joint widths:

    a. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
    b. Wall Tile: 1/16 inch (1.6 mm).

2. Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards.

O. Installation of Grout:

1. Remove all mortar from face and edges of tile.
2. Force a maximum amount of grout into the joints. Cushioned edge tile shall be finished evenly to the depth of the cushion. Square edge tile shall be finished flush with the tile surface. Finished joint shall be uniform in color, smooth and without pinholes, voids or low spots.
3. Grout tile to comply with the requirements of the following tile installation standards:

    a. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.
    b. For chemical-resistant epoxy grouts, comply with ANSI A108.6.
    c. For chemical-resistant furan grouts, comply with ANSI A108.8.

P. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Use cleaning materials and methods that comply with tile and grout manufacturers' written instructions.

1. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to brick and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

END OF SECTION 09 30 13

SECTION 09 91 00 PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Painting, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Surface preparation.
2. Prime coat application.
3. Finish coat application.
4. Upon completion of work under this contract, all surfaces within the contract limits and within vision, shall have a painters finish on the interior and exterior except excluded items defined herein. Include all roof mounted mechanical and electrical equipment which do not have factory finish. The surfaces to be painted include, but are not limited to the following:

    a. Interior Gypsum Board
    b. Interior painted Concrete Masonry Units
    c. Interior clear Concrete Masonry Units
    d. Interior and Exterior Hollow Metal Doors and Frames
    e. Steel fence and gates
    f. Exterior Metals
    g. Water Repellent for Exterior Concrete Masonry Units

C. Related Sections:

1. Division 05 Sections for shop priming of metal substrates with primers specified in Division 05.

D. Work not included:

1. Surfaces not to be painted:

    a. Prefinished wall, ceiling and floor coverings.
    b. Items with factory-applied final finish.
    c. Concealed ducts, pipes and conduit.
    d. Glass, plastic laminate, ceramic tile, anodized aluminum.
    e. Steel items embedded in concrete.
    f. Surfaces specifically scheduled or noted on the drawings not be painted.
    g. Fire-rated labels on doors or frames.
    h. Exterior Plaster
    i. Pre-Finished Interior Wood Doors

1.02 REFERENCES

A. AQMD – Air Quality Management District, Local Regulations.

B. ASTM D4442 – Direct Moisture Content Measurement of Wood and Wood-Base Materials.

C. ASTM D4444 – Use and Calibration of Hand-Held Moisture Meters.

D. MPI – Master Painters Institute

1.03 SUBMITTALS

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

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit samples on rigid backing, 8-1/2" x 11".
2. Step coats on samples to show each coat required for system.
3. Label each coat of each sample.
4. Label each sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on drawings and in schedules.
2. Printout of current "MPI Approved Product List" for each product category specified in Part 2, with the proposed product highlighted.

E. LEED Submittal:

1. Product Data for Credit MR 4 and MR 5: For products having recycled content and/or regional materials content, submit recycled content and regional materials documentation for each such product provided under work of this Section.
2. Product Data for Credit EQ 4.2: For paints and coatings, certify each interior field-applied paint and coating product meets the VOC requirements.

a. Include manufacturer's product data sheet and Material Safety Data Sheet (MSDS) highlighting VOC content for each product.

1.04 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of floor selections will be based on benchmark samples.

    a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

C. Regulatory Requirements: Materials shall comply with the current rules and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with FDA rules and regulations for dangerous materials in paint. Comply with governmental and local regulations for field applied products.

D. Coats: The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply such additional coats as are necessary to produce the required finish, at no additional cost to the Owner.

E. Employ coats and undercoats for types of finishes in accordance with the recommendations of the paint manufacturer whose products are used.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project site in unopened containers bearing manufacturer's name and product descriptions corresponding to designation on material list.

B. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area unless permitted otherwise by manufacturer's instructions.

C. Protection: Protect floors and adjacent surfaces from paint smears, spatters, and droppings. Cover fixtures not to be painted. Mask off areas where necessary. Exercise care to prevent paint from contacting surfaces not to be painted. During painting of exterior work, cover windows, doors, concrete, and other surfaces not to be painted.

1.06 PROJECT REQUIREMENTS

A. Environmental Requirements:

1. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes, unless permitted otherwise by manufacturer's instructions.
2. Do not apply exterior coatings during rain, or when relative humidity is above 50 percent, unless permitted otherwise by manufacturer's instructions.
3. Minimum application temperatures for Latex paints: 45 degrees F for interiors; 50 degrees F for exterior; unless permitted otherwise by manufacturer's instructions.
4. Minimum application temperature for Varnish and transparent finishes: 65 degrees F for interior or exterior, unless permitted otherwise by manufacturer's instructions.
5. Provide lighting level sufficient to conduct painting operations.

B. Hardware: Remove hardware before painting is started and replace only when paint finishes are thoroughly dry.

1.07 EXTRA STOCK

A. Provide a one gallon container of each color, type and gloss of paint used in the work.

B. Label each container with color, texture and room locations in addition to the manufacturer's label.

1.08 WARRANTY

A. Guarantee the painting work against peeling, fading, cracking, blistering or crazing for a period of two years from the Date of Substantial Completion.

B. Water Repellent: Provide 10 year warranty. A site visit shall be conducted by an agent of RAINGUARD and warranty application shall be completed by applicator.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers:

1. Products of the following manufacturer or supplier form the basis for design and quality intended.

a. ICI Paints, North America, Los Angeles, CA.

2. Equal products of the following may be submitted for approval:

a. Dunn-Edwards Corporation, Los Angeles, CA.
b. Frazee Paint and Wallcovering, Inc., City of Commerce, CA.
c. Sherwin Williams Paint Co.
d. Vista Paint

3. Or approved equal.
4. The Construction Specification Institure (CSI) shall be used to cross reference paint products from different manufacturers.

B. Materials:

1. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and iniformly dispersed to a homogeneous coating.
2. Colors and Glosses: The Architect will select color and hue to be used in the various types of paint specified and will be the sole judge of acceptability of the various glosses obtained from the materials proposed to be used in the work.
3. Undercoats and Thinners: Provide undercoat paint produced by the same naufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer and use only to the recommended limits. Insofar as practicable, use undercoat, finish coat and thinner material as parts of a unified system of paint finish.
4. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.
5. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified of commercial quality.

C. Application Equipment:

1. For application of the approved paint, use only such equipment as is recommended by the manufacturer.

2. Compatibility: Prior to actual use of application equipment, use all means necessary to verify that the proposed equipment is actually compatible with the material to be applied and that the integrity of the finish will not be jeopardized by use of the proposed application equipment.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Measure moisture content of new surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry, Concrete and Concrete Unit Masonry: 12 percent.
3. Interior Located Wood: 15 percent, measured in accordance with ASTM D4442 and ASTM D4444.
4. Exterior Located Wood: 19 percent, measured in accordance with ASTM D4442 and ASTM D4444.

D. Beginning of installation means acceptance of existing surfaces.

3.02 MATERIALS PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Store materials not in actual use in tightly covered containers.

C. Maintain containers used in storage, mixing and application of paint in a clean condition, free from foreign materials and residue.

D. Stir all materials before application to produce a mixture of uniform density and as required during the application of materials. Do not stir into the material any film which may form on the surface. Remove the film and strain the material before using.

3.03 PREPARATION

A. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulates.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

D. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.04 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfiguration.

B. Repair damage to other surfaces caused by work of this Section.

C. Furnish drop cloths, shields and protective methods to prevent spray or droppings from disfiguring other surfaces.

D. Remove empty paint containers from site.

3.05 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish. Number of coats specified is a minimum. Additional coats shall be applied at no extra cost, if coatings show evidence of uneven application, uneven pigmentation, brush strokes or otherwise unsatisfactory distribution of material.

D. Under coats shall be lighter and brighter in tint than finish coat.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

J. Seal tops, bottoms and cutouts for hardware and accessories of wood or plastic laminate covered doors.

K. Split paint door frames to match color of walls on each side of opening.

L. The number of coats of each product specified in the finish schedule is the minimum required. Contractor shall provide additional coats as required to produce proper finish.

3.06 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint shop primed equipment.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.

D. Replace identification markings on mechanical or electrical equipment when painted accidentally.

E. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers and grilles to match face panels.

F. Paint exposed conduit and electrical equipment occurring in finished area.

G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

H. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows names and numbering, using stencils or other approved systems.

I. Replace electrical plates, hardware, light fixture trim and fittings removed prior to finishing.

3.07 FINISHING HOLLOW METAL DOORS AND FRAMES

A. Paint for hollow metal doors and window frames shall be applied with mechanical sprayer.

B. Paint shall be installed prior to installing finish hardware or hardware shall be installed, removed for painting and reinstalled after painting is complete.

3.08 WATER REPELLANT

A. Install exterior and interior water repellent as per manufacturer’s recommendations for a 10 year warranty.

3.09 PLANETARIUM DOME

A. All surfaces behind the planetarium dome shall be painted flat black.

3.10 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.11 CLEANING AND PROTECTION

A. At end of each work day, remove rubbish, empty cans, rags, and other discarded materials from project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.12 PAINT FINISH SCHEDULE

INTERIOR SURFACE	COAT	PRODUCT
Metal Doors and Frames	1	ICI 203 Devran W/B Epoxy Primer
	2 and 3	ICI 379H Devthane Aliphatic Urethane Gloss Enamel
Gypsum Board	1	ICI 9116 Prep & Prime Odor-Less Primer
	2 and 3	ICI 9200 Dulux Lifemaster Semi-Gloss
Concrete Masonry Units Color	1	ICI 9116 Prep & Prime Odor-Less Primer
	2 and 3	ICI 9200 Dulux Lifemaster Semi-Gloss
Concrete Masonry Units Clear	1	RAINGUARD Micro-Seal Concentrate CR-0701

EXTERIOR SURFACE	COAT	PRODUCT
Metal Doors and Frames	1	ICI 203 Devran W/B Epoxy Primer
	2 and 3	ICI 379H Devthane Aliphatic Urethane Gloss Enamel
Concrete Masonry Water Repellent	1	RAINGUARD Micro-Seal Concentrate CR-0701

Galvanized Metal	1	ICI Solvent Clean
	1	ICI 4020PF Devflex DTM Primer
	2 and 3	ICI 2402V Dulux Professional, Satin

END OF SECTION 09 91 00

High-Performance, Non-Yellowing Crystal-Clear Sealers: GemKote™ 100, 350 and 400 and SuperSeal™ 2000 Acrylic-Based Sealer with Matte or Gloss Finish by Concrete Coatings Inc. A light coating of sealer will protect and enhance colored and textured concrete. Use on porous concrete and masonry to form a shield against stains and mildew.

Sealers dry to a matte or gloss wet-look finish, enhance color, penetrate the surface to retard efflorescence and resist oil, grease and food stains and virtually eliminate concrete dusting. Our sealers can be used on interior or exterior masonry and concrete-type surfaces; and as a base-coat, for interior applications where a compatible, commercial floor wax is planned as part of a maintenance program. Use on colored or uncolored, stamped or exposed aggregate concrete, overlays, porous brick, natural and manufactured stone, stucco, slate, unglazed tile and flagstone.

SECTION 09 97 23

CONCRETE SEALERS

PART 1 GENERAL

1.1 SUMMARY

A. This Section specifies an applied sealer for horizontal cast-in-place concrete surfaces.

B. Related Sections: Refer to the following specification sections for coordination.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions.

B Mock-Up: Prepare a test area minimum 2 by 2 feet in size to verify suitability of the sealer and final appearance.

1.3 QUALITY ASSURANCE

A. Manufacturer: Minimum 10 years experience producing concrete coatings.

B. Installer: Licensed installers experienced and trained in the use of specified products.

C. Suitability of Substrate: Concrete surface must be clean and dry with all stains, oil, grease, dust and dirt removed prior to application. A thorough pressure washing is highly recommended.

D. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Protect from damage.

B. Store in a safe place, out of direct sunlight. Keep containers tightly sealed. Do not allow product to freeze. Use within manufacturer’s recommended shelf life, approximately 12 months.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Sealer: High-performance, non-yellowing, clear acrylic-based sealer by Concrete Coatings

Inc., 1105 North 1600 West, Layton, UT 84041, 800-443-2871, www.concretecoatingsinc.com. Provide the following:

1. Sealer with Gloss Finish: CCI GemKote 100, with 100 g/L VOC.
2. Sealer with Gloss Finish: CCI GemKote 350, with 350 g/L VOC.
3. Sealer with Gloss Finish: CCI GemKote 400, with 400 g/L VOC.
4. Sealer with Gloss Finish: CCI SuperSeal 2000, with 600 g/L VOC.
5. Sealer with Matte Finish: CCI GemKote 100-M, with 100 g/L VOC.
6. Sealer with Matte Finish: CCI GemKote 350-M, with 350 g/L VOC.
7. Sealer with Matte Finish: CCI GemKote 400-M, with 400 g/L VOC.
8. Sealer with Matte Finish: CCI SuperSeal 2000-M, with 600 g/L VOC.
9. Performance: Concrete sealers shall meet or exceed the following:
   a. Coverage: As recommended by manufacturer.
   b. Moisture Retention, Test ASTM C 309: 0.21 kg/m² at 200 ft² per gallon and 0.32 kg/m² at 300 ft² per gallon.
   c. Gasoline Resistance: Slight dulling after15-minute exposure (ponding).
   d. Tg: 50°C.
   e. Tukon Hardness: 30 minutes at 180°F, 9.3; 30 minutes at 300°F, 13.7.
   f. Pencil Hardness: 30 minutes at 180°F, F; 30 minutes at 300°F, H.
   g. Spray Conditions, Viscosity: 19 seconds, No. 2 Zhan cup.
   h. Abrasion Resistance: 160 mg lost, CS-17 wheel, 1000 g load, 1000 cycles

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Prior to start of application, inspect existing conditions to ensure surfaces are suitable for installation including the following:

1. Concrete has cured for a minimum of 28 days prior to application of sealer.
2. Surface is completely free of sealers, oils, dirt, paint, alkali, penetrating sealers and foreign materials that would prevent the sealer from penetrating the concrete surface.
3. Concrete has been swept clean.
4. Test area has been approved.

3.2 APPLICATION

A. Concrete Sealer: Strictly comply with manufacturer’s installation recommendations including the following.

1. Apply after stain has dried at rate recommended by manufacturer.
2. Clean surface as recommended by manufacturer.
3. All concrete flatwork designated as being sealed in the plans and specifications shall be sealed with 2-3 even coats of sealer, at the rate of approximately 150 to 200 square feet per gallon.

3.3 CLEANING AND PROTECTION

A. Protection: Do not cover, but protect floor area from paint and other contaminates that could inhibit the sealer.

END OF SECTION 09 97 23

SECTION 10 14 00 SIGNS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Signage, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Room indentification signs.
2. Restroom signs
3. Occupancy signs
4. Accessibility signs

1.02 REFERENCES

A. ASTM A53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

B. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

C. FED-STD-595 – Colors used in Government Procurement.

D. ASTM D4802 – Poly (Methyl Methacrylate) Acrylic Plastic Sheet.

E. Chapters 10, 11B and 30 of California Building Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittal Procedures.

B. Submit shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.

C. Submit samples illustrating full size sample sign of each type, style and color specified.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements:

1. All Signage shall conform to CBC Section 1007.9 and 11B-703.
2. Tactile exit signage shall be provided per CBC 1011.3.
3. Raised characters shall comply with CBC Section 11B-703.2

a. Depth: It shall be 1.32 inch minimum above their background and shall be
b. Tactile Character type. Tactile characters on signs shall be sans serif uppercase characters and be duplicated Contracted (Grade 2) Braille.
c. Tactile Character size. Raised characters shall be a minimum of 5/8 inch and a maximum of 2 inches high based on the letter “I”. CBC Section 11B-703.2.5.

d. Finish and contrast: Contrast between characters, symbols and their backgounds shall have a non glare finish. Character shall contrast with their background with either light characters on a dark background or dark characters on a light background. CBC Section 11B-703.5.1.
e. Proportions: Raised characters on signs shall shall be selected from fonts where the width of the uppercase letter "O" is 60% minimum and 110% maximum of the height of the uppercase letter "I". Stroke thickness of the uppercase letter "I" shall be 15% maximum of the height of the character. CBC 11B-703.2.4 and 11B-703.2.6
f. Character Spacing: Spacing between individual tactile characters shall compy with CBC Section 11B-703.2.7 and 11B-703.2.8
g. Braille: It shall be contracted (Grade 2) and shall comply with CBC Section 11B703.3 and 11B-703.4. Braille dots shall have adomed and rounded shape and shall comply with CBC Table and Figure 11B-703.3.1.

4. Mounting height: A tactile sign shall be located 48" minimum to the baseline of the lowest Braille cells and 60" maximum to the baseline of the highest line of raised characters above the finish floor or ground surface.
5. Mounting location: A tactile sign shall be located on the approach side, as one enters or exits rooms or spaces, and be reached within 0" of the required clear floor space per CBC Section and Figure 11B-703.4.2 as follows

    a. a clear floor space of 18"x18" minimum, centered on the tactile characters, shall be provided beyond the arc of any door swings between the closed position and 45 degree open position.
    b. On the wall at the latch side of a single door.
    c. On the inactive leaf of a double door with one active leaf.
    d. On the nearest adjacnet wall where ther is no wall space at the latch side of a single door or no space at the right side of a double door with two active leafs.

6. Visual characters shall comply with CBC Section 11B-703.5 and shall be 40" minimum above finish floor or ground.
7. Pictograms shall compy with CBC Section 11B-703.6
8. Symbol of accessibility shall comply with CBC Section 11B-703.7

PART 2 - PRODUCTS

2.01 GENERAL

A. Room Identification Signage: Provide room identification signs where indicated. Install on wall adjacent to door latch, on latch side, 60 inches above finished floor to bottom of tactile lettering.

1. Materials: Laminated acrylic Plastice Sheet, ASTM D4802, ¼ inch thick

    a. Upper Layer: Non-glare clear acrylic, 1/8 inch thick.
    b. Lower Layer: Opaque acrylic, 1/8 inch thick.

2. Fasteners: stainless steel mechanical mounting, vandal / tamper resistant.
3. Color: As selected by Architect
4. Lettering Type Style: Helvetica Medium, caps only

B. Restroom Signage: Doorways leading to restrooms shall be identified with sign as detailed on drawings.

1. Materials: Laminated acrylic Plastice Sheet, ASTM D4802.
2. Male Restroom Signage: As per detail on drawings.
3. Female Restroom Signage: As per detail on drawings.
4. Unisex Restroom Signage: As per detail on drawings.
5. Fasteners: stainless steel mechanical mounting, vandal / tamper resistant.
6. Color: As selected by Architect.
7. Lettering Type Style: sans serif, caps only.

C. Occupant Load Sign: Provide maximum occupancy load signs where indicated.

1. Materials: Laminated acrylic Plastice Sheet, ASTM D4802, clear ¼ inch thick.

a. Upper Layer: Non-glare clear acrylic, 1/8 inch thick.
b. Lower Layer: Opaque acrylic, 1/8 inch thick.

2. Fasteners: stainless steel mechanical mounting, vandal / tamper resistant.
3. Color: As selected by Architect.
4. Lettering Type Style: Helvetica Medium.
5. Obtain occupant load number from Architect.

D. Accessibility Sign: Provide at each accessible building entrance.

1. Sign shall be visible to persons along approaching pedestrian ways. Provide additional directional signs as indicated on drawings.
2. Fasteners: stainless steel mechanical mounting, vandal / tamper resistant.

E. Parking Area Signs:

1. Materials:

a. Post mounted and wall mounted signs shall be fabricated from 16 guage enameling iron with porcelain enamel finish.
b. Mount signs to post with minimum two 3/16 inch diameter round head bolts with tamperproof nuts, galvanized.
c. Posts: 2” diameter galvanized steel pipe weighing a minimum of 3.65 lbs per foot and conforming to ASTM A53, Schedule or 2 inch x 2 inch galvanized steel tubing, weighing a minimum of 4.32 lbs per foot and conforming to ASTM A500, Grade B, 3/16 inch wall thickness.

2. Traffic Entry Warning Signs: As per drawings.
3. Parking Stall Signs: As per drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Locate signs where indicated, using mounting methods specified. Install level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

1. Post mounted signs: Set post in concrete base minimum 12 inch diameter and 18 inches deep. Signs set in paving shall be mounted in core drilled holes minimum 8 inch diameter and 18 inches deep with top of concrete fill flush to paving.
2. Wall mounted signs shall be installed after painting of wall surface.

3.03 CLEANING

A. After installation, clean soiled surfaces. Protect units from damage until acceptance by the Owner.

END OF SECTION 10 14 00

SECTION 10 21 13.19 TOILET ROOM COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Toilet Room Compartments, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes but is not limited to the following:

1. Toilet Room Partitions

C. Related Sections

1. Section 09 22 16, Non-Structural Metal Framing, wall backing for toilet room partitions
2. Section 10 28 13, Toilet Room Accessories

1.02 REFERENCES

D. American Society of Testing and Materials

1. ASTM A167 – Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip
2. ASTM b221 – Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
3. ASTM D2843 – Smoke Density
4. ASTM D 635-81 – Rate of Burn
5. ASTM D 1929 -77 – Self Ignition Properties

E. 2016 California Code of Regulations – Title 24, Part 2.

F. Americans with Disabilities Act. 1. ADA-Title II

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittal Procedures.

B. Shop Drawings:

1. Submit partition plan, elevation views, dimensions, panel and door sizes, details of wall, floor supports, and door swings.
2. Submit dimensioned layouts for the required location of backing in walls.

C. Product data: Provide data on panel construction, hardware and accessories.

D. Samples:

1. Submit sample of partition panels, illustrating panel finish, color, and sheen.
2. Submit sample of all hardware

1.04 QUALITY ASSURANCE

A. Accessibility Requirements

1. Wheelchair accessible compartments shall comply with CBC Section 11B-604.8.1
2. Toe clearance for at least one side partition of a wheelchair accessible compartment shall comply with CBC Section and Figure 11B-604.8.1.4. It shall be 9" high minimum above the finish floor and 6" deep minimum beyond the compartment side face of the partition, exclusive of partition support members. It shall be 12" high minimum above the finish floor for children's use. Partition components at toe clearances shall be smooth without sharp edges or abrasive surfaces. Toe clearance at the side partition is not required in a compartment greater than 66" wide.
3. An ambulatory accessible compartment shall be provided where there are six or more toilet compartments, or where the combination of urinals and water closets totals six or more per CBC Section 11B-213.3.1. Such compartments shall comply with CBC Section 11B-604.8.2.
4. Door and door hardware for accessible compartments shall be self closing and shall comply with CBC Section 11B-404 except that pull-side clearance for ambulatory accessible compartments shall be minimum 44" clear, rather than 60". CBC Figure 11B-604.8.2
5. A door pull complying with CBC Section 11B-404.2.7 shall be placed on both side of the dor near the latch.
6. Doors shall not swing into clear floor space or clearance required for fixtures.

B. Burning Characteristics

1. Flame spread rating not to exceed 25 and smoke development index not to exceed 450 when tested in accordance with ASTM E 84.

C. Field Measurements: Verify that field measurements are as indicated on shop drawings.

D. Coordination: Coordinate placement of backing in walls. Backing by others.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened and undamaged packages. Panels, doors, and pilasters shall be delivered with protective plastic covering.

B. Store in original packaging under protective cover.

C. Do not deliver to job site until building is enclosed and HVAC system is functioning.

1.06

1.07 EXTENDED WARRANTY

A. Provide manufacturer's standard 15 year warranty, to include breakage, corrosion or delamination of installed plastice components, door latch and strike, stainless steel shoes and wall brackets. Defective components shall be replaced. Labor for reinstallation not included.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers: Products of the following manufacturer or supplier form the basis for design and quality intended.

1. Mills Partitions
2. Santana Solid Plastic Products Company Inc.

3. Capital Partitions

B. Systems: Floor Mounted Overhead Braced, Poly-blend System.

C. Materials: Solid Plastic High Density Polythylene (HDPE) manufactured under high pressure forming a single component section that is waterproof, nonabsorbent, with self-lubricating surface resistant to marking with writing utensils.

D. Components:

1. Pilaster Shoe: Stainless Steel
2. Head Rail: ASTM B221; aluminum extrusion, 6364-T5 alloy with clear anodised finish and anti-grip configuration, minimum 1.188 lbs. per lineal foot.
3. Attachments, Screws and Bolts: ASTM A167; Type 304 stainless steel
4. Through Bolts and Nuts: Type 304 stainless steel, Anti-theft type.
5. Bracket Type: Aluminum continuous
6. Hardware:

a. Hinges: Provide continuous stainless steel piano hinge full length of door at all compartment doors with through bolts.
b. Door Latch Housing: Aluminum extrusion with clear anodized finish, surface mounted and fastened to door with Type 304 stainless steel vandal resistant screws.
c. Stike and Keeper: 6” long extruded aluminum sith clear anodized finish, equipped with rubber bumper, fastened to pilaster with vandal resistant theft resistant through bolts.
d. Provide sliding door latch for each door.
e. Provide door pull and wall stop for outswinging doors.

E. Accessories:

1. Equip each door with and coat hook with bumper

F. Accessible Stalls: Toilet stalls for persons with disabilities shall have the following hardware:

1. Slide bolt door latch
2. Wire pulls both sides of the door
3. Self closing hinges
4. Door hardware mounted at 34” – 44” above finished floor
5. Coat hook mounted at 48” above finished floor.
6. Doors at front entry stalls shall have 32” minimum clear width when the door is open 90 degrees.
7. Doors at side entry stalls shall have 34” minimum clear width when door is open 90 degrees.

G. Fabrication:

1. Fabricate partitions from HDPE material with finished faces, free of saw marks, and all edges machined to .250 inch radius.
2. Bevel corners and edges of cutouts.
3. Doors, Panels, Pilasters and urinal screens: 1” minimum thickness.

H. Finish: As selected by Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify correct spacing of and between plumbing fixtures.

B. Verify correct location of built-in framing, anchorage, and backing.

3.02 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer.

1. Install units level, plumb, and firmly anchored in locations and at heights indicated.
2. Attach continuous wall brackets securely to walls using stainless steel fasteners spaced maximum 12” O.C.

B. Verify all dimensions shown on drawings by taking field measurements.

C. Coordinate with all other trades whose work relates to the items specified herein for the placing of all required backing and furring to ensure proper anchorage and proper fit.

3.03 CLEANING

A. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 21 13.19

SECTION 10 28 13 TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Toilet Room Accessories, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Provide paper and soap dispensers.
2. Provide waste receptacles.
3. Provide warm air dryers
4. Provide mirrors.
5. Provide grab bars
6. Provide underlavatory guards

1.02 SUBMITTALS

A. Manufacturer's Product Data. Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

1.03 ACCESSIBILITY REQUIREMENTS

A. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 11B-602 through 11B-612.

B. Grab bars in toilet facilities and bathing facilities shall compy with CBC Section 11B-609. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall bave rounded edges. The space around the grab bars shall be as follows

1. 1-1/2” between grab bar and the wall
2. 1-1/2” minimum between the grab bar and projectiong objects below and at the ends.
3. 12” minimum between the grab bar and projecting objects above.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturers: Provide accessories by one of the following:

1. Bradley, (basis for design)
2. Bobrick

B. Toilet Paper Dispensers:

1. Model: Bradley 522
2. Quantity: Provide (1) at each toilet

3. Location: Verify with Architect.
4. Accessible stall: Bradley 5412

C. Paper towel dispenser and waste receptacle:

1. Model: Bradley 2017-10, semi-recessed Bradex.
2. Quantity: Provide (1) at single use toilet rooms. Provide (2) at joint use toilet rooms.
3. Location: Verify with Architect.

D. Feminine Napkin Disposal:

1. Model: Bradley 4731-15, recessed.
2. Quantity: Provide (1) at each female toilet.
3. Location: Verify with Architect.

E. Toilet Seat Cover:

1. Model: Bradley 584.
2. Quantity: Provide (1) at each toilet.
3. Location: Verify with Architect.

F. Soap Dispenser:

1. Model: Bradley 6562.
2. Quantity: Provide (1) at each lavoratory.
3. Location: Install above lavoratory.

G. Mirrors:

1. Model: Bobrick B-290, 18” x 36”.
2. Quantity: Provide (1) at each lavoratory.
3. Location: See interior elevations.

H. Hand Dryers:

1. Manufacturer: Saniflow
2. Description: Speedflow, cast iron white enameled coating, surface mounted, 4” projection
3. Model: M06AF-UL.
4. Quantity: Provide (1) at each lavoratory
5. Location: See interior elevations.
6. Electrical: verify voltage with electrical drawings

I. Grab Bars:

1. Model: Bobrick B-490 Series
2. Quantity and Configuration: As per drawings
3. Location: As per drawings.

J. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer.

B. Install units level, plumb, and firmly anchored in locations and at heights indicated.

C. Secure mirrors to walls in concealed, tamper-resistant screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

D. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

E. Verify all dimensions shown on drawings by taking field measurements.

F. Coordinate with all other trades whose work relates to the items specified herein for the placing of all required backing and furring to ensure proper anchorage and proper fit.

G. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 13

SECTION 21 13 13 – WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, equipment, appliances, and necessary incidentals for the complete installation of all fire protection systems as indicated and as specified herein. These specifications are intended to describe, generally, the scope of work to be performed under this contract. All work necessary for a complete operating fire protection system in areas indicated, including but not limited to:

1. Fixtures and equipment.
2. Trenching and compaction of underground piping.
3. Fire sprinkler piping.

C. Areas to be provided with sprinklers shall be:

1. Gymnasium Building

D. Related Work not in this section:

1. The following work, although similar in nature or relevant to the work of the section, is required in other sections or is to be furnished by others:

a. Underground dedicated water line for private fire hydrants and building sprinkler system. See Fire Protection Drawings.
b. Interior riser stubbed 18” above finished floor with flange. See Fire Protection Drawings.

E. Drawings and Specifications: Contractor shall install complete system in accordance with DSA approved drawings and specifications.

1. Any deviation shall be submitted to DSA as a Construction Change Doccument (CCD).

F. Guarantees: Furnish a written guarantee form, required under Division 1, against defects in materials and workmanship for 1 year. Guarantee shall include repair of damage to, or replacement if so required of any part of premises caused by water leaks or breaks in pipe, fixtures, or equipment provide under this Division, except when damage is caused by abuse.

1.02 REFERENCES

A. National Fire Protection Association (NFPA):

1. NFPA 13, Installation of Sprinkler Systems
2. NFPA 25, Care & Maintenance of Sprinkler Systems
3. NFPA 14, Installation of Standpipe and Hose Systems
4. NFPA 24, Private Fire Service Mains and Their Appurtenances

B. American Society for Testing & Materials (ASTM)
C. American Welding Society (AWS): Standard Qualifications of Welding Procedures and Welders for Piping and Tubing

D. California Fire Code

1.03 SUBMITTALS

A. Submit product data as per section 01 33 00 - Submittals.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Contractor shall provide evidence of having a minimum of five (5) years experience in the fabrication and installation of fire protection systems and must posses a valid C-16 California Fire Sprinkler Contractor's License.

B. Requirements of Governing Agencies: Conform to all requirements of the agencies listed below in addition to all other agencies having jurisdiction.

1. DSA
2. California State Fire Marshall
3. Local Fire Marshall

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials to be used in this project shall be new and shall have U.L. or F.M. and CSFM approval.

B. Pipe and fittings Above Ground:

1. Branch piping: Schedule 10 black steel pipe, ASTM A53 with Class 125 Standard cast-iron screwed fittings, ANSI B16.4. Thin Wall Pipe and Light Wall Pipe are approved for this project in all areas out of reach of students.
2. Main Piping: Schedule 10 black steel pipe, ASTM A53, threaded, welded, rolled groove without metal removal or grooved end in accordance with manufacturer's instructions, Victaulic's, Gustin-Bacon or equal. Fittings shall be standard weight weld or Class 125 Standard cast-iron screwed fittings, ANSI B16.4 or Victaulic fittings with grade E gaskets. Thin Wall Pipe and Light Wall Pipe are approved for this project in all areas out of reach of students.
3. All Arm-Overs, Sprigs and Drops shall be Schedule 40
4. Mechanical couplings and fittings shall be of same manufacturer.
5. Victaulic type or equal, Hookers and FIT fittings are not acceptable.

C. Pipe and fittings Below Ground:

1. Class 51 ductile iron pipe cement-lined, ANSI A21.51 and ANSI A21.4. Fittings shall be 250-lb. cast-iron cement-lined, ANSI 21.10 and ANSI A21.4. Joints shall be restrained type, consisting of bolted mechanical joint, with joint retainer gland, ANSI A21.11. Refer to pipe protection as specified herein.
2. As approved by Code Authorities, approved PVC piping may be used as an option on-site, beyond 5-feet of building boundary.

D. Valves (Provide supervisory switches at all control valves):

1. O.S. & Y. Valves; 175 lb. WWP 2 inch and smaller: Stockham B-133, Crane 459 or Nibco T-104-0 or equal, bronze body, screwed.

2. O.S. & Y. Valves; 175 lb. WWP 2-1/2 inch and larger: Stockham G-634, Crane 467 or Nibco F-607-0, or equal, iron body, flanged.
3. Butterfly Valves: 175 psig, ductile iron body; nickel plated ductile iron disc; stainless steel stem; integral tamper switch; slow close gear operator.
4. Angle Valves: 175 lb. WWP, Nibco T-301, or equal, bronze screwed.
5. Check Valves; 2-1/2 inch and larger: 175 lb. WWP, Victaulic Series 717 or Gruvlok Series 7800 FP, or equal.
6. Check Valves (Non-Slam): Muessco 101 AP, 125 lb. ANSI iron body, bronze seats and discs and stainless steel spring.
7. Alarm Bell: Water operated motor gong with guard. Provide signage "Sprinkler Fire Alarm".
8. Pressure Switches: U.L. listed, automatic recycle retard with DPDT contacts, Potter-Roemer 6200 series, Viking VSR-D or equal.
9. Alarm Check Valve Assembly: Grinnell Model H-2, Viking model F-1 or G-1 or equal, completed with retard chamber and all necessary appurtenances.

E. Fire Sprinkler Heads:

1. Sprinkler heads for all other finished areas shall be recessed type with chrome finish head and white color finish for escutcheon; Viking Micromatic Model M, Central or equal.
2. In areas where there are no finished ceilings, upright or pendant type shall be provide as required to suit installation; Viking Model M, with brass finish, Central or equal.
3. Provide 6 spare sprinkler heads of each type with wrench in cabinet per NFPA 13.
4. All sprinkler heads shall be quick response type.

F. Pressure Gauges: U.L. approved equivalent to Potter-Roemer 6240 or equal, 0-300 PSI rating.

G. Fire Department Connections: Two (2) way inlet connection with caps and chains, rough brass, Standard S133 (4 x 2-1/2 x 2-1/2), post type and labeled "Auto-Spkr", with local fire department hose thread, Potter Roemer 5730 or equal.

H. Post indicator and Valve: 175 psig cast-iron body bronze mounted, double disc, non-rising stem gate valve with indicating post flange and round, full length adjustable cast iron body indicator post. Handle shall be secured with pad break-a-way type and lock. Control operator nut shall be 36 to 42 inches above grade, Stockham F-635-O valve and G-91 post, Kennedy or equal (provide supervisory switch).

PART 3 - EXECUTION

3.01 INSPECTIONS

A. Inspections: Prior to commencing work required by this section, inspect all work of other trades and verify that such work has been properly completed and installed to allow for proper installation of all materials and methods required of this section.

1. All fire protection system shall be installed in accordance with the requirements of all governing authorities and the referenced standards.

3.02 INSTALLATION

A. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Interferences between installed work and various trades due to lack of coordination shall be resolved by the Architect whose decision is final. Relocate or offset any work as required to accommodate work of other trades, at no extra cost to the Owner, when so directed by the Architect.

B. Conform to all requirements of agencies having jurisdiction.

C. Attention is called to requirements that air conditioning, plumbing and electrical systems are to be installed in locations adjacent to sprinkler system piping.

1. Coordinate efforts with other trades doing work on site to avoid interference.
2. When limited space conditions exist above ceilings due to installation of combined trades, penetrations through the structural beams will be provided at designated locations mid-height of the beam and at one third intervals of beam span. Verify and coordinate all locations per structural drawings and Structural Engineer.
3. Work specified shall be installed and arranged as directed in a satisfactory manner.
4. Check conditions at site and examine pertinent drawings before preparing working drawings. Take measurements for this work, verify drawings of other trades and be responsible for proper installation in available space for appurtenances herein specified or indicated.
5. Before making any changes considered necessary, secure approval from the Architect for such variations.

D. Sleeves: All sleeves in concealed and exterior walls shall be 20 gauge galvanized iron 1 inch O.D. larger than the pipe, caulking in a moisture proof manner.

E. Flexible Connections:

1. Flexible connections shall be of approved design and installed where, when or deemed necessary.
2. Where piping crosses seismic joints, install a flexible pipe expansion joint of approved design to absorb the specified seismic movement in any direction. Shop drawings of proposed joint shall be submitted.

F. Penetrations through fire rated walls or floors shall be U.L. listed through penetration firestop system assemblies for fire separation rating as required and installed per manufacturers printed instructions. Provide and install polished chromium plated brass floor ceiling or wall plates for all pipes, exposed in finished portions of the building.

G. For buried cast iron and ductile iron valves, pipe and fittings: Install inside a 9 mil polyethylene sleeve in accordance with AWWA Standard C-105. Any steel parts, such as bolts, nuts, clamps, tie-rods, etc., shall be coated with Koppers Bitumastic 505 before encasing in polyethylene sleeve.

3.03 FLASHING INSTALLATION

A. Provide flashing for all pipe and tubing extending through the roof. Extend the base flashing at least 8-inches in all directions from the pipe and turn the cap flashing down into the pipe. Flashing shall be installed as to be watertight.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Test system in accordance with NFPA #13, #14, #24, CSFM and local Fire requirements. Attention is called to NFPA pamphlets 13 and 24 requiring flushing and testing in the presence of Architect and Owner's Insurance Underwriter.

C. Certification: Upon completion, subcontractor and general contractor's representatives shall jointly inspect work of this Section and deliver a written certification to the Architect, that installed materials and workmanship conform to specifications. Provide the NFPA certificate (under ground and above ground) to the Owner, the Architect, the local fire official, and DSA.

D. All labeling of valves and equipment shall be done as required.

END OF SECTION 21 13 13

SECTION 22 00 00 PLUMBING

PART 1 – GENERAL

1.01 SUMMARY

A. The drawings and general provisions of the Contract, including General and Special Conditions and Division 1 Specification Sections, shall govern the work in this section the same as though written herein in full. It is the intent to provide a complete, tested, and operating plumbing system.

B. Scope of Work: The work to be done under this heading shall include furnishing all labor, materials, fixtures and services together with the demolition, installation, testing and adjusting necessary to the acceptable completion of all the plumbing work shown on the drawings or as herein specified.

C. Description Of Work

1. The following list is intended to generally describe the various plumbing systems to be installed, but shall not be considered as a limit of the work to be performed under this section of the specifications:

a. Connection to site water, sewer, gas piping systems as shown including sawcutting and haul-away.
b. Sanitary soil, waste and vent systems.
c. Rainwater drainage systems.
d. Domestic hot and cold water systems, including new water service to building.
e. Natural Gas piping systems including new gas service to building.
f. Rough in and final connections to owner furnished equipment.
g. Air conditioning condensate drain systems.
h. Plumbing fixtures and equipment.
i. Rough-in and final connections for all fixtures and equipment.
j. Insulation.
k. Remote chillers for drinking fountains
l. Sterilization and tests of domestic water systems.
m. Roof sanitary vents and flashing for the same.
n. Trenching and Backfill per Section 31 23 33.

D. Related Work not in this Section

1. The following work will not be furnished under this section of the Specifications, but will be included in other specification sections:

a. All line voltage wiring (regardless of voltage) and all miscellaneous wiring devices and all connections thereto and all line and low voltage conduit. All electrical disconnects and starters not integral to equipment scheduled and / or specified. All timeclocks and miscellaneous “on-off” control devices.
b. Final painting.
c. Toilet room accessories.
d. Fire protection system.
e. Joint sealants.
f. Landscape irrigation and drainage systems

1.02 SUBMITTALS

A. The Plumbing Contractor shall provide submittal data for all fixtures and material being furnished by him to the Architect for approval. Submit the following according to the Conditions of the Contract and Division 1 Specifications Sections: 01 33 00.

1. Product data for:

a. Plumbing fixtures including floor drains, floor sinks
b. Laboratory Fixtures
c. Laboratory Equipment
d. Water heaters
e. Pumps
f. Remote chillers for drinking fountains
g. Pipe, fittings, valves, specialties
h. Insulation

2. Pipe penetrations:

a. Fire proofing material and sleeves

B. Each submittal brochure shall contain all of the items listed above and shall be bound with covers, indexed with tabs and have a table of contents. Submittals shall indicate make, specific model and size, accessories, dimensional drawings, diagrams and other pertinent information. Submit all items at one time. Partial submittals are not acceptable. Substitutions of materials and fixtures from that specified herein, noted on the drawings or as outlined in the General or Supplementary Conditions shall be clearly identified as substitutes. Deviation data to clearly demonstrate equivalency and comparisons between specified items and proposed substitutions shall be provided by the Plumbing Contractor unless prior arrangements are made to compensate the Architect for researching this data. "Equivalent" submittals lacking this information will be returned "not reviewed". Approval of substitutions shall in no way relieve the Plumbing Contractor from the responsibility of complying with the plans and specifications and installation in the space available.

C. The following submittals for closing out the job shall be a prerequisite to the issuance of Final Certificate of Payment.

1. Certificates of water quality
2. Reproducible "As-built" (record) drawings
3. Approved inspection reports
4. Guarantee

1.03 QUALITY ASSURANCE

A. Work of the contract shall satisfy the requirements of:

1. IAPMO, ASME, ANSI, ASTM, CISPI standards for base materials.
2. N.F.P.A.- 13
3. American Gas Association (A.G.A.)
4. 2016 California Building Code (CBC) Title 24, Part 2, CCR
5. 2016 California Electric Code (CEC) Title 24, Part 3, CCR
6. 2016 California Mechanical Code (CMC) Title 24, Part 4, CCR
7. 2016 California Plumbing Code (CPC) Title 24, Part 5, CCR
8. SMACNA Seismic Restraint Manual, latest edition.

B. All brazers and welders shall be qualified with the brazing and welding procedures set forth in ASME Boiler and Pressure Vessel Code – current edition. If the work of any welder or brazer creates a reasonable doubt as to his skill, the Architect/Engineer may require the welder to be requalified.

C. Provide manufacturer's certificate that materials and fixtures meet or exceed minimum requirements as specified.

D. Where these drawings and specifications call for or describe materials or construction of a better quality or larger sizes than required by all laws, codes ordinances, regulations and orders of any public authority bearing on the performance of the work, the drawings and specifications shall take precedence.

E. Testing and Inspections: Contractor shall arrange for inspections required by authority having jurisdiction and deliver any certificates of such inspections to the Owner. Owner shall pay for all inspections required.

F. Permits: Owner shall apply and pay for all permits required by any public authority having jurisdiction.

1.04 PRODUCT AND FIXTURE DELIVERY, STORAGE AND HANDLING

A. Exercise care in transporting and handling to avoid damage to and contamination of materials and fixtures.

B. Materials and fixtures kept at the job site shall be stored in enclosures or under protective covering. Material and fixtures shall be stored above grade in manufacturer's original, unopened protective packaging and kept as clean and dry as possible.

C. Damage to materials and/or fixtures due to negligence in handling, storage or delivery shall be cause to reject and replace all such damaged material and/or fixtures at the Contractor's own expense with no additional cost to the Project.

1.05 PROJECT CONDITIONS, SUPERVISION AND WORKMANSHIP

A. The Plumbing Contractor shall examine the complete project drawings and make a preliminary examination of the site. The Plumbing Contractor shall also examine in advance methods for installation, means to be provided for getting fixtures and equipment into place, routing of piping and any other requirements of the work. This shall include verification that all systems and all fixtures will fit spaces allotted. Work shall be installed so that indicated ceiling heights are maintained, with no portion of the work requiring excessive furring.

B. The Plumbing Contractor must consider and include any additional cost involved in verifying and coordinating the work with existing conditions and points of connection. If situations arise where the work cannot be installed as intended, the Owner's representative must be informed to assist in resolving the problem.

C. Fixtures shall be located within rooms as indicated on Architectural and Plumbing drawings. In the event these drawings do not indicate locations by exact dimension, such locations shall be obtained from the Architect prior to installation. Should the Plumbing Contractor elect to install such fixtures without prior instruction, he shall be subject to removal and reinstallation of such fixtures at the discretion of the Architect without additional cost to the project.

D. The Plumbing Contractor shall provide all the rigging, scaffolding, tools, tackle, hoist, personnel safety equipment, labor, etc., necessary to complete the installation of fixtures and materials in accordance with the intent of this specification.

E. The Plumbing Contractor must coordinate all areas of the work required with the Owner's Representative as they relate to material, storage, trash removal, hours of work, job site office, telephone, sanitary facilities, electrical power, drinking water, hoisting, temporary barriers, safety measures, etc., including cost of such items.

F. The Plumbing Contractor is responsible to coordinate demolition and reconstruction (cutting and patching) of walls, floors, and ceilings required for the performance of the work of this Section of the Contract. Other appropriate Contractor is responsible for the actual demolition and reconstruction of walls, floors and ceilings. The Plumbing Contractor is responsible for demolition and reconstruction of existing hardscape as required for performance of work under this Section of the Contract.

G. The Plumbing Contractor shall have a competent Job Superintendent and/or Foreman on site or available at all times by phone ("pager") during project progress with authority to act on the Contractor's behalf and to supervise the installation of the work under this section. Superintendent shall also be responsible in conferring with other trades as to the proper execution and conduct of the work under this section so that work may be carried on as rapidly as possible and still maintain coordination with the other trades in progress at the same time.

H. All workmanship shall be first class in every respect and shall be performed only by skilled mechanics recognized as such in each of their respective trades.

1.06 DRAWINGS AND SPECIFICATIONS

A. Drawing and specifications are intended to complement each other and are required to be taken together to provide all associated items of work, materials and equipment necessary for a complete installation.

B. A set of plumbing drawings will accompany these specifications showing the arrangements and sizes of piping systems and principal connections to the plumbing fixtures. Drawings and specifications are intended to complement each other to the extent that all associated items of work and materials necessary to the completion of the installation of the systems shall be provided whether or not mentioned in the specifications or shown on the drawings.

C. Discrepancies between Architectual and Plumbing drawings: the drawings showing the greater number of fixtures shall govern. Where fixtures are indicated on the Architectual plan, but not similarly shown on the Plumbing drawings and where such items are covered by specifications, all such items together with the necessary appurtenances and services shall be provided. Discrepancies as described above are inadvertent and it shall be the Plumbing Contractor's responsibility to comply with the intent of this paragraph and the Contract.

D. Plumbing work, as laid out, is to some extent, diagrammatic and locations thereon are drawn to scale where possible. It is not the intention of the drawings to show all the offsets, fittings, and accessories. Locations indicated shall be adhered to as closely as possible; reasonable deviations therefrom shall be made at no additional expense.

1.07 AS-BUILT DRAWINGS

A. On a set of contract drawings kept at the site during construction, the Plumbing Contractor shall mark all work as it is completed with sufficient dimensions including depths of below floor or finish grade to locate all work installed. Mark all work inside, outside and beneath the building.

B. The marked drawing shall be kept current as the work progresses and shall be available for inspection upon request. At the close of construction The Plumbing Contractor shall transfer all markings to a set of reproducibles and deliver these drawings to the Architect.

C. The correct and completed "As-Built" drawings are a pre-requisite to final contract payment in conformance with Paragraph 1.6.C.

1.08 GUARANTEE

A. All work shall be guaranteed for a minimum period of one year from either the official date of completion or from the official date of acceptance by the Owner whichever is the later date.

B. Certain items shall be guaranteed for a longer period, as stated in the specification for those items.

C. Should any trouble develop during this time due to defective material, faulty workmanship, or non-compliance with plans, specifications, codes, or written directions of the Owner, Architect, or Inspector the Plumbing Contractor shall furnish all necessary labor and materials to correct the trouble without additional charges.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials shall be new, of commercial quality, and shall be standard current products of manufacturers regularly engaged in the production of plumbing products. Unless indicated otherwise, all fixtures, and equipment shall conform to the same requirements as "materials". Use the same brand of manufacture for each class of fixtures, equipment, or material.

2.02 PIPING SYSTEMS MATERIALS

A. Soil, Waste and Vent Systems (above grade): ASTM A-74 cast iron soil pipe with "No-hub" fittings and joints. Alternate: Use DWV copper with solder joints for vertical vent piping. Alternate: Use DWV copper with solder joints for above grade waste in congested areas as required.

B. Soil, Waste and Vent Systems (interior, below grade): ASTM D2751 ABS pipe and solvent cement fittings.

C. Soil, Waste (exterior, below grade): ASTM D2751 ABS pipe and solvent cement fittings.

D. Rainwater Piping Systems: ASTM-74 cast iron soil pipe with "no-hub" fittings and joints at concealed areas. Schedule 40 galvanized steel pipe at exposed areas.

E. Domestic Water Systems (above grade and connections to existing below grade): ASTM B-88 Type L hard drawn copper tubing with wrot copper solder fittings. Solder with 95-5 tin-antimony or approved lead free solder.

F. Domestic Water System (exterior, below grade): Schedule 40 PVC Pipe with solvent cement fittings.

G. Domestic Water Systems (interior, below floor): ASTM B-88 Type L soft copper tubing with no joints below slab. Solder above grade connections to hard drawn tubing with 95-5 tin-antimony or approved lead free solder.

H. Air Conditioning Condensate Systems: ASTM B-88 Type M (insulated) hard drawn copper tubing with wrot or cast solder fittings. Solder with Harris "Stay-Safe 50", or equivalent lead-free solder.

I. Indirect Drains: Type DWV copper tubing and fittings or Type M hard drawn copper tubing with wrot or cast solder fittings. Solder with Harris "Stay-Safe 50", or equivalent lead-free solder. Insulate refrigerated drains.

J. Fuel Gas Systems (exterior, above grade): ASTM A-53, Schedule 40 galvanized steel pipe with malleable 150 lb. screwed fittings for up through 2" and butt welding fittings for 2-1/2 " and larger.

K. Fuel Gas Systems (interior, above grade): ASTM A-53, Schedule 40 steel pipe with malleable 150 lb. screwed fittings for up through 2" and butt welding fittings for 2-1/2" and larger.

L. Fuel Gas Systems (exterior, below grade): SDR II polyethylene (PE) pipe with manufacturer's recommended heat fusion fittings, approved PE-to-steel transition riser, tracer wire and warning tape.

2.03 VALVES AND SPECIALTIES

A. Domestic Water (shut-off): Stockham #255 Series (or equivalent by Apollo or Nibco) full port brass body ball valves, 600CWP/150SWP, solder or threaded ends.

B. Domestic Water (check): Stockham #309Y/319Y (or equivalent by Apollo or Nibco) swing type, bronze body, bronze disc.

C. Gas (2" and smaller): Crane #1228 (or equivalent by A.Y. McDonald) gas cock.

D. Gas (2-1/2" and larger): Rockwell Figure 142/143 plug valve.

E. Trap Primers: Precision Plumbing Products "Prime-Rite", installed per manufacturer's recommendations, or equivalent.

F. Water Hammer Arrestors: Precision Plumbing Products, or equivalent, P.D.I. sizing.

G. Access Panels: Milcor, or equivalent, minimum 10" x 10" size, stainless steel, key locks, vandal resistant.

H. Pressure Gauges: Weiss Instruments (or equivalent by Trerice), #TL25, 21/2" dial, utility gauge, 0-100 psig (0" – 30" for vacuum) range.

I. Thermometers: Weiss Instruments (or equivalent by Trerice) bimetal or industrial type with 0° to 160° range.

J. Dielectric Fittings: Victaulic "Clear Flow" dielectric waterway.

K. Floor Cleanouts (F.C.O.): J.R. Smith #4810 cover with U.P.C. bronze plug.

L. Wall Cleanouts (W.C.O.): Terri, prime-coated, with U.P.C. bronze plug in no-hub test tee.

M. Cleanout-to-Grade (C.O.T.G.at soil): Concrete yard box with C.I. lid marked "SEWER".

N. Cleanout-to-Grade (C.O.T.G. at site concrete): Zurn #1400

O. Expansion Tanks (at water heaters): Amtrol Therm-X-Trol #ST series, sized as shown on drawings

P. Downspout nozzle: Zurn Z-199

2.04 HANGERS AND SUPPORTS

A. Provide hangers as specified herein, or equivalent galvanized or cadmium plated hangers by Elcen, Fee & Mason, or B-Line. Perforated strap is not approved for this project.

B. Adjustable Hangers: B-Line #B3690. Provide shields at insulated piping.

C. Trapeze Hangers: B-Line #B22 channel with pipe clamps and guides as required. Provide shields at insulated piping.

D. Riser Clamps: B-Line #B3373 (steel, C.I.), 3B3373 CTC (copper).

E. Offset Pipe Clamps: B-Line #B3148.

F. Water Pipe Isolators: Include felt lining at each hanger.

G. Hanger Rods: Galvanized, threaded, minimum 3/8" diameter.

H. Upper Attachments: Galvanized steel for type of surface involved and for supported load.

I. Seismic Restraints: B-Line OSHPD approved system or approved equivalent.

2.05 INSULATION

A. Hot Water Supply/Return and Chilled Drinking Water Supply: 1" thick preformed fiberglass pipe insulation with all service jacket (ASJ) and fitting covers.

B. Air Conditioning Condensate: 3/8" thick wall cellular plastic, Rubatex, Armaflex, or equivalent.

C. Refrigerated Indirect Drains: 3/8" thick wall cellular plastic, Rubatex, Armaflex, or equivalent.

D. Lavatory Traps and H.W. Supplies: Truebro #101 "Handi LAV-GUARD" insulation kit, or equivalent, grey color.

E. Insulation shall have a flame spread rating of not more than 25 and a smoke developed rating of not more than 50.

2.06 PLUMBING FIXTURES

A. Fixtures shall be as scheduled on the drawings. Equivalent models by other manufacturers including Kohler or Eljer (for water closets, urinals and lavatories), Elkay (for stainless steel sinks), Oasis (for water fountains and remote chillers) and J.R. Smith, Wade or Josam (for drains) may be approved by the Architect.

B. Provide all necessary angle stops, risers, escutcheons, 17-guage CP traps, sealant, etc. as required for fixtures. All fixtures shall be white unless otherwise scheduled.

C. Accessibility Requirements:

1. Plumbing fixtures and accessories provided in a tiolet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.

2. All single-user toilet facilities shall be identified as Gender Neutral facilities by a door symbol that complies with CBC Section 11B-216.8 and 11B-703.2.6.3 No pictogram, text or braille is required on the symbol. If tactile jamb signage is provided, the signage shall comply with the appropriate technical requirements of CBC Section 11B-703. Examples of appropriate designations are "ALL-GENDER RESTROOM", "RESTROOM" or "UNISEX RESTROOM". DSA BU 701.
3. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6
4. Heights and location of all accessible fixtures shall be mounted according to CBC Section 11B-602 through 11B-612.
5. Fixture controls shall comply with CBC Section 11B-602.3 for drinking fountains, 11B-604.6 for water closets, 11B-604.9.5 for children's water closets, 11B-605.4 for urinals, 11B-606.4 for lavatories and sinks, 11B-607.5 for bathtubs, 11B-608.5 for showers, and 11B-611.3 for washing machines and clothes dryers.
6. Accessible sinks shall not exceed 6-1/2" in depth, Sinks shall be mounted with the front of the higher rim and counter surface 34" maximum above the finish floor or ground.
7. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks. CBC Section 11B-606.

PART 3 – EXECUTION

3.01 DEMOLITION

A. The Plumbing Contractor shall notify the Architect immediately upon encountering unknown existing utilities or piping arrangements that may require protection or relocation. Any discovery of this type shall require a decision from the Architect as to the final disposition of such a disclosure. Contractor shall not proceed in these areas until written approval has been given by the Architect or his representative.

3.02 EXCAVATING AND BACKFILLING

A. Provide all excavating, trenching, and backfilling required to install the work of this Section of the Contract. All excavating, backfilling and materials shall meet all requirements of Section 31 23 33 Trenching and Backfilling and as specified herein.

B. Excavate to dimensions and depths indicated or necessary for work to be installed. Cut a minimum of 6" below required grade and place a 6" compacted sand bed to provide uniform grade and bearing for piping throughout its entire length. Excavations that are carried to unnecessary depths shall be refilled to the proper level with sand fill and thoroughly compacted to the density specified in the above referenced section.

C. Shore and brace pipe trenches by members of suitable size and arrangement as required by OSHA and C.P.C. to provide against injurious caving and erosion during construction work, pipe laying and backfilling. Provide constant grade level watch personnel whenever workmen are in trenches over 5 feet in depth. Remove shoring, bracing and sheeting as excavation is backfilled. Provide suitable means to keep excavation free of water during all operations.

D. All piping shall have a 6-inch neutral sand base and covered with 6-inch of neutral sand to form an envelope around the pipe.

E. Backfill as rapidly as construction and testing will permit in a manner that will not disturb the pipe. Fill shall be placed by hand in 6-inch layers to a point 1-foot above top of pipe and shall be uniformly and thoroughly hand tamped. Backfill in well compacted 12-inch layers for the remaining portion of

the work. All backfill shall be brought to grade and surplus dirt removed. All backfill shall be compacted as per drawings and specifications.

F. No excavation below level of , or adjacent to, foundation or footings shall be made except in manner approved by the Architect.

3.03 STRUCTURAL MEMBERS

A. There shall be NO cutting of building structural members without prior written approval from the Architect or his representative.

B. Where pipes are placed in partitions necessitating cutting of any non-structural member, metal ties shall be provided in accordance with applicable structural code.

3.04 INSTALLATION OF PIPING, FIXTURES AND EQUIPMENT

A. All piping shall be so routed and installed to clear beams, plates, footings and structural members. All piping shall be run in a neat and orderly fashion, generally level, free of traps or unnecessary bends and arranged to conform to building requirements.

B. No piping shall be run exposed unless specifically indicated. Piping inside the building shall be run in partitions, furred ceiling spaces, over ceilings or in roof structure.

C. Piping indicated to be exposed shall be parallel with or perpendicular to, as applicable, supporting wall, beam, or ceiling. Where various exposed runs of pipe are routed in the same general direction, such runs shall be routed and supported to form a pipe grouping.

D. All piping shall be so graded and valved as to provide for the complete drainage, control and service of the systems. No piping shall be installed so as to cause unusual noise with the flow of water therein under normal conditions.

E. Water Hammer Arrestors shall be installed as shown on drawings and at all quick close valves. Provide access panel large enough to remove water hammer arrestor.

F. Air conditioning condensate shall slope toward drain point at 1/8” per foot minimum, ¼” per foot where space permits.

G. Indirect drains from miscellaneous equipment shall slope toward drain point. Insulate all refrigerated drains with material as specified herein in Paragraph 2.05.

H. Provisions shall be made for expansion and contraction of all piping as required and necessary whether specifically shown or not. Expansion joints and the required guides thereto shall be so installed and located that the pipeline will be properly guided and anchored to force the joints to compensate for expansion and contraction.

I. Equipment, fixtures, piping and accessories shall be individually mounted and/or hung from the structure and shall not be supported from ductwork, other piping, conduit or equipment. Approved hangers, mounts and supports shall be provided as specified in Part 2 of this specification section. Piping shall be supported at intervals specified in Paragraph 3.05 to keep it in alignment, carry weight of pipe and contents and prevent sagging.

J. Plumber’s tape or perforated metal strap are not acceptable for any type of hanger or support.

K. All equipment and fixtures, floor and wall mounted, shall be securely bolted or sealed to the structure to prevent movement during seismic disturbances.

L. Cast iron pipe shall be supported and anchored in accordance with Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe and Fittings Handbook, Chapter 4; except that pipe hangers, clamps, rods, angle iron, concrete attachments shall be used; strap iron, wire staples, plumber's tape and wood are not acceptable.

M. Pipe hangers and supports for insulated piping shall be sized to permit installation of insulation to pass unrestricted through them. Insulation shall be protected by insulation shields of size and weight required by service.

N. Piping isolation: All uninsulated piping shall be provided with not less than ¼- inch of soft sound-deadening material at all points of suspension and supports. It is intended that bare piping shall also be isolated from the structure at all points of contact, in addition to suspension and support points specified.

O. Only self-drilling Phillips Drill Co. "Red Head" (ESR-3699) or Hilti "KB-TZ" (ESL-1067) anchors of type and proper size for service required shall be approved for use in concrete. No other type anchorage will be permitted unless approved by the Architect or his representative.

P. Approved friction type wrenches shall be used in making up joints on all brass pipe. Marked or crushed pipe caused by wrenches, vices or machine chucks will be replaced at no additional expense.

Q. Ends of all threaded pipe shall be reamed out smooth full size with long tapered reamer so as to be partially bell-mouthed and perfectly smooth. All threads of pipe shall be cut with new, clean dies, full thickness of die and so that no more than two threads are left exposed on pipe when joint is made up with approved pipe dope on male fitting only. Copper tubing shall be cut true and filed smooth and reamed to eliminate all burrs.

R. Piping shall be full lengths except at ends of runs where necessary to make a cut-to-fit. Reducing fittings shall be used where changes in pipe sizes occur. Reducing bushings will not be permitted.

S. Rough-in for and make final domestic water, distilled water, and drain connections and interconnections to Laboratory Fixtures and Laboratory Equipment including the installation of all loose controls furnished with equipment for remote installation, shut-off valves, floor drains and floor sinks. Install exterior acid waste tank, vault and remote monitoring equipment as shown on the drawings and as per manufacturer's written installation instructions. Obtain detailed written manufacturers' written rough-in/final connection data for all Laboratory fixtures and Equipment prior to installation of piping services.

T. Where two or more fixtures are located in a row or battery, water supply header shall be continued full size extending past the last branch outlet.

U. Keep inside of piping dry and free of dirt, cutting burrs and other foreign substances.

V. Escutcheon plates shall be provided at all exposed piping passing through walls, floors or ceilings. Plates shall be solid or split ring type, chrome-plated.

W. All piping to be used in this project shall be thoroughly cleaned inside and out before installation. Piping shall be capped for storage. Plumbing fixtures shall have all labels and protective coverings removed and finally cleaned with a cleaning agent approved by the Architect or his representative.

X. Materials and equipment shall be provided with adequate protection when installed where damage may result by further construction, painting or plastering. If damage is incurred during construction, all damaged equipment shall be repainted, repaired or replaced as directed by the Architect.

Y. Floor cleanouts shall be brought up to finished floor level, where shown on the drawings.

Z. All vents shall be offset as necessary to miss beams and other structural members. No structural member shall be cut, bored or notched without specific written permission by the Architect. Vents shall be collected into single connections in attic spaces or walls where practicable so roof will be penetrated as few times as possible. Size all combined vents per CPC, Table 7-5

AA. Pipe, Valve and Equipment I.D.: Piping: Seton, or equivalent, pressure sensitive labels applied per ANSI A13.1-1981, with directional arrows. Apply labels at all valve locations in addition to ANSI requirements. Valves: Seton, or equivalent, 1" diameter brass valve tags with jack chain. Provide valve chart in Owner's Operation and Maintenance Manuals. Equipment: Bakelite nameplates, permanently attached to equipment, engraved with item designator, i.e., "WH-1", etc.

BB. Polyethylene (PE) gas piping, fittings, tracer wire and warning tape shall be installed in accordance with IAPMO IS-93.

CC. Polypropylene distilled water piping and socket fusion valves and fittings shall be installed only after receiving instruction in fusion connection techniques from Harrington Industrial Plastics, San Diego. Call for information at (858) 278-9311. Include this service as a part of the plumbing contract.

DD. Provide dielectric waterway fittings as specified herein wherever dissimilar metals are interconnected

3.05 PIPING HANGERS INSTALLATION

A. Unless shown otherwise on drawings, install hangers for horizontal runs of ferrous piping with the following maximum spacing:

1. Pipe up to and including 1 inch.....6 feet
2. Pipe 1-1/4 inches to 3 inches.....10 feet
3. Pipe 3-1/2 inches and 4 inches.....13 feet
4. Pipe 5 inches to 8 inches.....16 feet
5. Cast iron soil pipe.....4 feet

B. Note that hanger spacing is based on beam strength characteristics of pipe; provide closer spacing as required to interface with building structure.

C. Unless shown otherwise on drawings, install hangers for horizontal runs of copper piping with the following maximum spacing:

1. Pipe up to ½ inch in size.....5 feet
2. Pipe ¾ inch to 1-1/2 inches.....6 feet
3. Pipe 2 inches.....8 feet
4. Pipe 2-1/2 inches and larger.....10 feet

D. For all piping, install a hanger within 2 feet of each elbow or tee. Install additional supports for valves and strainers. Install not less than one hanger per length of cast iron pipe and as required by CPC. Support vertical risers by riser clamps as specified herein at each floor.

E. Galvanized hanger rod sizes shall meet requirements of the following schedule:

1. Pipe up to and including 2 inches.....3/8 inch rods
2. Pipe 2-1/2 inches to 3-1/2 inches.....1/2 inch rods
3. Pipe 4 inches and 5 inches.....5/8 inch rods
4. Pipe 6 inches and larger.....3/4 inch rods

3.06 PIPE SLEEVES AND FLASHINGS

A. Provide pipe sleeves made of No. 22 gauge galvanized steel, properly secured in place with approximately ¼ inch space between each sleeve and pipe surface and insulation passing through the sleeve for pipes which pass through concrete floors, roofs and masonry walls. Install pipe sleeves in place as walls and floors are built up. Provide sleeves for insertion into structural building parts. Make space between sleeves and pipes passing through concrete floors, exterior walls and roofs watertight and fire resistant with approved non-hardening mastic material. Sleeves through pipe chase floors shall project a minimum of 1 inch above floor and shall be galvanized steel. Use Link-Seal "Century-Line" thermoplastic sleeves or Schedule 40 galvanized steel for sleeves through foundation walls.

B. Restore fire rating of floors or walls at all pipe penetrations by packing with fire-safing, grouting, or other approved means.

C. Pipe Flashings: Semco or R.K. Industries, 4 pound lead, 8" skirt, with counter flashing sleeve at sanitary vents.

D. Provide dielectric waterway fittings as specified herein wherever dissimilar metals are interconnected.

3.07 TESTING

A. The type of test, the test pressure and the duration of each test for each of the piping system shall be made in accordance with the following:

B. Piping: Each piping system shall be tested as specified below in sections or upon completion of systems or both. However, piping shall not be concealed until it has been tested, inspected and approved. Test time will be accrued only while full test pressure is on system. Tightening of flange joints under pressure is permissible. It shall be the responsibility of Contractor to remove during test anything on system that will not withstand pipe test pressure called below and replace same on completion of testing. All equipment damage resulting from negligence is the responsibility of Contractor.

C. SPECIAL NOTE: Testing of systems covered by local, State or national codes shall be tested as herein noted or in accordance with the applicable codes, whichever is the most stringent.

System	Medium	Pressure	Duration	Tolerance
Soil, waste, Storm	Water	Top of highest Vent or (10') head of water	4-hours	No joint sweat
Domestic Water lines	Water	150 psi	4-hours	None, except temp. change
Natural Gas	Air	60 psig	1-hour	None, except

temp. change

NOTE: Air for testing shall be oil-free.

3.08 INSULATION

A. All piping shall be pressure tested as in paragraph “Tests,” thoroughly cleaned and approved before the application of any insulation.

B. Insulation adhesives shall have no flash point wet or dry.

C. Domestic hot water supply and return, chilled drinking water supply, air conditioning condensate drains, refrigerated equipment drains shall be insulated as specified herein installed in accordance with insulation manufacturers’ recommendations.

3.09 VALVES AND SPECIALTIES

A. All valves and specialties throughout the plumbing systems shall be as specified in Paragraph 2.3 and installed in accordance with manufacturer’s recommendations.

B. Valves shall be provided where shown on plans and as specified herein.

3.10 PLUMBING FIXTURES AND MISCELLANEOUS EQUIPMENT

A. All fixtures shall be anchored and set level with relation to walls and floor lines in a neat and workmanlike manner using equal spacing and neat grouping.

B. Fill all joints between plumbing fixtures and walls or floors or cabinets with Dow-Corning 780 Sealant or Sonolastic Sealant, color to match fixtures. Sealant shall be applied as recommended by the manufacturer, workmanship subject to approval of Architect or his representative.

C. Wall mounted fixtures shall be securely attached to 3/8-inch thick x 6-inch wide steel wall plate extending one stud beyond the fixture mounting points and bolted to each stud it passes with two 3/8-inch bolts or welded. Plates may be welded to steel studs. Drill and tap plate for installation of fixture. Lavatory arm carrier shall be bolted or welded to the 3/8 inch thick x 6 inch steelplate.

D. All fixtures shall be covered and protected until completion of the work. Fixtures shall be cleaned and all fittings shall be polished. Metal parts shall be polished chrome plated brass unless otherwise indicated. All exposed piping and fittings shall be polished chrome plated.

3.11 VIBRATION ISOLATION REQUIREMENTS FOR THE PLUMBING SYSTEM

A. General: There shall be absolutely no rigid contact between any domestic cold water line, hot water supply or return line, waste, vent or storm drain pipe within the occupied building area and the building structure (the building structure includes slabs, ceilings, studs, drywall, ductwork, conduit etc.) except as follows:

1. At the connection to the plumbing trim or fixtures.
2. Through an approved vibration isolator.

B. Seal all fixture water supply and drain pipe penetrations of finished walls with acoustical sealant.

3.12 STERILIZATION

A. The Plumbing Contractor shall provide feed and flush nipples near point of connection of new piping to building hot and cold water system to facilitate systems flushing and chlorinating.

B. Provide the services of a commercial disinfecting/chlorinating company to perform standard commercial water systems sterilization, Atlantis Chlor, Walsh Enterprises or equivalent.

C. Flush out all new water piping to thoroughly remove all dirt and debris.

D. Chlorinate all new water piping up to points of connection to existing building systems.

E. Flush solution with clear water and until residual chlorine levels are equal to level of incoming City water supply.

F. Obtain test samples of flushed out systems and test to verify that total plate count of bacteria/c.c. of sample is less than 100 or equal to the supply and for negative coliform organisms per ANSI/AWWA C651-92. Testing shall be performed by a State of California approved water testing laboratory.

G. Repeat the above procedure until results in paragraph F above are obtained.

H. Provide certificates of final satisfactory test results as part of close out requirements.

END OF SECTION 22 00 00

SECTION 23 00 00 – HEATING, VENTING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section and shall govern the work the same as though written herein in full. It is the intent to provide a complete tested, balanced and operating heating, ventilating and air conditioning system.

B. Scope of Work: The work under this section includes furnishing all labor, materials, fixtures and services together with the demolition, installation, testing and adjusting necessary to the acceptable completion of all the heating, ventilating and air-conditioning (HVAC) work shown on the drawings or as herein specified.

C. Description of the Systems: The following list is intended to generally describe the various HVAC systems components to be installed, but shall not be considered as a limit of the work to be performed under this section of the specifications.

1. Rooftop Package Heat Pumps
2. Rooftop ERV units
3. Automatic Temperature Control including low voltage wiring
4. Ductwork systems and accessories
5. Toilet Exhaust Systems
6. General Exhaust Systems
7. Air distribution equipment
8. Insulation and duct liner
9. Testing, Adjusting and Balancing

D. Related Work not in this Section:

1. The following work will not be furnished under this section of the specifications but will be included in other specification sections:

a. All line voltage wiring (regardless of voltage) and all miscellaneous wiring devices and all connections thereto and all line and low voltage conduit. All electrical disconnects and starters not integral to equipment scheduled and / or specified. All timeclocks and miscellaneous “on-off” control devices.
b. Openings in wall and roofs
c. Roofing, including flashing
d. Condensate drains
e. Direct digital control system (DDC) in Section 23 09 13
f. Finish painting

E. Work Under Seperate Contracts

1. Automatic fire protection will be designed and installed under separate contract with the Owner.

1.02 SUBMITTALS

A. The HVAC Contractor shall provide submittal data for all equipment and material being furnished by him to the Architect for approval. Submit the following according to the Conditions of the Contract and Division 1 Specifications Section: 01 33 00.

1. Product Data for:

    a. Ductwork, ductwork accessories and supports.
    b. Dampers, all types including combination fire/smoke dampers
    c. Fire-safing material
    d. Supply, return and exhaust grilles and diffusers
    e. Pipe and Duct insulation and acoustical duct liner
    f. Insulated flexible duct
    g. Filters
    h. Gauges and thermometers
    i. Duct sealant and coatings
    j. Heating hot water boilers and pumps
    k. Energy recovery ventilators (ERV's)
    l. Exhaust fans, all types
    m. Fan-coil and makeup fan-coil units
    n. Variable frequency drives (VFD's)

2. Wiring diagrams for:

    a. all equipment requiring power

B. Each submittal brochure shall contain all of the items listed above and shall be bound with covers, indexed with tabs and have a table of contents. Submittals shall indicate make, specific model and size, accessories, dimensional drawings, wiring diagrams and other pertinent information. Submit all items at one time. Partial submittals are not acceptable. Substitutions of materials and fixtures form that specified herein, noted on the drawings or as outlined in the General or Supplementary Conditions shall be clearly identified as deviations. Deviation data to clearly demonstrate equivalency and comparisons between specified and proposed items shall be provided by the HVAC Contractor unless prior arrangements are made to compensate the Engineer for researching this data. This data shall specifically include tabulated comparisons between scheduled and proposed equipment in the following areas:

    1. Weight (including curbs and other accessories).
    2. Dimensions
    3. Electrical requirements (voltage, phase, full load amps).
    4. Sound levels
    5. Performance (efficiencies, heating, cooling, air flow, static pressure, pressure drops, etc.)

C. "Equivalent" submittals lacking above information will be returned "not reviewed". Approval of substitutions shall in no way relieve the HVAC Contractor from the responsibility of complying with the design intent of the plans and specifications and for installation in the space available.

D. Shop Drawings for coordination, fabrication, and installation:

    1. Dimension drawings for concrete pad equipment foundations including bolt sizes and locations (1/4" scale minimum).
    2. Details of suspension, supports and seismic restraint and anchors for above ceiling hung equipment.
    3. Chilled and hot water piping drawings (1/4" scale).
    4. Ductwork fabrication and installation drawings for all congested areas including laboratory classrooms with fume hood exhaust and make-up air and laboratory classrooms with formaldehyde venting and makeup air.

5. The contract HVAC drawings shall not be used and substituted for ductwork and piping shop drawings.
6. Coordinate location of piping and ductwork systems with electrical, plumbing and fire protection systems in the preparation of shop drawings. Provide number of copies of prints of piping and ductwork as required by the Owner's representative for use in coordination with the other trades.

E. The following submittals for closing out the job shall be a prerequisite to the issuance of Final Certificate of Payment:

1. Test and Balance Reports
2. Reproducible "As-built" (record) drawings
3. Approved inspection reports
4. Guarantee

1.03 QUALITY ASSURANCE

A. Work of the Contract Documents shall satisfy the requirements of:

1. Air Diffusion Council (ADC).
2. ASME, ASTM and ANSI standards for base materials.
3. California Fire Marshal requirements for fire and smoke dampers.
4. ASHRAE standards for heat transfer coils and air filters.
5. National Fire Protection Association standards (N.F.P.A.).
6. SMACNA Seismic Restraint Manual Guideline for Mechanical Systems.
7. 2016 California Building Code (C.B.C.).
8. 2016 California Mechanical Code (C.M.C.) (Title 24, Part 4)
9. 2016 California Fire Code (C.F.C.).

B. Where these drawings and specifications call for or describe materials or construction of a better quality or larger sizes than required by all laws, codes, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work, the drawings and specification shall take precedence.

1.04 PRODUCT AND EQUIPMENT DELIVERY, STORAGE AND HANDLING

A. Exercise care in transporting and handling to avoid damage to and contamination of materials and equipment.

B. Materials and equipment kept at the job site shall be stored in enclosures or under protective covering to prevent physical and weather damage or the introduction of foreign material. Material and equipment shall be stored above grade in manufacturer's original, unopened protective packaging and kept as clean and dry as possible.

C. Damage to materials and/or equipment due to negligence in handling, storage or delivery shall be cause to reject and replace all such damaged material and/or equipment at the Contractor's own expense with no additional cost to the Project.

1.05 PROJECT CONDITIONS, SUPERVISION AND WORKMANSHIP

A. The HVAC Contractor shall examine the complete project drawings and make a preliminary examination of the site. The HVAC Contractor shall also examine in advance methods for installation, means to be provided for getting ductwork and equipment into place and any other requirements of the work. This shall include verification that all systems and all equipment will fit

spaces allotted. Work shall be installed so that indicated ceiling heights are maintained, with no portion of the work requiring excessive furring.

B. The HVAC Contractor must consider and include any additional cost involved in verifying and coordinating the work with existing conditions and points of connection. If situations arise where the work cannot be installed as intended, the Owner's representative must be informed to assist in resolving the problem.

C. Maintain ample headroom in passageways and rooms, and clearance around all equipment, ductwork, conduits and pipelines shall be maintained for unrestricted passage and for easy servicing. Install the work to maintain indicated ceiling heights.

D. The HVAC Contractor shall provide all the rigging, scaffolding, tools, tackle, hoists, personnel safety equipment, labor, etc., necessary to complete the installation of equipment and materials in accordance with the intent of this specification.

E. The HVAC Contractor must coordinate all areas of the work required with the Owner's Representative as they relate to material, storage, trash removal, hours of work, job site office, telephone, sanitary facilities, electrical power, drinking water, hoisting, temporary barriers, safety measures, etc., including cost of such items.

F. The HVAC Contractor is responsible to coordinate demolition and reconstruction (cutting and patching) of walls, floors, and ceilings required for the performance of the work of this Section of the Contract. The appropriate Contractor shall perform the actual work of demolition and reconstruction of walls, floors and ceilings.

G. The HVAC Contractor shall have a competent Job Superintendent and/or Foreman on-site or available at all times by phone ("pager") during project progress with authority to act on the Contractor's behalf and to supervise the installation of the work under this section. Superintendent shall also be responsible in conferring with other trades as to the proper execution and conduct of the work under this section so that work may be carried on as rapidly as possible and still maintain coordination with the other trades in progress at the same time.

H. All workmanship shall be first class in every respect and shall be performed only by skilled mechanics recognized as such in each of their respective trades.

1.06 DESCRIPTION OF THE SYSTEMS

A. The following list is intended to generally describe the various HVAC systems components to be installed, but shall not be considered as a limit of the work to be performed under this section of the specifications:

1. Heating Hot Water Boilers
2. Heating Hot Water Pumps
3. 4-Pipe Fan-Coil and Units
4. Energy Recovery Ventilators
5. Direct Digital Control (DDC) System
6. Ductwork systems and accessories
7. Toilet exhaust systems
8. General exhaust systems
9. Laboratory Fume Hood exhaust and make-up air systems including connections to fume hoods including exhaust and make-up air control valves.
10. Laboratory Exhaust (formaldehyde venting)Exhaust Fans
11. Air distribution equipment

12. Duct and Pipe Insulation and duct liner
13. Testing, Adjusting and Balancing.

1.07 DRAWINGS AND SPECIFICATIONS

A. Drawing and specifications are intended to complement each other and are required to be taken together to provide all associated items of work, materials and equipment necessary for a complete installation.

B. A set of HVAC drawings will accompany these specifications showing the arrangements and sizes of ductwork and piping systems. Drawings and specifications are intended to complement each other to the extent that all associated items of work and materials necessary to the completion of the installation of the systems shall be provided whether or not mentioned in the specifications or shown on the drawings.

C. Discrepancies between Architectual and HVAC drawings: In the case of discrepancies between the Architectual drawings and the HVAC drawings, the drawing showing the greater number of items or pieces of equipment shall govern unless otherwise directed by the Architect. Discrepancies encountered among drawings are to be brought to the attention of the Architect for clarification. In the case of diffusers, thermostats or other mechanical items indicated on architectual drawings but not on HVAC drawings, specifications for such items shall be deemed to be respectively similar to other such items which are covered by specifications and all necessary services and appurtenances shall be provided. Discrepancies as described above are inadvertent and it shall be the Contractor's responsibility to check the intent of this paragraph.

D. HVAC work, as laid out, is to some extent, diagrammatic and locations thereon are drawn to scale where possible. It is not the intention of the drawings to show all the offsets, fittings, and accessories. Locations indicated shall be adhered to as closely as possible; reasonable deviations therefrom shall be made at no additional expense.

1.08 PERMITS AND FEES

A. Contractor shall arrange for inspections required by authority having jurisdiction. Deliver any certificates of such inspections to the Owner.

B. Owner shall apply and pay for all permits required by any public authority having jurisdiction. Owner shall pay for all inspections required.

1.09 RECORD DRAWINGS

A. Submit reproducible record ("As-Built") drawings as required by the General Conditions showing final locations of all equipment, piping and ductwork.

1.10 GUARANTEE AND OPERATION

A. The HVAC Contractor shall furnish to the Owner a guarantee in writing. All work shall be guaranteed for a minimum period of one year from either the official date of completion or from the official date of acceptance by the Owner whichever is the later date.

B. It is to be understood that any equipment and systems requested in writing to be put into service by the Owner to serve their needs while the project is still under construction and used for that purpose only, shall be considered as accepted on the date said equipment is put into operation. The warranty for any such particular piece of equipment shall then be in effect as of the day of acceptance. Date of

acceptance for all other materials and equipment not so used shall become effective on the date of acceptance for the entire project by the Owner.

C. Guarantee shall warrant all materials and equipment to be free from defects whether they be of faulty manufacture or defective workmanship, and the HVAC Contractor shall agree to replace any such material or equipment at his expense that may prove defective from either cause within the warranty period.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials and equipment shall be new, full weight, of best quality suitable for desert environment, with the same brand of manufacture used for each class of material or equipment. All similar materials and equipment such as heat pumps, fans and air distribution devices shall be of the same type and manufacture unless specified otherwise. All equipment and devices shall be designed for resistance to earthquake disturbances. All equipment shall have motors, controls, accessories and fans properly fastened to the equipment to prevent "break-away" during an earthquake. All rotating equipment shall operate in factory standard dynamic balance. Failure to comply with these conditions shall be cause for rejection of any such material or equipment installed; the HVAC Contractor shall be so advised and shall be subject to removing all rejected material or equipment and replacing same with approved material or equipment at his expense.

2.02 MOTORS AND CONTROLLERS

A. Furnish with each piece of equipment all motors and solid state controls.

B. Motors shall conform to latest NEMA motor standard requirements and shall be manufactured by Gould, GE, Louis Allis or Marathon of a type suitable for service intended. Motors shall be rated to operate at an ambient temperature of 40° C. Oiling devices shall be located where readily accessible. In general, motors of ½ HP capacity or larger shall be three phase, and smaller motors shall be single phase. Motors for belt-driven equipment shall be provided with adjustable slide rails. Nameplate horsepower of motor submitted shall be equal to or greater than scheduled horsepower and shall be greater than required brake horsepower to handle load. All motors shall be premium high efficiency models where available.

C. Starters for equipment other than packaged air-cooled chillers shall be provided by Division 26 Electrical.

D. Variable Frequency Drives (VFD's) shall be provided with the equipment being controlled as a part of that equipment package. VFD's shall be provided with a BacNet interface to ensure compatibility with the project direct digital control (DDC) system.

E. Electrical devices that fall within scope of UL testing capabilities shall be so tested and marked.

2.03 SHEET METAL DUCTWORK

A. All ductwork shall be constructed of new galvanized prime grade steel sheets in accordance with Duct Construction Standards published by Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA). Fume hood and formaldehyde exhaust ductwork shall be 4 mil inside/1 mil outside PVS coated 20 gage spiral galvanized steel.

B. Unless otherwise noted on Drawings, pressure-velocity classification of supply and return ductwork from HVAC units and fans shall be in accordance with Table 1-1 of SMACNA Manual.

C. Installed ductwork shall meet "Functional Standards for Rectangular Low Pressure Ducts" cited in SMACNA Manual with respect to sheet deflection and vibration, reinforcing, seam and joint integrity, beam strength of duct section and duct leakage.

D. Ductwork gauge and reinforcing shall comply with Tables 1-3 through 1-5 of SMACNA Manual to specified or noted static pressure rating.

E. Duct sizes 19 inches to 48 inches wide and larger which have more than 10 square feet of unbraced panel shall be beaded or cross-broken unless ducts have nonconductive covering or acoustical liner. See Figure 1-8 of SMACNA Manual.

F. For duct longitudinal seams use button punch snap lock for up to 20 gauge metal. Use Pittsburgh lock for up to 18 gauge metal and for fittings.

G. Duct connectors shall be as follows or connectors of equal performance.

Width 0 to 60 inches:	S-Slip.
Depth 0 to 18 inches:	Drive slip.
Depth 19 to 30 inches:	Reinforced drive slip.

Corner closures shall be as shown on Figures 1-13 through 1-18 of SMACNA Manual or as recommended by duct connection system manufacturer.

H. Provide turning vanes in each square elbow. Construct turning vanes as shown in Figures 2-3 and 2-4 of SMACNA Manual. Use single thickness turning vanes with ¾ inch flat trailing edge for velocities below 2000 FPM. For higher velocities use double thickness turning vanes.

I. Duct transition and offsets shall be as shown in Figure 2-9 of SMACNA Manual.

J. Main or parallel duct splits shall be as shown in Figure 2-7 of SMACNA Manual. Splitter blade shall be 16 gauge minimum and leading edge shall be hemmed.

K. Round laterals and branches shall be made up with 45° taps and saddles to round or rectangular main or branch ducts as shown in SMACNA figure 3-4.

L. Each individual air supply or return device, whether sidewall or ceiling diffuser, shall be fitted with a device to permit adjustment of air amount supplied to unit independently of any other outlet. These devices may take the form of outlet boots with opposed blade dampers, or of branch duct with dampers, as installation conditions dictate, but in any case, each shall be fitted with a means of manual adjustment of air amount delivered to outlet.

M. Unless otherwise noted on drawings, duct sizes shown on drawings are for net free area.

2.04 DUCT AND PIPING INSULATION

A. General: All instructions and associated materials such as coverings, vapor barriers, mastics and adhesives shall bear the Underwriters' Laboratories listing. U.L. rating not to exceed: flame spread 25, smoke developed 50. Insulation shall meet the requirements of NFPA Pamphlet No. 90-A and 2016 California Mechanical Code. The insulation Contractor shall provide a certificate that the system is installed and all materials comply with the Underwriters' Laboratories requirements. All

insulation shall be delivered to the job site in unopened packages from the manufacturer. Approved manufacturers: Certainteed, Owens-Corning, Manville, Knauf.

B. Duct wrap: 1 1/2 inch thick Fiber Glass, faced with Type IV (scrim-reinforced foil-craft laminate vapor barrier), 2 inch overlap tab along edge, 1-lb. density.

C. Insulate all heating hot water and chilled water piping with 1-1/2" thickness (runouts may be ½" thickness) fiberglass pipe insulation with FSK jacket, Knauf 1000 Degree or approved equivalent. Provide molded fitting covers at all elbows and B-Line #B3154 metal shields at all pipe hangers. Cover all insulated piping exposed to the weather with aluminum jacketing.

2.05 DUCT LINER

A. General: All liners and associated materials such as coverings, vapor barriers, mastics and adhesives shall bear the Underwriter's Laboratories listing. U.L. rating not to exceed: flame spread 25, smoke developed 50. Insulation shall meet the requirements of NFPA Pamphlet No. 90-A and California Mechanical Code. The insulation Contractor shall provide a certificate that the system is installed and all materials comply with the Underwriter's Laboratories requirements. Any liner delivered to the job site shall be in unopened packages from the manufacturer. Approved Manufacturers: Certainteed, Owens-Corning, Manville, Knauf.

B. Provide duct liner in plenums and ductwork where indicated on plans in accordance with SMACNA "Duct Liner Application Standard," 2nd edition.

C. Unless otherwise noted on drawings, use flexible duct liner with 1-1/2 pound density, 1 inch thickness.

D. Duct liner shall be adhered to sheet metal and with edges coated with one of the adhesives conforming to Standard for Adhesives for Duct Liner, ASC-A-7001C-1972, OF Adhesive Sealant Council, Inc. Duct liner shall be further secured with fasteners conforming to Mechanical Fastener Standard, MF-111975, on page 22 of Duct Liner Application Standard.

2.06 FLEXIBLE CONNECTIONS

A. Furnish flexible connections fabricated of Durolon fabric with Hypalon coating, Metal Fab or Super Metal Fab, which shall meet requirements of UL test procedure UL-214. Fabric shall be coated on exterior side, with inorganic elastomeric compound and shall be able to withstand exposure to 250° to -50° F and shall be ozone resistant and airtight. Connectors shall be pre-assembled utilizing 24 gauge metal edges and shall have 3 inches or 6 inches as required exposed fabric and shall be as manufactured by Duro-Dyne Corporation.

2.07 ACCESS DOORS

A. Provide access doors in ductwork to provide access to automatic dampers, fire and smoke dampers. Where ducts are insulated access doors shall be double skin doors with 1 inch insulation in door. Where size of duct permits, doors shall be 18 inches x 16 inches. Doors 24 inches x 16 inches and larger shall be provided with Ventlok No. 100 or 140. Provide identification for fire and/or smoke damper access openings. Stencil the words FIRE (or SMOKE) DAMPER on access doors in sheet metal ducts.

2.08 INSULATED FLEXIBLE DUCT

A. The flexible duct for connection between ducting and air diffusers and grilles shall be a factory fabricated assembly consisting of an inner sleeve, insulation and an outer moisture barrier. The inner

sleeve shall be constructed of an elastomeric compound helix. No installed flexible duct lengths shall exceed 8'-0". U.L. rating not to exceed: flame spread 25, smoke developed 50

B. A minimum 1 inch thick fiberglass insulating blanket shall encase the inner sleeve and be sheathed with an outer moisture barrier of a reinforced metalized Mylar/neoprene laminated or equal.

C. Acoustical performance of the flexible duct shall be in accordance with Air Diffusion Council Flexible Air Duct Test FD72R1: Paragraph 3.2.1, Sound Attenuation. The test data shall be made by accredited independent testing laboratory in accordance with the above testing procedure.

D. Materials shall be Automation industries, Inc. Thermaflex G-KM Class I flexible air duct or equal, rated for 6" positive to .5" negative pressures.

E. Aluminum flexible ductwork is not an approved material for this project.

2.09 FIRE/SMOKE DAMPERS

A. Furnish and install all fire, smoke and combination fire/smoke dampers as required by the 2016 California Building and Mechanical Codes. Dampers shall be U.L. labeled and shall comply with the requirements of N.F.P.A.-90A, and shall be approved by the State of California Fire Marshal. Dampers shall be Ruskin, Greenheck or approved equivalent, as follows:

1. Fire – Style B (rectangular), 95% or greater free area, rated for surface penetrated.
2. Fire – Style C (round), 100% free area, rated for surface penetrated.
3. Smoke – SD35 or SDRS25, 120 volt operator.
4. Combination Fire/Smoke – FSD35, 120 volt operator.

B. Provide smoke detectors for smoke damper operation, located as required per 2016 CMC.

2.10 MANUAL BALANCING DAMPERS

A. Provide Ruskin MD-35 or equivalent opposed blade manual balancing damper fabricated from galvanized steel.

B. Provide minimum 22 gauge butterfly type damper with locking damper/quadrant and regulator set for round duct.

2.11 GRILLES, REGISTERS AND DIFFUSERS

A. Grilles, registers and diffusers units shall be all metal and constructed to have a neat, well-made appearance. Grille framework shall be rigidly constructed; flange corners shall be mitered and supported. Face bars shall be of heavy gauge metal to adequately resist bending or twisting and fit tightly and closely within framework. Units shall have a neck to slip inside ductwork for an airtight noiseless connection.

B. Check drawings to supply proper outlets and adapting framework for type of construction at each outlet. Adapter shall be same finish as unit and be of configuration manufacturer recommends for construction involved.

C. Manufacturer furnishing grilles, registers and diffusers shall verify sizes against CFM requirements for each outlet to get intended throw without objectionable noise.

D. Provide grilles, registers and diffusers as scheduled on the drawings, Krueger, Metalaire, Titus, J & J, Price or Tuttle and Bailey.

2.12 DISPOSABLE AIR FILTERS

A. Air filters shall be Farr 30/30, ECO-AIR #E35, or approved equivalent, pleated type.

B. Provide two sets of filters for equipment requiring filters. Filters in heat pumps shall be 2 inches thick, disposable type.

C. Filters shall have a rated average dust spot efficiency of 25-30% when tested in accordance with ASHRAE 52.1 test method.

D. Filters shall be capable of operating with face velocities up to 500 FPM without impairing efficiency and shall have an initial resistance not to exceed 0.17 inch W.G. and shall be listed Underwriters Laboratories 900 Class 2 and with State of California Fire Marshal.

2.13 DUCT SEALANT/PROTECTIVE COATINGS

A. Sealant for interior longitudinal and transverse duct seams shall be United McGill “UNI-GRIP” vinyl acrylic type, or equivalent by Foster.

B. For ducts exposed to the weather use United McGill “UNI-WEATHER” all weather duct sealer, or equivalent by Foster

C. For ducts exposed to the weather coat ducts with appropriate primer for finish painting by Painting Contractor.

2.14 EQUIPMENT

A. All equipment shall be of manufacturers and capacities as scheduled herein or on the drawings or approved equivalent by:

1. Roof top package units: Carrier as scheduled (No known equivalent).
2. Exhaust Fans: Greenheck as scheduled or equivalents by Cook.
3. Energy Recovery Ventilators: MicroMetl as scheduled.
4. Make-Up Air Units: Champion, or equivalent.
5. Air Distribution: Titus as scheduled or equivalent by Price, Metalaire.
6. Fire and Fire/Smoke Dampers and Access Panels: Ruskin as specified herein or equivalent by Greenheck, Potorff or ABI.

PART 3 – EXECUTION

3.01 VERIFICATION

A. Before fabrication and installation of work, carefully verify all dimensions, sizes and actual building conditions. Coordinate work with other affected trades to avoid possible conflicts and resolve same where such exist. Install work to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear.

B. Work shall be installed so that ceiling heights indicated are maintained with no portion of work requiring furring. Changes necessary, resulting from lack of such verifications and coordinations, shall not be a cause for additional expense.

C. Air distribution devices, access panels and controls shall be located within rooms as indicated on the architectual and HVAC drawings. In the event these drawings do not indicate exact locations, such locations shall be obtained from the Architect. In the event they are installed without instruction and if directed to be relocated as a result, they shall be moved and reinstalled without additional cost. Submit all pertinent information as to size, location and approximate number of additional access panels required. It shall further be the responsibility under this section to confer with all the trades on the project, and, wherever possible, dampers or other equipment shall be so grouped so that the least number of panels will be required.

D. Diffusers, grilles, registers, controls, thermostats, etc., shall be located within rooms as indicated on Architectual and HVAC drawings. In the event these drawings do not indicate exact locations, such locations shall be obtained from the Architect. In the event they are installed without instruction and if directed to be relocated, they shall be moved and reinstalled without additional expense.

3.02 GENERAL INSTALLATION

A. Because of small scale of the drawings, it is not intended that all of the offsets and accessories required be shown. All equipment apparatus, ductwork, piping and associated accessories shall be installed as closely as possible to indicated locations on drawings; but reasonable necessary deviations therefrom shall be made at no additional expense.

B. There shall be NO cutting of structural members without prior written approval from Architect or his representative.

C. Equipment shall be installed in locations shown in accordance with the equipment manufacturer's written installation instructions. Maintain all necessary clearances for air flow, access, repair and to electric control panels, etc.

3.03 HANGERS, MOUNTS AND SUPPORTS

A. Equipment, piping, ductwork and accessories shall be individually mounted and/or hung from the structure. Approved hangers, and curbs shall be provided.

B. Ductwork support upper attachments shall comply with Figures 4-1 and 4-2 of SMACNA Manual.

C. Ductwork support lower attachments shall comply with Figure 4-4 of SMACNA Manual..

D. Hanger sizes shall be per Tables 4-1 and 4-2 of SMACNA Manual.

3.04 CLEANING AND PROTECTION

A. Interior of ductwork and equipment shall be cleaned and all scale, sand and dirt removed before closing and shall remain closed until final connections or extensions thereto are made.

B. Equipment shall be provided with adequate protection when installed where damage may result by further construction, the weather, painting or plastering. If damage is incurred during construction, all damaged equipment shall be repainted, repaired or replaced to match new construction with no additional cost to Owner.

C. Protective guards: All exposed parts such as shafts, couplings, drives and associated items shall be covered with guards to comply with the California State Safety Orders of Division of Industrial Accidents. Where guards are covering belt drives, provision shall be made for checking the RPM of the rotating parts.

3.05 DUCTWORK SYSTEMS

A. Install all supply ductwork, return ductwork and exhaust ductwork in accordance with SMACNA recommendations and California Mechanical Code.

B. Provide flexible ductwork only where indicated.

C. Run ductwork in straight lines parallel with, or at right angles to, the lines of the building unless otherwise shown on the drawings.

D. Run ductwork so as to not to interfere with doors, or other openings, or to prevent access to equipment.

E. Conceal all ductwork except in equipment room(s) or where noted otherwise on drawings.

F. Seal all duct seams and joints so the leakage rate is less than 5% of the system operating air flow.

G. Provide final duct connections to all equipment requiring same and furnish all material required for final connection.

H. Install ductwork and accessories to provide a system free from buckling, warping, leaking, vibration, rattles and objectionable noise.

I. Fabricate and install exposed ductwork on the roof so as to shed rainwater off the top surface with no ponding at any point.

J. During and after complete installation of ductwork, entire system shall be cleaned of rubbish, plaster, dirt and other debris before any grilles, outlets or registers are installed.

K. Use radius elbows wherever possible. Where indicated or where space or condition does not permit use of radius elbows, use square elbows with turning vanes as specified herein.

L. Flange duct openings where grilles and registers are attached. Paint the inside of all supply, return and exhaust ducts one coat of flat black paint, wherever the duct or duct liner is visible through openings. Exposed interior ducts through walls, ceilings, roofs, etc., shall have a metal collar to conceal opening between duct and finished surface.

M. In reducing from one duct size to another, provide an angle of not more than 15 degrees from line parallel to air flow, for low pressure ductwork.

N. Inlet and discharge connections to all air handling equipment shall have flexible connections.

O. Multi-blade dampers, splitter dampers, extractors, turning vanes and other devices shall be provided where shown on drawings and where required to balance the air systems.

P. Where ducts are insulated on inside (liner), dimensions shall be increased as required for thickness of liner beyond dimensions shown. Sizes indicated are net clear dimensions.

3.06 INSULATION INSTALLATION

A. Duct Liner: Liner shall be adhered to all interior sides of duct with 100% coverage of Underwriter's Laboratories listed self-extinguishing adhesive such as Benjamin Fosters' 85-20 "Spark Free" or Minnesota Mining 38. Mechanical fasteners, similar to Graham Welded Pins, Tuff-Weld nylon hangers or Stic-Klips, shall be used on maximum 12-inch centers at top sections (when width exceeds

12 inches) and on sides (when height exceeds 24- inches); coating shall be exposed to the air stream. All exposed edges and the leading edge of all cross joints of the liner shall be coated with the same adhesive used to secure the duct liner to the metal surface.

B. Duct Insulation: Insulation shall be installed per insulation written installation instructions. Duct liner shall be adhered to sheet metal and with edges coated with one of the adhesives conforming to Standard for Adhesives for Duct Liner, ASC-A-7001C-1972, OF Adhesive Sealant Council, Inc. Duct liner shall be further secured with fasteners conforming to Mechanical Fastener Standard, MF-111975, on page 22 of Duct Liner Application Standard.

C. Insulate exposed and concealed kiln exhaust duct with insulation as noted above.

3.07 TAGGING AND IDENTIFICATION

A. Equipment: Install laminated plastic equipment I.D. tags for all equipment provided. Tags shall be permanently secured to equipment using pop rivets. Engrave identity number of each item of equipment. Coordinate I.D. number designated for each piece of equipment with the room identification provided by the owner.

B. HVAC Equipment: The following items of new equipment are scheduled on the drawings:

1. Hot water pumps (HWP's)
2. Air-Cooled Chillers (CH's)
3. Hot Water Boilers (B's)
4. Fume Hood Exhaust Fans (FHE's)
5. Laboratory (formaldehyde venting) Exhaust Fans (LEF's)
6. Exhaust fans (EF's)
7. Fan-Coil Units (FC's)
8. Energy Recovery Ventilators (ERV's)
9. Make-Up Air Fan-Coil Units (MUA's)

C. HVAC Piping and Ductwork: Seton, or equivalent, pressure sensitive labels and directional arrows applied per ANSI A13.1-1981. Apply labels at all valve and damper locations in addition to ANSI requirements. Valves: Seton, or equivalent, 1" diameter brass valve tags with jack chain. Dampers: 1" bakelite nameplates affixed to adjacent ductwork. Provide valve and damper charts in Owner's Operation and Maintenance Manuals.

3.08 TESTS AND BALANCING

A. All equipment and apparatus necessary for the tests shall be furnished by the Contractor. All defects disclosed by the tests shall be rectified without additional expense.

B. Heating, Ventilating and Air Conditioning Systems: Provide the services of an approved independent air balancing testing agency to balance, adjust and test all air moving equipment and air distribution and exhausting systems, heating hot and chilled water systems, on both cooling and heating cycles as herein specified. All work shall be done under the direct supervision of a qualified and experienced Heating, Ventilating and Air Conditioning Technician. All instruments used shall be accurately calibrated and maintained in good working order. Agency or Contractor shall be a member of A.A.B.C. or T.A.B.B.

C. Air balancing and testing shall not begin until system has been completed and is in full working order. All heating, ventilating and air conditioning systems and equipment shall be in full operation and shall continue the operation of same during each working day of testing and balancing. All electrical lighting systems shall be in operation during the testing when room temperatures are recorded.

D. Air Systems: Upon the completion of the heating, ventilating and air conditioning system, the agency shall perform the following tests and balance each system in accordance with the following requirements:

1. Test and record system supply and return static pressures, at each fan-coil and makeup air fan-coil unit, exhaust fan and energy recovery ventilator.
2. Test and adjust system for design return air, design outside air, and design relief air CFM.
3. Check and record running load amps for all equipment and RPM for all fans.
4. Obtain the assistance of the controls contractor in the balancing of laboratory fume hood exhaust, formaldehyde exhaust and makeup air systems and for laboratory classroom roomside pressures.
5. Test and adjust each diffuser, grille, register and air terminal unit to within 5% of design requirements.
6. All diffusers, grilles and registers shall be adjusted to minimize drafts in all occupied areas.
7. Make all changes in the pulleys, belts and dampers or the addition of dampers required for correct balance.

E. Upon completing of balancing and testing insert all information on a sheet listing all items required by specifications and be included in complete test and balance report. Six copies of the testing and balancing report shall be submitted to the Architect for evaluation and approval within 15 days after completion of tests and prior to final acceptance of the project.

F. The testing agency shall provide a 13 month warranty, effective from date of final contract acceptance of project, during which the testing agency will provide field services to reset areas, change CFM requirements, or adjust conditions not foreseen during design.

3.09 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide three sets of written operating, maintenance and lubrication instructions for all installed systems and equipment.

B. Provide the services of a competent representative to instruct the Owner’s representative in the operation of all systems.

END OF SECTION 23 00 00

SECTION 23 09 00
BUILDING MANAGEMENT SYSTEM

1.GENERAL

1.1. SECTION INCLUDES

A. Building Management System (BMS), utilizing direct digital controls furnished & installed by M&M Controls, Inc. (858) 309-2022

B. Substitution requests must be submitted to the architect 90 days in advance of project bid date.

1.2. RELATED WORK SPECIFIED ELSEWHERE

1.3. Products Supplied But Not Installed Under This Section:
1. None.

B. Products Installed But Not Supplied Under This Section:
1. IP Connections to existing FinStack Operator Workstation.

C. Products Not Furnished or Installed although Integrated with the Work of This Section:
1. RTU Heat Pump/AC Unit with factory installed terminal strip connections for connection to the dedicated KMC DDC controller(s).
2. Economizer actuators shall be factory furnished & installed on RTU units with 0-10v control signal.
3. Connections to Owners network providing remote internet access to the dedicated DDC system network.
4. Network switches or any connection devices required to connect to Owners dedicated DDC System network.
5. Integration with existing FinStack web server and cloud architecture. No new server or software required for this project.

D. Additional products furnished and installed under this section include:

1. KMC BACnet IP DDC controllers model # BAC-9311CE, Zone sensors w/Override feature.

2. OSA sensor(s), IP connections, duct sensors, current sensors, control relays, etc.

E. Work Required Under Other Divisions Related to This Section:.
1. 120v Power to all control panels & transformers. All wiring & conduit above 90 volts.
2. Campus LAN (Ethernet) connection to Main Control panel server.
3. Furnish & Installing components & controls associated with 3rd party manufacturers.
4. RTU Pkg units furnished with terminal strip connections and economizers for field installation of controllers and end control devices.

1.4. SYSTEM DESCRIPTION

A. Scope: Furnish all labor, materials and equipment necessary for a complete and operating Building Management System (BMS), utilizing Direct Digital Controls as shown on the drawings and as described herein. Drawings are diagrammatic only. Controllers furnished in this section shall communicate on a peer-to-peer IP network utilizing BACnet IP protocol.
1. The new Operator Workstation is based upon the existing Open-Protocol FIN Stack Framework software system. The existing OWS shall provide mobile (cell phone or tablet) access without additional costs or programming. The OWS shall utilize cloud applications via Haystack and web services. OWS access shall be via “Cloud Access” utilizing secure network access via Amazon web services or similar. The only access to the Owners network is via a cloud connection preventing OWS user access to the owners internal IT network.
2. The intent of this specification is to provide a system consistent with BACnet BTL Certified

Controllers and an OWS using open, non-proprietary software. Tridium products and software are excluded and not acceptable.

3. System architecture shall fully support a multi-vendor environment and be able to integrate third party systems via existing vendor protocols utilizing BACnet IP.
4. System architecture shall provide secure Web access using any of the current versions of Microsoft Internet Explorer, Mozilla Firefox, or Google Chrome browsers from any computer on the owner's LAN or remotely accessed.
5. All control devices furnished with this Section shall be programmable directly from the BAS server or via the cloud.
6. The BMS server and the “cloud server” shall host graphic files for the control system.
7. Owner shall receive all administrator login and passwords for the engineering toolset at first training session. The Owner shall have full licensing and full access rights for all network management, operating system server and programming software.

1.5. SPECIFICATION NOMENCLATURE

A. Acronyms used in this specification are as follows:
1. AI: Analog Input.
2. AO: Analog Output.
3. Analog: Continuously variable state over stated range of values.
4. BMS: Building Management System.
5. DDC: Direct Digital Control.
6. Discrete: Binary or digital state.
7. DI: Discrete Input.
8. DO: Discrete Output.
9. GUI: Graphical User Interface.
10. HVAC: Heating, Ventilating and Air Conditioning.
11. IDC: Interoperable Digital Controller.
12. LAN: Local Area Network.
13. Modulating: Movement of a control device through an entire range of values, proportional to an infinitely variable input value.
14. Motorized: Control device with actuator.
15. NAC: Network Area Controller.
16. OSS: Operating System Server, host for system graphics, alarms, trends, etc.
17. Operator: Same as actuator.
18. PC: Personal Computer.
19. Peer-to-Peer: Mode of communication between controllers in which each device connected to network has equal status and each shares its database values with all other devices connected to network.
20. PICS: BACnet Product Interoperability Compliance Statement.
21. PID: Proportional-Integral-Derivative control, control mode with continuous correction of final controller output element versus input signal based on proportional error, its time history (reset) and rate at which it's changing (derivative).
22. Point: Analog or discrete instrument with addressable database value.
23. WAN: Wide Area Network.

1.6. SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

B. Submit documentation of contractor qualifications, including those indicated in "Quality Assurance" if requested by the A-E.

C. 4 copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers' catalog data sheets and installation instructions. Submit in printed electronic format. Samples of written Controller Checkout Sheets and

Performance Verification Procedures for applications similar in scope shall be included for approval.

D. Shop drawings shall also contain complete wiring and schematic diagrams, sequences of operation, control system bus layout and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings.

E. Upon completion of the work, provide 2 complete sets of ' as-built' drawings and other project-specific documentation in 3-ring hard-backed binders and on Flash media.

F. Any deviations from these specifications or the work indicated on the drawings shall be clearly identified in the Submittals.

1.7. QUALITY ASSURANCE

A. Single Source Responsibility of Supplier: The Controls Contractor shall be responsible for the complete installation and proper operation of the control system. The Controls Contractor shall be exclusively in the regular and customary business of design, installation and service of computerized building management systems similar in size and complexity to the system specified. The Control System Contractor shall be the representative of the manufacturer of the DDC system components or shall have been in the Building Automation Controls Contracting arena for at least 10 years serving El Centro, CA.

B. Equipment and Materials: Equipment and materials shall be cataloged products of manufacturers regularly engaged in the production and installation of HVAC control systems.

1.8. JOB CONDITIONS

A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the Work will be carried out in an orderly fashion. It shall be this Contractor's responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers and structural and architectural features.

2.PRODUCTS

2.1. MANUFACTURERS

A. KMC BACnet IP Controls & FinStack Framework by M&M Controls, Inc. 858-309-2022.

B. No substitutions accepted.

2.2. GENERAL

A. The Building Management System (BMS) shall be comprised of a network of interoperable, stand-alone digital controllers, a network server, graphics and programming and other control devices for a complete system as specified herein.

B. The installed DDC Controllers shall communicate via IP BACnet Ethernet.

2.3. OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURE

A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system utilizing Open protocols in one open, interoperable system.

B. Physical connection of any BACnet control equipment shall be via IP Ethernet. Any BACnet IP interface(s) shall be furnished & installed by others.

C. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not

be acceptable. System shall utilize BACnet IP communications.

D. The supplied system shall incorporate the ability to access all data using HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins. Servers and data shall reside on the Operating System Server located as per project drawings. Systems requiring proprietary database and user interface programs shall not be acceptable.

2.4. BAS EXISTING SERVER HARDWARE (Integrate into existing FinStack)

A. Server Configuration:
1. Central Web Server. A dedicated Web Graphics server for this project. Servers manufactured by OnLOGIC with Intel i5 or better processor.
2. Memory: Provide 5x memory above the requirement for this project. Additional memory shall be reserved for future projects.
3. Network Support: Ethernet adapter (10/100 Mb with RJ-45 connector).

B. Standard Client Browser: Windows Chrome, Android: Chrome, iPhone/iPad/Mac: Safari, Linux: Chrome. System shall be accessible via mobile cell phone and tablets with auto-screen sizing functionality.

2.5. SYSTEM NETWORK CONTROLLER (SNC)

A. These controllers are designed to manage communications between the programmable equipment controllers (PEC), application specific controllers (ASC) and advanced unitary controllers (AUC) which are connected to its BACnet Ethernet Network, manage communications between itself and other system network controllers (SNC) and with any operator workstations (OWS) that are part of the BAS.

B. The controllers shall be capable of peer-to-peer communications with other SNC's and with any OWS connected to the BAS, whether the OWS is directly connected, connected via cellular modem or connected via the Internet.

C. The communication protocols utilized for peer-to-peer communications between SNC's will be BACnet TCP/IP. Use of a proprietary communication protocol for peer-to-peer communications between SNC's is NOT ALLOWED.

D. The SNC shall be enabled to support and shall be licensed with the following Open protocol drivers (client and server) by default:
1. BACnet IP

E. The SNC shall be capable of executing application control programs to provide:
1. Calendar functions.
2. Scheduling.
3. Trending.
4. Alarm monitoring and routing.
5. Time synchronization.
6. Integration of BACnet IP, ms/tp, MAMAC & MODBUS controller data.

F. The SNC shall provide the following hardware features as a minimum:
1. One 10/100 Mbps Ethernet port.
2. 1 GB SDRAM
3. USB Flash Drive
4. Plugin 120V to 24 VAC/DC Power Supply

G. The SNC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 100 simultaneous users.

H. The SNC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.

I. The SNC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via cellular modem, or wide-area network.
   1. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:
      a. Alarm.
      b. Return to normal.
      c. To default.
   2. Alarms shall be annunciated in any of the following manners as defined by the user:
      a. Screen message text.
      b. Email of complete alarm message to multiple recipients.
      c. Pagers via paging services that initiate a page on receipt of email message.
      d. Graphics with flashing alarm object(s).
   3. The following shall be recorded by the SNC for each alarm (at a minimum):
      a. Time and date.
      b. Equipment (air handler #, access way, etc.).
      c. Acknowledge time, date, and user who issued acknowledgement.

J. Programming software and all controller "Setup Wizards" shall be embedded into the SNC.

K. The SNC shall employ template functionality. Templates are a containerized set of configured data tags, graphics, histories, alarms... that are set to be deployed as a unit based upon manufacturer's controller and relationships. All lower level communicating controllers (PEC, AUC, AVAV, VFD…) shall have an associated template file for reuse on future project additions.

L. The SNC shall be provided with a NO COST Software License. NO LICENSING FEES OF ANY KIND IS ACCEPTABLE.

2.6. PROGRAMMABLE EQUIPMENT CONTROLLERS (PEC) BY KMC CONTROLS

A. General: Controllers shall be responsible for monitoring and controlling directly connected HVAC and Lighting equipment and other building automation systems as required. Each controller shall be classified as a "native" BACnet device, supporting the BACnet Advanced Application Controllers (B-AAC) profile. Controllers that support a lesser profile such as B-ASC are not acceptable. Controllers shall conform to the BACnet Advanced Application Controller (B-AAC) profile.

B. Software Specifications
   1. General: The controller shall contain non-volatile memory to store both the resident operating system and application programming. Any program may affect the operation of any other program. This execution of control function shall not be interrupted due to normal user communications including interrogation, program entry, extraction of the program for storage, routing communications, etc.

   2. Automatic Restart after Power Failure: Upon restoration of power after an outage, the controller shall automatically and without human intervention update all monitored functions; resume operation based on current synchronized time and status, and implement special start-up strategies as required.

   3. User Programming Language: The application software shall be user programmable. This includes all strategies, sequences of operation, control algorithms, parameters, and setpoints. Controllers shall be capable of utilizing both line code based programming and Graphical Function Block programming interfaces.
      a. Programs shall be generated by an English-language based (line) editor or a Graphical Function Block interface.
      b. The language shall be structured to allow for the easy configuration of control programs and mathematical calculations.

c. Controllers that use non-editable factory programming only method will not be accepted.

4. Energy Management Applications: The controller shall have the ability to perform any or all of the following energy management routines:
   - Time of Day Scheduling
   - Calendar Based Scheduling
   - Holiday Scheduling
   - Exception Scheduling
   - Temporary Schedule Overrides
   - Optimal Start
   - Optimal Stop
   - Night Setback Control
   - Enthalpy Switchover (Economizer)
   - Temperature Compensated Duty Cycling
   - CFM Tracking
   - Demand Ventilation

C. History Logging: Each controller shall be capable of locally logging any input, output, calculated value, etc. over user defined time intervals (1 second minimum time).

D. Alarm Management: For each system point, alarms can be created based on high/low limits or conditional expressions. A minimum of 255 priority levels shall be provided. If communication with the Operator Workstation is temporarily interrupted, the alarm will be time-stamped and buffered in the controller. When communications return, the alarm will be transmitted to the Operator Workstation.

E. Communications: The controllers shall be a native BACnet communications, available as EIA-485 (MS/TP) or Ethernet/IP physical connections as required. The controller shall be capable of communication to both the Workstation(s) and the field buses.
   1. MS/TP Devices: For devices with MS/TP connectivity, baud rates between 9600 and 115.2k baud shall be selectable.
   2. This project requires BACnet IP as the communication protocol. No exceptions.

F. Dedicated Room Sensor Port: The controller shall have a Dedicated Room Sensor port for direct interface to a Digital Room Sensor or Discrete Room Sensor. The controller shall have the ability of detecting if a sensor has been connected to the port and identify its type.

G. Firmware Upgrades: The controller firmware shall be upgradeable for updates as future enhancements and expanded functionality. Firmware updates shall be supported via BACnet communications (over-the-network) and ALWAYS offered at NO COST.

H. Hardware Platform Features:
   1. Processor: The controller shall employ at minimum a 32-bit microprocessor.
   2. Memory: The operating system and the application programs for the controller shall be stored in non-volatile FLASH memory. The controller shall support up to 8 MB Flash memory and up to 2 MB of RAM. The controller shall include an on-board capacitor to back up the controller's RAM memory for a period of at least six hours. In the case of a power failure, the controller shall first try to restart from the RAM memory. If that memory is corrupted or unusable, then the controller shall restart itself from its application program stored in its FLASH memory.
   3. Network Communication Ports: The controller shall have on-board, dual 10/100bT Ethernet port or an EIA-485 port. The dual Ethernet connections shall function as an Ethernet hub, allowing daisy-chained Ethernet topologies. The EIA-485 port shall have network protection

bulbs and integrated end-of-line (EOL) terminations.

4. Dedicated Room Sensor Port: The controller shall have a dedicated room sensor port to directly connect a Digital Room Sensor or Discrete Room Sensor (supporting both room temperature and room setpoint). Sensors shall be hot-swappable without powering down the controller.
5. Inputs: The controller shall have on-board universal inputs with a minimum of 16-bit analog to digital conversion. Each universal input shall have over-voltage protection. Universal inputs shall have the following integrated, software selectable terminations: 1K pullup, 10K pullup, 0-12VDC, 0-20mA. Each universal input shall be software selectable as analog or binary. Manually set, hardware configuration jumpers shall not be necessary.
6. Outputs: The controller shall have on-board universal outputs with a 12-bit digital to analog conversion. Analog outputs shall be capable of sourcing 100 mA per channel and be short circuit protected. Each universal outputs shall be software selectable as analog or binary.
7. Local Status Indicator Lamps: Provide as a minimum, LED indication of CPU status, Ethernet LAN status, MS/TP LAN Status, and Expansion I/O field bus status. For each output module with an optional override card, provide an LED that gives a visual indication of what state it is in (ON/OFF) and markings to indicate the switch setting (H-O-A).
8. Real Time Clock (RTC): Each controller shall have an integrated real-time clock, accurate to 1.5 minutes per month. The system shall automatically correct for daylight savings time and leap years.
9. Power Supply: The power supply for the controller shall be 24 volts AC (-15%, +20%) power. Voltage below the operating range of the system shall be considered an outage.

2.7. SYSTEM ARCHITECTURE (ANSI BACnet STANDARD 135/2008 OR LATER COMPLIANT)

A. The System Architecture of the IBMS system to be furnished by the IBMS contractor shall be completely based on the use of controllers and devices that comply with ANSI/ASHRAE standard 135 (BACnet), revision 2008 or later. This Architecture consists of a “client/server” Architecture with four levels of products, systems, and services.

1. Definition of “Edge Controller” - BACnet controllers that are physically connected to controlled mechanical, electrical, water, and other systems of the building are defined as “Edge Controllers” in that they sense and control physical characteristics of the building “at the edge” of the physical environment. By strict definition, this may include some of the controllers used at the “I/P” or “MS/TP” Network Levels defined in the following paragraphs. Freedom is given to the IBMS system contractor to select either Network Level or Edge Level controllers at their discretion as long as the Minimum Controller Requirements of Section 1.4 are maintained.
2. Operator Workstation Level – The Level consists of server computer. This level of equipment communicates with sub-ordinate levels of devices strictly using common “I/P” level infrastructure, structured wiring, and other facilities that are provided either by the BMS contractor directly OR, more commonly, the project’s ELV (structured cabling) sub-contractor. When using the I/P infrastructure, the BMS system communicates to all sub-systems by STRICTLY using the BACnet I/P or BACnet Ethernet (8802.3) Communication protocols defined in ANSI/ASHRAE 135.
3. I/P Network Level Controllers and Gateways – The level consists of BACnet “I/P” level controllers and BACnet routers. A requirement of any device at this level is that it must and shall

comply with BACnet I/P or BACnet Ethernet to seamlessly link with B-AWS systems or other BACnet I/P level systems.

Field Device Level – The level consists physical components and select "proprietary" communicating sensors of the BMS Manufacturer's design.

a. These devices are typically wired to the "Edge Level" controllers for the direct sensing of physical conditions of the building such as temperature, humidity, pressure, air quality, fluid level, light level, etc.

b. Other physical devices such as relays, actuators, and other actuating devices are physically connected to system control points to regulate the desired conditions of the controlled environment.

c. Some "proprietary" communicating sensors of the BMS manufacturer may be used at this level at the BMS manufacturer's discretion as long as the device is directly connected to an Edge controller and provides no other functions other than the abilities to:

1. Sense one or more physical parameters from one location (ie temperature, occupancy, humidity, CO2 levels)

2. Allow a local user to make simple operational changes (ie change a setpoint or mode of operation.)

2.8. OTHER CONTROL SYSTEM HARDWARE

A. Current Sensors: Solid state, split core current sensors that measure current and provide either a 0-10v or 0-5v signal to the DDC controller. Current sensors (transducers) shall be the primary feedback device providing motor or unit status.

B. Control Panels: Furnish temperature control panels of code gauge steel with locking doors for mounting all devices as shown. All electrical devices within a control panel shall be factory wired. Control panel shall be assembled by the Control Contractor. A complete set of ' as-built' control drawings (relating to the controls within that panel) shall be furnished within each control panel.

C. Relays: Start/stop relay model shall provide either momentary or maintained switching action as appropriate for the motor being started. All relays shall have indicating lamp. Relays installed outside of controlled devices shall be enclosed in a NEMA enclosure suitable for the location. Relays shall be labeled with UR symbol. RIB-style relays are acceptable for remote enable/disable.

2.9. BAS SERVER & FIN STACK WEB BROWSER GUI - SYSTEM OVERVIEW

A. The Controls Contractor shall provide system software based on server/thin-client architecture, designed around the open standards of web technology. The BAS server shall communicate using Ethernet and TCP. Server shall be accessed using a web browser connected to a Cloud Server via the internet. Server manufactured by On-Logic.

B. The intent of the OWS architecture is to provide the operator(s) complete access to the BAS system via a web browser. The web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support HTML5 enabled browsers without requiring proprietary operator interface and configuration programs or browser plug-ins. Microsoft, Firefox, and Chrome browsers (current released versions), and Windows as well as non-Window operating systems.

C. The web browser GUI shall provide a completely interactive user interface and shall provide a HTML5 experience that supports the following features as a minimum:

1. Trending.
2. Scheduling.
3. Electrical demand limiting.
4. Duty Cycling.

5. Downloading Memory to field devices.
6. Real time 'live' Graphic Programs.
7. Tree Navigation.
8. Parameter change of properties.
9. Set point adjustments.
10. Alarm / event information.
11. Configuration of operators.
12. Execution of global commands.
13. Add, delete, and modify graphics and displayed data.

2.10. WEB BROWSER GRAPHICAL USER INTERFACE

A. Web Browser Navigation: The GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single application, and provide a complete and intuitive mouse/menu driven operator interface. It shall be possible to navigate through the system using a web browser to accomplish requirements of this specification. The Web Browser GUI shall (as a minimum) provide for navigation, and for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic set point controls, configuration menus for operator access, reports and reporting actions for events. All graphics shall 100% replicate the existing system in functionality, 3-D displays and operation.

B. 3-D Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to set points and comfort. Graphics tools used to create Web Browser graphics shall be non-proprietary.
1. 3-D Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors. Provide a visual display of temperature relative to their respective set points.
2. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.

C. Alarms: Alarms associated with a specific system, area, or equipment selected in the Navigation Tree, shall be displayed in the Alarm Pane by selecting an ' Alarms' view. Alarms, and reporting actions shall have the following capabilities:
1. Alarms View: Each Alarm shall display an Alarms Category, date/time of occurrence, current status, alarm report and a link to the associated graphic for the selected system, area or equipment.
2. Alarm Time/Date Stamp: All events shall be generated at the DDC control module level and comprise the Time/Date Stamp using the standalone control module time and date.
3. Alarm Reporting Actions: Alarm Reporting Actions specified shall be automatically launched (under certain conditions) after an Alarm is received by the BAS server software. Reporting Actions shall be as follows:
a. Print: Alarm information shall be printed to the BAS server's PC or a networked printer.
b. Email: Email shall be sent via compatible e-mail server. Email messages may be copied to several email accounts.

D. Trends: As system is engineered, all points shall be enabled to trend. Trends shall both be displayed and user configurable through the Web Browser GUI. Trends shall comprise analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.
1. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic Pane.
2. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the BAS server if historical trending is enabled for the object. Systems that rely on a gateway/router to run trends are NOT acceptable.

3. Zoom/Pan. It shall be possible to zoom-in on a particular section of a trend for more detailed examination and ' pan through' historical data by simply scrolling the mouse.

E. Security Access: Systems that Security access from the web browser GUI to BAS server shall require a Login Name and Strong Password.

3.EXECUTION

3.1. GENERAL

A. Line and low voltage electrical connections to control equipment shown specified or shown on the control diagrams shall be furnished and installed by the Control System Contractor in accordance with these specifications. Any voltage greater than 90 volts is by others.

B. Equipment furnished by the Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Control wiring normally performed in the field will be furnished and installed by the Controls Contractor.

3.2. WIRING

A. All low voltage electrical control wiring to the control panels shall be the responsibility of the Control System Contractor. All high voltage (120v or higher) furnished & installed by others.

B. All wiring shall be in accordance with the Project Electrical Specifications (Division 26), the National Electrical Code and any applicable local codes. All control wiring shall be installed in raceways where exposed to damage. Plenum rated cabling allowed in concealed, accessible areas.

C. District standard DDC System color coded wiring is required.

D. Use manufacturer-specified wire for all network connections.

3.3. ACCEPTANCE TESTING

A. Upon completion of the installation, the Control System Contractor shall load all system software and start-up the system. The Control System Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.

B. System Acceptance: Satisfactory completion is when the Control System Contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative. System acceptance shall be contingent upon completion and review of all corrected deficiencies.

3.4. OPERATOR TRAINING

A. During system commissioning and at such time acceptable performance of the Control System hardware and software has been established, the Control System Contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.

B. The Control System Contractor shall provide 8 total hours of training for system orientation, product maintenance and troubleshooting, programming and engineering.

3.5. WARRANTY PERIOD SERVICES

A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.

B. Within this period, upon notice by the Owner, any defects in the BMS due to faulty materials,

methods of installation or workmanship shall be promptly repaired or replaced by the Control System Contractor at no expense to the Owner.

C. Maintenance of Computer Software Programs: The Control System Contractor shall maintain all software during the standard first year warranty period. In addition, all factory or sub-vendor upgrades to software during the first year warranty period shall be added to the systems, when they become available, at no additional cost.

D. Maintenance of Control Hardware: The Control System Contractor shall inspect, repair, replace, adjust, and calibrate, as required, the controllers, control devices and associated peripheral units during the warranty period.

E. Service Period: Calls for service by the Owner shall be addressed either remotely or on-site within 24 hours and are not to be considered as part of routine maintenance.

3.6. OPERATION & MAINTENANCE MANUALS

A. See Division 1 for requirements. O&M manuals shall include the following elements, as a minimum:
1. As-built control drawings for all equipment.
2. As-built Network Communications Diagram.
3. General description and specifications for all components.
4. Completed Controller Checkout/Calibration Sheets.

END OF SECTION

SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Scope Of Work: The work under this division includes furnishing all labor, material, and equipment necessary for the installation and placing into operation of the electrical systems as indicated on the drawings. The work includes, but is not necessarily limited to, furnishing and installing the following:

1. Complete power and lighting, distribution board, generator and all accessories, transformers, panels, switches, feeders, branch circuits, lighting fixtures, lamps, controls and accessories.
2. Motor and power wiring for all motor and/or equipment furnished under the contract. Except as otherwise specified to be furnished by or under other divisions of this specification, all wiring devices, conduit, feeders, and final connections to all equipment shall be furnished under this section.
3. Install electrical control wiring for all equipment, except as described in 1.24, "Mechanical/Electrical Coordination Requirements".
4. All equipment and materials specified in this division.
5. Empty conduit systems as indicated on the drawings.
6. All other items and/or work indicated on the drawings.
7. Extension of the existing power and communications systems.

B. This division of the specification outlines the provisions of the contract work to be performed under this division. This section applies to and forms a part of each section of specifications in Division 26 and all work performed under the electrical and communications contracts. In addition, work in this division is governed by the provisions of the bidding requirements, contract forms, general conditions, supplementary conditions, and all sections under general requirements.

C. These specifications contain statements which may be more definitive or more restrictive than those contained in the General Conditions. Where these statements occur, they shall take precedence over the General Conditions.

D. Where the word 'provide' or 'provision' is used, it shall be definitely interpreted as 'furnishing and installing complete in operating condition'. Where the words 'as indicated' or 'as shown' are used, it shall mean as shown on contract drawings.

E. Where items are specified in the singular, this division shall provide the quantity as shown on drawings plus any spares or extras mentioned on drawings or specifications. All specified and supplied equipment shall be new.

1.02 DEFINITIONS

A. Concealed: Hidden from sight, as in trenches, chases, hollow construction, or above furred spaces, hung ceilings B acoustical or plastic type, or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.

B. Exposed, Non-concealed, Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the 'finish schedule' with exposed and unpainted construction for walls, floors, or ceilings or specifically mentioned as 'unfinished'.

C. Finish Space: Any space ordinarily visible, including exterior areas.

1.03 SUBMITTALS

A. Shop Drawings:

1. Submit shop drawings and all data in accordance with Section 01 33 00 for all equipment provided under this division.
2. Shop drawings submittals processed are not change orders: the purpose of shop drawings submittals by the contractor is to demonstrate to the Architect that the Contractor understands the design concept. He demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods of material and equipment he intends to use. If deviations, discrepancies, or conflicts between submittals and specifications are discovered either prior to or after submittals are processed, the design drawings and specifications shall control and shall be followed.

B. Manufacturer's data and dimension sheets shall be submitted giving all pertinent physical and engineering data including weights, cross sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.

C. Index all submittals and reference to these specifications. All submittal items shall be assembled and submitted in a single complete binder. Partial submittals will not be reviewed.

D. Project Closeout: Prior to completion of project, compile a complete equipment maintenance manual for all equipment supplied under sections of this division, as described below.

1. Equipment Lists and Maintenance Manuals:

a. Prior to completion of job, contractor shall compile a complete equipment list and maintenance manuals. The equipment list shall include the following items for every piece of material equipment supplied under this section of the specifications:

2. Name, model, and manufacturer
3. Complete parts drawings and lists
4. Local supply for parts and replacement and telephone number.

5. All tags, inspection slips, instruction packages, etc., removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.

6. Maintenance manuals shall be furnished for each applicable section of the specifications and shall be suitably bound with hard covers and shall include all available manufacturers' operating and maintenance instructions, together with "as-built" drawings to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to the Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the name, address, and phone numbers of all subcontractors involved in any of the work specified herein. Four copies of the maintenance manuals bound in single volumes shall be provided.

1.04 QUALITY ASSURANCE

A. The following standard publications of the latest editions enforced and supplements thereto shall form a part of these specifications. All electrical work must, as a minimum, be in accordance with these standards.

1. National Electrical Code
2. National Fire Protection Association
3. Underwriters' Laboratories, Inc. (UL)
4. Certified Ballast Manufacturers' Association (CBM)
5. National Electrical Manufacturers' Association (NEMA)
6. Institute of Electrical & Electronics Engineers (IEEE)
7. American Society for Testing & Materials (ASTM)
8. National Board of Fire Underwriters (NBFU)
9. National Board of Standards (NBS)
10. American National Standards Institute (ANSI)
11. Insulated Power Cable Engineers Association (IPECS)
12. Electrical Testing Laboratories (ETL)
13. National Electrical Safety Code (NESC)
14. California Electrical Code Title 24, Part 3
15. California Building Code
16. Americans with Disability Act (ADA)

B. Comply with all applicable laws, ordinances, rules, regulations, codes, or rulings of governmental units having jurisdiction as well as standards of NFPA, and serving utility requirements.

C. Owner shall pay all permit fees and inspections required by any public authority having jurisdiction. Contractor shall coordinate work and arrange inspections with any public authority having jurisdiction.

D. Installation procedures methods and conditions shall comply with the latest requirements of the Federal Occupational Safety and Health Act (OSHA).

E. Cover no work until inspected, tested, and approved by the Architect. Where work is covered before inspection and test, uncover it and when inspected, tested, and approved, restore all work to original proper condition at no additional cost to Owner.

1.05 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, request clarification.

B. The Architect shall interpret the drawings and the specifications, and his decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.

C. In case of conflicts not clarified prior to Bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful Bidder as soon as feasible after the Award and if appropriate, a deductive change order will be issued.

D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word “may” or “option”.

1.06 EXAMINATION OF PREMISES

A. Examine the construction drawings and premises prior to bidding. No allowances will be made for not being knowledgeable of existing conditions.

1.07 WORK AND MATERIALS

A. Unless otherwise specified, all materials must be new and of the best quality. Perform all labor in a thorough and workmanlike manner, to the satisfaction of the Architect.

B. All materials provided under the contract must bear the UL label where normally available. Note that this requirement may be repeated under equipment specifications. In general, such devices as will void the label should be provided in separate enclosures and wired to the labeled unit in proper manner.

1.08 SUBSTITUTIONS

A. Substitutions will be allowed only in strict conformance with the General Conditions of the Contract and Division.

1. Whenever in specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be substantially equal or better in every respect to that so indicated or specified. If material, process, or article offered by Contractor is not, in opinion of architect, substantially equal or better in every respect to that specified, then Contractor shall furnish material, process or article specified. Burden of proof as to equality of any material, process, or article shall rest with Contractor. Contractor shall submit request together with substantiating data for substitution of an "or equal" item within thirty-five (35) days after award of contract. Provision authorizing submission of "or-equal" justification data shall not in any way authorize an extension of time for performance of this contract.

1.09 EQUIPMENT PURCHASES

A. Arrange for purchase and delivery of all materials and equipment within 20 days after approval of submittals. All materials and equipment must be ordered in ample quantities for delivery at the proper time. If items are not on the project in time to expedite completion, the Owner may purchase said equipment and materials and deduct the cost from the contract sum.

B. Provide all materials of similar class or service by one manufacturer.

1.10 COOPERATIVE WORK

A. Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration.

B. Cooperative work includes: General supervision and responsibility for proper location and size of work related to this division, but provided under the other sections of these specifications, and installation of sleeves, inserts, and anchor bolts for work under each section in this division.

1.11 VERIFICATION OF DIMENSIONS

A. Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions, etc., and be responsible for properly fitting equipment and materials together and to the structure in properly fitting equipment and materials together and to the structure in spaces provided.

B. Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact location, routes, building obstructions, etc. and install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, keep openings and passageways clean, and maintain proper clearances.

1.12 CLEANUP

A. In addition to cleanup specified under other sections, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any spattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.

B. Use steel brushes on exposed metal work to carefully remove rust, etc., and leave smooth and clean.

C. During the progress of the work, keep the premises clean and free of debris.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 CUTTING AND PATCHING

A. Cut existing work and patch as necessary to properly install new work. As the work progresses, leave necessary openings, holes, chases, etc., in their correct location. If the required openings, holes, chases, etc., are not in their correct locations, make the necessary corrections at no cost to the Owner. Avoid excessive cutting and do not cut structural members without the consent of the Architect and DSA.

3.02 CONCRETE

A. Where used for structures to be provided under the contract such as bases, etc., concrete work, and associated reinforcing shall be as specified under architectural. See architectural drawings for details.

B. See other sections for additional requirements for underground vaults, cable ducts, etc.

3.03 PAINTING

A. Paint all unfinished metal with one coat of rust-inhibiting primer. (Galvanized and factory painted equipment shall be considered as having a sub-base finish.)

B. Finished painting is specified Under "Finishes".

C. Furnish all connections to electrical services furnished under other sections except as otherwise specifically designated. Provide all necessary connections, etc., required to properly connect all services and equipment.

D. General: Painting requirements of this section are supplementary to other Painting Sections.

E. Switchboards, panels, terminal cabinets, equipment enclosures, wireways, boxes, conduit, etc.: Standard gray or galvanized manufacturers’ finish unless otherwise noted herein.

F. Exceptions in public areas:
   1. Flush panels and cabinets: Fronts shall have factory applied primer and field applied oil base semi-gloss enamel finish coat (except metal plated parts) to match adjacent wall surfaces.
   2. Surface panels, cabinets and wireways: Same as "1. Flush Panels" above except also paint the enclosure (can) using the same paint as is on adjacent surface in lieu of semi-gloss paint. Apply etching compound (galvanized surfaces) and undercoater prior to finish coat.
   3. Surface and flush boxes: Paint to match adjacent surfaces as described in "2. Surface panels" above.
   4. Exposed conduit: Paint to match adjacent surfaces as described in "2. Surface panels" above.
   5. Ferrous metal miscellaneous parts (except stainless steel): Galvanized in accordance with ASTM A123 or A153.
   6. Lighting fixtures in public areas: Standard manufacturers' finish except as modified by the LIGHTING section, including Fixture Schedule. Exception: Paint the trims of recessed fixtures to match adjacent wall or ceiling surface if so directed by Owner's representative.
   7. Wiring devices, device plates and floor boxes in public areas: As specified in WIRING DEVICES and DEVICE PLATES Sections.

3.04 UTILITY SERVICES

A. Upon notification of award of contract, notify the serving power, telephone utilities of the following:

   1. Name and address of Contractor.
   2. Estimated times of construction start, completion and required service connections.
   3. Project service voltage, phase load, and service size.

3.05 TEMPORARY LIGHTING AND POWER

A. Contractor shall provide on-site generation, labor, materials and/or any required utility fees associated with the installation and maintenance of a temporary power source for Contractor's equipment or field offices during the period of construction.

B. Building and site shall be sufficiently illuminated so that construction work can be safely performed. Lights shall be controlled by switches located with consideration for safety, security, and convenience.

3.06 RECORD DRAWINGS

A. The Electrical Division shall maintain record drawings as specified in Section 01 78 39.

B. Drawings shall show locations of all concealed and exposed conduit runs, giving the number and size of conduit wires. Underground ducts shall be shown with cross section elevations. Drawing changes shall not be identified only with referencing COR's and RFI's, the drawings shall reflect all the actual changes made.

C. Two sets of reproducible as-built drawings shall be delivered to the Architect. See Section 01 78 39 for additional requirements.

3.07 EXCAVATION AND BACKFILL

A. Perform all necessary excavation, shoring, and backfilling required for the proper laying of all conduits inside the building and premises, and outside as may be necessary. Remove all excess excavated materials from the site, or as otherwise directed by the Architect.

B. Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms no wider than necessary to provide ample work room. Grade trench bottoms accurately. Machine grade only to the top line of the conduits, doing the remainder by hand. Do not cut any trench near or under footings without first consulting the Architect. All trenches shall be done in accordance with OSHA standards and regulations.

C. Trenching and backfilling shall be done as per Section 31 23 33. No stones or coarse lumps shall be laid directly on conduit or conduits.

D. Provide pumps and drainage of all open trenches for purposes of installing electrical duct and wiring.

3.08 ACCESSIBILITY

A. Install all control devices or other specialties requiring reading, adjustment, inspection, repairs, removal, or replacement conveniently and accessibly throughout the finished building.

B. All required access doors or panels in walls and ceilings are to be furnished and installed as part of the work under this section.

C. Provide doors which pierce a fire separation with same fire ratings as the separations.

D. Refer to 'Finish Schedule' for types of walls and ceilings in each area and the architectural drawings for rated wall construction.

E. Coordinate work of the various sections to locate specialties requiring accessibility with others to avoid unnecessary duplication of access doors.

3.09 FLASHING

A. Flash and counterflash all conduits penetrating roofing membrane.

3.10 IDENTIFICATION OF EQUIPMENT

A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedules:

B. General:

1. In general, the installed laminated nameplates as hereinafter called for shall also clearly indicate its use, areas served, circuit identification, voltage and any other useful data.
2. All auxiliary systems, including communications, shall be labeled to indicate function.
3. All labels, tags, and stamps shall use the owner room designation and room numbering system.
4. Provide nameplates for safety switches, switchboards, breakers mounted in switchboards, relay cabinets, signal terminal cabinets, individually mounted enclosed breakers, panelboards, starters, time clocks, remote control switches and similar items. Nameplates shall be laminated black-white-black backlit or phenolic plastic with ¼-inch high lettering engraved through the outer covering except where specifically described otherwise. Affix with self-tapping machine screws (no rivets or glue). The screws shall not project beyond the backside face of enclosure doors or panels.

C. Conduits and outlet boxes for all special systems including emergency power, fire alarm, and communications systems shall be color coded for identification throughout. Conduits shall be spray painted with the system color code at 3-foot intervals. Outlet and junction boxes shall be spray

painted with the system color code on the exterior of the box, except boxes which are flush mounted in walls, ceilings, or floors shall be painted on the inside of the box. System color codes shall be as follows:

1.	Emergency Power Systems	Orange
2.	Fire Alarm System	Red
3.	Nurse Call System	Blue
4.	Music/Paging System	Yellow
5.	Intercom System	Pink
6.	Telephone System	White
7.	Data System	Gray
8.	SMATV/Radio Program System	Brown
9.	Miscellaneous Signaling Systems	Violet

D. Lighting and Local Panelboards Transformers:

1. Panel identification shall be with white and black micarta nameplates. Emergency power distribution panels shall be identified with red and white micarta nameplates. Letters shall be no less than 3/8" high.
2. Circuit directory shall be 2-column typewritten card set under glass or glass equivalent. Each circuit shall be identified by the room number and/or number of unit and other pertinent data as required.
3. The circuit directory shall reference the building number and room number as designated by the school directory. Circuit directories which reference the building number and room number as designated on drawings are not acceptable.

E. Distribution Switchboards and Feeders Sections, Motor Control Centers, Automatic Transfer Switches:

1. Identification shall be with 1" H 4" laminated white micarta nameplates with black lettering on each major component, each with name and/or number of unit and other pertinent data as required. Emergency power distribution panels shall be identified with red micarta nameplates and white lettering. Letters shall be no less than 3/8" high.
2. Circuit breakers and switches shall be identified by number and name with 3/8" H 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to or on circuit breaker or switch.

F. Disconnect Switches, Motor Starters and Transformers:

1. Identification shall be with white micarta laminated labels and 3/8" high black lettering.
2. Emergency equipment shall be identified with red labels and 3/8" high white lettering.

3.11 CONSTRUCTION FACILITIES

A. Furnish and maintain from the beginning to the completion all lawful and necessary guards, railings, fences, canopies, lights, warning signs, etc. Take all necessary precautions required by City, State Laws, and OSHA to avoid injury or damage to any persons and property.

B. Temporary power and lighting for construction purposes shall be provided under this section. Refer to 'temporary facilities' for description of work.

3.12 GUARANTEE

A. Guarantee all material, equipment and workmanship for all sections under this division in writing to be free from defect of material and workmanship for one year from date of final acceptance, as

outlined in the general conditions. Replace without charge any material or equipment proving defective during this period. The guarantee shall include performance of equipment under all site conditions, conditions of load, installing any additional items of control and/or protective devices, as required.

3.13 PATENTS

A. Refer to the General Conditions for Contractor's responsibilities regarding patents.

3.14 MECHANICAL / ELECTRICAL COORDINATION REQUIREMENTS

A. All electrical work performed for this project shall conform to the National Electrical Code, to Local Building Codes and in conformance with Division 26 of these specifications whether provided under the Mechanical or the Electrical sections of the specifications. Where the mechanical contractor is required to provide electrical work, he shall arrange for the work to be done by a licensed electrical contractor using qualified electricians. The Mechanical Contractor shall be solely and completely responsible for the correct functioning of all mechanical equipment regardless of who provided the electrical work.

B. The Mechanical Contractor shall provide the following:

1. All motors required by mechanical equipment.
2. All starters for mechanical equipment which are integral to equipment scheduled and / or specified.
3. All wiring interior to packaged equipment furnished as an integral part of the equipment.
4. All control wiring for mechanical systems.
5. All control systems required by mechanical equipment.
6. Control wiring shall be defined as all wiring, either line voltage or low voltage, required for the control and interlocking of equipment, including but not limited to wiring to motor control stations, solenoid valves, pressure switches, limit switches, flow switches, thermostats, humidistats, safety devices and other components required for the proper operation of the equipment.
7. Motor starters supplied by Mechanical shall be fused combination type minimum size 1, and conform to appropriate NEMA standards for the service required. Provide NEMA type 3R/12 enclosures in wet locations. Provide all starters with appropriately sized overload protection and heater strips provided in each phase, hand/off auto switches, a minimum of 2 NO and NC auxiliary contacts as required, and an integral disconnecting means. For 1/2 horsepower motors and below, when control requirements do not dictate the use of a starter, a manual motor starter switch with overload protection in each phase may be provided. Acceptable manufacturers are Allen Bradley, General Electric, Square D, Furnas and Westinghouse.

C. The Electrical Contractor shall provide the following for mechanical equipment:

1. All power wiring.
2. Electrical disconnects as shown on the electrical drawings.
3. All starters not integral to equipment scheduled and / or specified and all starters forming part of a motor control center.

D. All power wiring and conduit to equipment furnished under Mechanical Division shall be provided under Electrical Division. Control wiring, whether line voltage or low voltage, shall be provided under the division which furnishes the equipment.

E. Conduit for wiring for all HVAC and plumbing control shall be furnished and installed under Electrical Division.

F. Power wiring shall be defined as all wiring between the panelboard switchboard overcurrent device, motor control center starter or switch, and the safety disconnect switch or control panel serving the equipment. Also, the power wiring between safety disconnect switch and the equipment line terminals.

G. All motor starters which are not part of motor control centers and which are required for equipment furnished under this division shall be furnished and installed under the Electrical Division.

H. Electrical Division shall make all final connections of power wiring to equipment furnished under this division.

I. Wiring diagrams complete with all connection details shall be furnished under each respective section.

3.15 EQUIPMENT ROUGH-IN

A. Rough-in all equipment, fixtures, etc. as designed on the drawings and as specified herein. The drawings indicate only the approximate location of rough-ins. The exact rough-in locations for manufactured equipment must be determined from large scale certified drawings. Mounting heights of all switches, receptacles, wall mounted fixtures and such equipment must be coordinated with the architectural designs. The contractor shall obtain all rough-in information before progressing with any work for rough-in connections. Minor changes in the contract drawings shall be anticipated and provided for under this division of the specifications to comply with rough-in drawings.

3.16 OWNER-FURNISHED AND OTHER EQUIPMENT

A. Rough-in and make final connections to all Owner-furnished equipment shown on the drawings and specified, and all equipment furnished under other sections of the specifications.

3.17 EQUIPMENT FINAL CONNECTIONS

A. Provide all final connections for the following:

1. All equipment furnished under this Division.
2. Electrical equipment furnished under other sections of the specification.
3. Owner-furnished equipment as specified under this Division.

3.18 INSERTS, ANCHORS, AND MOUNTING SLEEVES

A. Inserts and anchors must be:

1. Furnished and installed for support of work under this Division.
2. Adjustable concrete hanger inserts installed in new concrete work shall be as manufactured by Grinnell or approved equal.
3. Installed in location as approved by the Architect. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Ackerman-Johnson, Pierce, Diamond, or Hilti.
4. Toggle Bolts, or "Molly-Anchors" where installed in concrete block walls.
5. Complete with 3/16" or heavier steel back-up plate where used to support heavy items. Thru-bolts for back-up plate shall be concealed from view, except as otherwise indicated. Refer to drawings for details of supports at post-tension concrete slab.
6. Mounting of equipment that is of such size as to be free standing and that equipment which cannot conveniently be located on walls such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle of Unistrut or B-line systems with all unfinished edges painted.

B. Furnish and install all sleeves as required for the installation of all work under all sections of this division. Sleeves through floors, roof, and walls shall be as described in conduit section.

3.19 SEISMIC RESTRAINTS

A. Provide the work in compliance with the most stringent seismic requirements for site specific, of applicable Codes including the Title 24 and California Code of Regulations (CCR) Uniform Building Code, but with the requirements herein as minimum standards. Provide seismic restraints for materials and equipment of this Division, including (but not limited to) the items listed below. The attachments shall resist forces applied to the center of gravity of the components. Criteria shall be the operating weight of the item times .5g for horizontal forces and .33g for vertical forces. Design for the horizontal force to be applied in any direction. Wall mounted or suspended components shall, in addition, resist a downward force of 200 pounds minimum added to the operating weight.

B. All switchgear and other free standing electrical equipment shall be anchored to withstand seismic forces in this area.

C. Switchboards, transformers, and all free-standing panels or cabinets and similar equipment.

D. Suspended lighting fixtures.

E. Lighting fixtures integral with ceiling or directly mounted to ceiling.

F. Suspended conduit hangers and trapezes.

G. Suspended electrical conduit, 2-1/2" nominal size and larger, shall have individual hangers not longer than 12" from the top of the pipe to the bottom of the support for the hanger. If a longer hanger is used, Contractor shall apply seismic restraints. Supporting calculations and details shall be submitted for Title 24 compliance review.

H. Four #9-12 gauge hanger wires shall be provided to each recessed troffer one located at each diagonal corner. In addition troffers shall be fastened with two self tapping screws at each end of fixture through housing to main runners of the T-bar grid. Installation of these screws shall in no way deform the fixture housing. Provide spacers between the fixture housing and the T-bar grid where required.

I. Provide bracing and anchorage of conduit hangers and trapezes in accordance with SMACNA published "Guidelines for Seismic Restraints of Mechanical Systems".

J. Pendant, suspended, or stem mounted lighting fixtures shall have approved earthquake resistant hangers if code required and have movable joints at ceiling and fixture when more than one stem is used per fixture. In addition, fixtures shall have steel stranded aircraft cable attached to the structure and to the fixture at each point of support, in addition to the fixture hanger. Cables shall be installed slack and shall be capable of supporting four times the vertical load. The fixture shall be capable of swinging 45° in any direction. Where a 45° swing would cause the fixture to strike a wall or other object, suitable cables or other means of bracing shall be added to prevent the fixture from swinging against the other object.

K. Carefully review the space available to insure that the restraint systems proposed will not impair the required equipment clearance, working space or access.

L. Submit details of the seismic anchorages and receive approval of the IOR and EOR prior to installation. Details shown on the drawings are for reference only and may not be suitable for the actual equipment to be installed. Exception: Details for seismic anchorage may be omitted for equipment installed on a floor or roof and weighing less than 400 lbs. but the installation shall be subject to the approval of the Owner's representative.

3.20 RUSTPROOFING

A. Rust proofing must be applied to all ferrous metals as follows:

1. Hot-dipped galvanized shall be applied after forming of angle-iron, bolts, anchors, etc.
2. Hot-dipped galvanized shall be applied after fabrication for junction boxes and pull boxes cast in concrete.

3.21 GENERAL WIRING

A. Where located adjacent in walls, outlet boxes shall not be placed back to back, nor shall extension rings be used in place of double boxes, all to limit sound transmission between rooms. Provide short horizontal nipple between adjacent outlet boxes, which shall have depth sufficient to maintain wall coverage in rear by masonry wall.

B. In those isolated instances in which construction conditions will not permit staggered outlet boxes, provide "Flamesafe" FSD 1077 fire stopping pads or approved equal, over the outlet box.

C. Complete rough-in requirements of all equipment to be wired under the contract are not indicated. Coordinate with respective trades furnishing equipment or with the Architect as the case may be for complete and accurate requirements to result in a neat, workmanlike installation.

D. Provide proper size and type of feeds from proper sources for all such items indicated, checking drawings of all trades to ensure inclusion of all items.

3.22 SEPARATE CONDUIT SYSTEMS

A. Each electrical and signal system shall be contained in a separate conduit system as shown on the drawings and as specified herein. This includes each power system, each lighting system, each signal system of whatever nature, telephone, emergency system, sound system, control system, fire alarm system, etc.

B. Further, each item of building equipment must have its own run of power wiring. Control wiring may be included in properly sized conduit for equipment feeders of #6 AWG and smaller, having separate conduit for larger sizes.

3.23 SPECIAL CONDUIT REQUIREMENTS

A. The electrical contractor shall furnish and install all conduits for the total and complete conduit for the following communication systems.

1. Clock and Bell

B. The fire alarm system shall be in conduit at all areas.

C. Conduit for all low voltage systems, including fire alarm and clock and bell located above suspended ceiling shall be installed below gypsum board on bottom chord of truss, exposed.

D. Provide a pull chord in all spare conduit and where conductors are installed by others.

END OF SECTION 26 05 00

SECTION 26 05 13 – POWER CONDUCTORS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and quipment and performing all operations in connection with Conductors, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Furnishing and installing wire and cable for branch circuits and feeders.

1.02 SUBMITTALS

A. Submit manufacturer's data for the following items:

1. 600 volt cables

PART 2 - PRODUCTS

2.01 WIRE AND CABLE RATED 120 VOLT TO 600 VOLT

A. All wire and cable shall be new, 600 volt insulated copper, of types specified below for different application.

1. Conductor Material: Copper
2. All conductor sizes shall be designated by American Wire Gauge (AWG) or Thousand Circular Mills. (kcmil).
3. Wire used as feeders to switchboards, panleboards, motor control centers or other major electrical components shall be type XHHW-2.
4. All underground conductors shall be Type XHHW-2.
5. Wire and cable larger than #6 AWG shall be type XHHW-2
6. Wire #6 AWG and smaller shall be type THHN.
7. Conductors for branch circuit lighting, receptacle, power and miscellaneous systems shall be a minimum of No. 12 AWG.
8. Increase conductor size to No. 10 AWG for 120 volt circuits greater than 100 feet from the panel to the load and for 277 volt circuits greater than 200 feet from the panel to the load.
9. Wire indicated to be larger than No. 12 must be increased the entire length of the circuit.
10. Wire sizes No. 14 through No. 10 shall be solid. No. 8 and larger shall be stranded.

B. All wire and cable shall bear the UL label and shall be brought to the job in unbroken packages.

C. Wire insulation shall be color as specified herein.

2.02 WIRE AND CABLE FOR SYSTEMS BELOW 120 VOLTS

A. All low voltage and communications systems cable shall be plenum rated.

PART 3 - EXECUTION

3.01 SYSTEMS 600 VOLT OR BELOW

A. Wire and cable shall be pulled into conduits without strain using powdered soapstone, mineralac, or other approved lubricant. In no case shall wire be repulled if same has been pulled out of a conduit run for any purpose. No conductor shall be pulled into conduit until conduit system is complete, including junction boxes, pull boxes, etc.

B. All connections and joints in wires shall be made as noted below:

C. Connections to outlets: Wire formed around binding post of screw.

D. No. 8 wire and larger - Burndy "Quick-Lug" type QDA, or approved equal, round flange, solderless lug.

E. Fixture Connections: Circuit wiring connections to fixture wire shall be made with pressure type solderless connectors, Buchanan, Scotchlock, Wing Nut, or approved equal.

F. Joints in Wire: No. 6 wire and larger, Burndy or approved equal.

G. No. 8 wire and smaller - Buchanan, Scotchlock, Wing Nut, or equal pressure type solderless connectors.

H. Uninsulated solderless connectors shall be insulated as follows: Tape and covering of rubber tape, equal in thickness in the insulation. This shall be followed with an outer covering of vinyl tape in two layers.

I. All wiring throughout shall be color-coded as follows:

	480-Volt System	208-Volt System
A Phase	Brown	Black
B Phase	Orange	Red
C Phase	Yellow	Blue
Neutral	Grey	White
Ground	Green	Green

J. Wiring must be color-coded throughout its entire length, except feeders may have color-coded plastic tape at both ends and any other accessible point.

K. All control wiring in a circuit shall be color-coded, each phase leg having a separate color, and with all segments of the control circuit, whether in apparatus or conduit, utilizing the same color coding.

L. At all terminations of control wiring, the wiring shall have a numbered T & B or Brady plastic wire marker.

M. 120 volt control wiring may be installed with the power conductors when insulated at the same voltage level as the power conductors. All other control and instrumentation wiring must be installed in a separate conduit.

N. Cables when installed are to be properly trained in junction boxes, etc., and in such a manner as to prevent any forces on the cable which might damage the cable.

O. Wire and cables when installed in underground pull boxes shall not be spliced. All wire and cable in underground pull boxes shall be continuous.

P. Wire and cable when installed in underground pull boxes shall be neatly strapped / looped together and anchored to side walls of junction box. The wire and cable shall be neatly strapped to the side walls of junction boxes to keep the floor of the junction box open.

END OF SECTION 26 05 13

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. The scope of work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Grounding, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Furnish and install grounding and grounding conductors.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GROUNDING

A. All panelboard cabinets, equipment, enclosures, and complete conduit system shall be grounded securely in accordance with pertinent sections of Article 250 of CEC. Conductors shall be copper. All electrically operated equipment shall be bonded to the grounded conduit system. All non-current carrying conductive surfaces that are likely to become energized and subject to personal contact shall be grounded by one or more of the methods detailed in Article 250 CEC. All ground connections shall have clean contact surfaces. Install all grounding conductors in conduit and make connections readily accessible for inspection. Furnish and install grounding electrodes as described on the drawings.

B. Grounding of metal raceways shall be assured by means of provisions of grounding bushings on feeder conduit terminations at the panelboard, and by means of insulated continuous stranded copper grounding wire extended from the grounds bus in the panelboard to the conduit grounding bushings.

C. Except for connections which access for periodic testing is required, make grounding connections which are buried or otherwise inaccessible by exothermite type process.

D. Equipment Grounding Conductors:

1. Provide copper THWN insulated equipment grounding conductors in all raceways.
2. The grounding conductors shall be provided whether scheduled or shown on the drawings or not, and, if necessary, the conduit size shall be increased to accommodate them. These grounding conductors shall be connected to the ground terminals on the device or enclosure at each end of the installation and shall be interconnected with the other ground terminals and conductors to form a continuous wired grounding system throughout the electrical wiring system.

E. Ground Rods: 3/4" diameter × 8-feet copper clad steel. Drive full length into earth with the top 3-inch minimum below grade or underside of slab. Where ground rods cannot be driven vertically to the desired depth below grade, they shall be driven at an angle away from or parallel to the exterior wall. When driven parallel to the wall, the angle shall not exceed 45degrees. The rod shall penetrate

to a depth of permanent ground moisture. When ground rods cannot be driven because of bedrock at less than 4 feet below grade level, a counterpoise ground electrode shall be used in place of rods. The counterpoise system shall consist of not less than 50 feet of No. 2 AWG bare tinned copper wire, buried to a depth of at least 18" below grade, for each ground rod shown. The wires shall be run in a straight line. Each pad-mounted transformer and vacuum interrupting sectionalizing switch shall be grounded using the methods indicated herein.

F. Connections: Connection to inaccessible ground rods below ground shall be made using exothermic welding devices. Above ground and accessible connections shall be made using exothermic devices. Multiple bolt silicon bronze connectors, Burndy or O.Z. Electric; or exothermic welded, Burndy, Erico Cadweld products, or equal.

G. Test each grounding electrode for resistance at the connection point before connecting any wires. Resistance at the grounding electrode shall not exceed the following:

1. Service Equipment, 25 ohms
2. Interior Electrical Systems, 25 ohms
3. Exterior Transformers, 10 ohms
4. Junction Boxes and Manholes, 10 ohms

H. If the above values are not achieved with the installed system, notify the Owner's representative.

I. Each ground electrode shall be tested using a ground resistance meter, or other suitable instrument, in conformance with the manufacturer's directions. Submit a report listing as a minimum the date of testing, name of tester, instrument used, location and type of ground electrode, and resistance in ohms. Submit within five (5) days after testing is completed.

END OF SECTION 26 05 26

SECTION 26 05 33 – RACEWAY AND BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General and Supplementary Conditions, Division One, and Section 26 05 00 Common Work Results for Electrical apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Raceway and Boxes, as indicated on the drawings, specified herein, or reasonably required to complete the work.

1.02 SUBMITTALS

A. Submit manufacturer's data on the following:

1. Conduit
2. Fittings
3. Fire Seal Material

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. LFNC: Liquidtight flexible nonmetallic conduit.

G. RNC: Rigid nonmetallic conduit.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with CEC.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.

3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. IMC: ANSI C80.6.

C. EMT: ANSI C80.3.

D. FMC: Zinc-coated steel or aluminum.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (including all types and flexible and liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: Steel, set-screw or compression type.

2.02 NONMETALLIC CONDUIT AND TUBING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. Certain Teed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise noted.

C. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 BOXES

A. Boxes shall be as manufactured by Steel City, Appleton, Raco, or approved equal.

B. All boxes must conform to the provisions of Article 370 of the CEC. All boxes shall be of the proper size to accommodate the quantity of conductors enclosed in the box.

C. Boxes generally shall be hot dipped galvanized steel with knockouts. Boxes on exterior surfaces or in damp locations shall be corrosion resistant, cast aluminum. Boxes shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Boxes shall be Appleton Type FS, Crouse-Hinds, or

the approved equal. Conduit bodies shall be corrosion resistant, cast malleable iron. Bodies shall have threaded hubs for rigid conduit and neoprene gaskets for their covers. Bodies shall be Appleton Unilets, Crouse-Hinds, or the approved equal. Where recessed, boxes shall have square cut corners.

D. Deep boxes shall be used in wall covered by wainscot or paneling and in walls or glazed tile, brick, or other masonry which will not be covered with plaster. Through the wall type boxes shall not be used unless specifically called for. All boxes shall be nongangable. Boxes in concrete shall be of a type to allow the placing of conduit without displacing the reinforcing bars. All lighting fixture outlet boxes shall be equipped with the proper fittings to support and attach a light fixture.

E. All light, switch, receptacle, and similar outlets shall be provided with approved boxes, suitable for their function. Back boxes shall be furnished and installed as required for the equipment and/or systems under this contract.

F. Pull and junction boxes shall be code gauge boxes with screw covers. Boxes shall be rigid under torsional and deflecting forces and shall be provided with angle from framing where required. Boxes shall be 4" square with a blank cover in unfinished areas and with a plaster ring and blank cover in finished areas. Covers for flush mounted oversize boxes shall extend 3/4" past boxes all around. Covers for 4" square and 4" ganged boxes shall extend 1/4" past box all around.

PART 3 – EXECUTION

3.01 CONDUIT INSTALLATION – GENERAL

A. Continuously check the work previously installed to prevent any interference between the various installations. Should structural difficulties or other work prevent the routing of conduit as indicated on the drawings, make necessary deviations there from as directed by the Owner's representative.

B. Route conduit so as to clear beams, plates, footings and structural members, whether or not indicated on the plans. Do not run conduit through any structural member of the building, except as specifically directed by the Owner's representative. Under no circumstances run conduits through column footings or grade beams.

C. Concrete Slabs on Grade: Conduit shall not be installed in slab on grade.

D. Where conduit penetrates a fire-rated separation, any of the following packing methods may be used to restore the integrity of the separation if Code approved: cement, mineral fiber sprayed with a flame retardant coating, or Dow Corning 3-6548 RTV silicon foam, 3M caulk #CP25, 3M putty #303, or equal. Seal shall be water-tight and shall be accomplished prior to wire pulling.

E. Where a conduit enters building through the concrete foundation wall or floor below ground water level, a watertight entrance seal shall be used. These seals shall be 0.Z. Type “FSK” or “WSK”, or as equal.

F. Do not run conduit closer than 6 inches to any uninsulated hot water or steam pipe, heater flue or vent. If pipe is insulated, the clearance may be reduced to 2-inch. Provide condulets for exposed runs of conduit where junction, bends or offset are required, whether such condulets are indicated on the plans or not. No bends are permitted around corners, beams, wall or equipment. No running threads are permitted. Run a die over factory threads to ensure that they are clean and free from all coating material and that good metallic contact with the fittings is obtained. Paint the exposed portion of field-cut threads with a suitable zinc-rich paint.

G. Upon completion of each run of conduit, test the run and clear it of all obstructions. Plug each conduit end with conduit pennies and bushings or manufacturers' seals until ready for pulling wire. Provide a 200-pound test nylon or polypropylene pull rope in each empty conduit, tie off rope at each end, and provide an identification tag on rope at each end.

H. All branch circuits shall be installed in void spaces and not in concrete floor slabs unless for floor receptacles.

I. Conduit sizes for various numbers and sizes of wire shall be as required by the CEC, but not smaller than 3/4-inch.

J. Conduit size shall be such that the required number and sizes of wires can be easily pulled in and the Contractor shall be responsible for the selection of the conduit sizes to facilitate the ease of pulling. Conduit sizes shown on the drawings are minimum sizes in accordance with appropriate tables in the NEC. If because of bends or elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.

K. Flexible conduit shall be used as shown on drawings and only to connect motors, transformers, and other equipment subjected to vibration. Flexible conduit shall not be used to replace EMT in other locations.

L. Flexible metal conduit shall be ferrous, in lengths not exceeding 6 feet. Installation shall be such that considerable slack is realized. The conduit shall contain separate code sized grounding conductor.

M. Liquid tight flexible conduit shall be used in conformance with NEC in lengths not to exceed 4 feet. For equipment connections, route the conduit at 90 degrees to the adjacent path for point of connection. The conduit shall contain separate code sized grounding conductor. Use liquid tight flexible conduit for all equipment connections in possible corrosive areas, e.g. kitchens and outside areas.

N. Plastic conduit joints shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected. Conduit joint couplings shall be made watertight. Plastic conduit joints shall be made up by brushing a plastic solvent cement on the inside of a plastic fitting and on the outside of the conduit ends. The conduit and fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.

O. Conduit shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practical number of junction boxes.

P. All conduits shall be concealed wherever possible. All conduit runs may be exposed in mechanical equipment rooms, electrical equipment rooms, and electrical closets. No conduit shall be run exposed in finished areas without the specific approval of the Architect.

Q. All raceways which are not buried or embedded in concrete shall be supported by straps, clamps, or hangers to provide a rigid installation. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams, or columns. In no case shall conduit be supported or fastened to other pipes or installed to prevent the ready removal of other trades piping. Baling wire shall not be used to support conduit.

R. Where possible, all conduits for wiring within stud or movable partitions shall enter the partition from above.

S. Conduits above lay-in grid-type ceilings shall be installed in such a manner that they do not interfere with the "lift-out" feature of the ceiling system. Conduit runs shall be installed to maintain the following minimum spacing wherever practical.

1. Water and waste piping not less than 3-inch.
2. Steam and condensate lines not less than 12-inch.
3. Radiation and reheat lines not less than 6-inch.

T. Provide all necessary sleeves and chases required where conduits pass through floors or walls as part of the work of this section. Core drilling will only be permitted where approved by the Architect.

U. All empty conduits shall be provided a 1/2-inch polypropylene plastic pull cord and plastic plugs over the ends.

V. The ends of all conduits shall be securely plugged, and all boxes temporarily covered to prevent foreign material from entering the conduits during construction. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place.

3.02 CONDUIT INSTALLATION – ABOVE GRADE

A. All conduits above grade or inside of a structure shall be metallic, except in masonry and concrete walls Schedule 40 may be used.

B. Run conduit concealed, except as otherwise indicated.

C. Run exposed conduit parallel with or at right angles to walls or as directed by the Owner's representative.

D. Where conduits are placed in partitions necessitating cutting of any structural member, provide supports as directed by Owner's representative in accordance with applicable structural requirements.

E. Locate conduit so as not to obstruct access or service to equipment.

F. Conduit Passing Through the Roof: Flash and counterflash and/or provide a pitch pocket. Method shall be compatible with roofing system and acceptable to the Owner's representative.

G. Conduit 1-inch and smaller over metal channel for lath and plaster or acoustical ceilings shall be tied to the supporting channels with 12 gauge galvanized tie wire spaced at a maximum of 10-feet intervals. Conduits shall not obstruct accessibility of ceiling or removal of panels. Do not use ceiling wires for support. Support exposed conduit 1-inch and smaller from building with T & B, or equal, pipe straps spaced at a maximum of 10-feet intervals. Attach supports with machine screws, nets and lock washers in metal; wood screws in wood; and expansion shields or inserts in masonry or concrete. Perforated strap iron shall not be use. Conduits larger than 1-inch shall be suspended on pipe racks with Grinnell No. 107B, or equal, split-ring hangers and rods from concrete inserts.

H. RSC shall be installed in interior wet locations, exposed exterior locations, and wherever specifically shown. Where installed in exterior locations, RSC and fittings shall be encased in PVC coated for corrosion protection. Conduit, from slab to bottom of surface-mounted panelboards, distribution panels, device outlet boxes, terminal cabinets, where exposed, shall be RSC. Conduit concealed in wall from slab to flush-mounted panels, distribution panels, terminal cabinets, and all device outlet boxes for all systems shall be EMT except to devices mounted at 36" or less in which case flexible conduit may be used. Contractor shall be allowed a dimension of 3 inches above slab to make transition from PVC to EMT, flex or rigid steel as allowed above.

I. All above grade metallic conduit shall be EMT, unless noted otherwise

J. Rigid steel conduit or IMC shall be used at thefollow locations:

1. Exposed exterior locations.
2. Emergency feeders routed overhead.

3.03 CONDUIT INSTALLATION – UNDERGROUND

A. Bury underground conduit (except under buildings) to a 30-inch minimum depth below finish grade to top of conduit. Deeper burial depths shall be as indicated on drawings, or as required to meet minimum spacing from other utilities' lines and obstructions.

B. Plastic conduit shall be used only for all exterior underground systems, in slab, not on grade, and below slab, on grade. Install bell ends at all conduit terminations in manholes and pull boxes.

C. Risers to grade shall be PVC-coated rigid galvanized steel unless otherwise noted.

D. The ends of all underground conduits entering buildings and equipment shall be capped or sealed with acceptable compound, such as Crouse Hinds “Chico A”, or equal, after installation of wire. Cap empty conduit stubouts at both ends. In landscaped areas, terminate in a waterproof J-box.

E. Provide a plastic warning tape in the backfill over the ductlines approximately 12 inches below grade. Tape shall be run continuously along the entire length of the underground utility lines. Tape shall be polyethylene plastic manufactured specifically for warning and identification of all buried utility lines. Tape shall be of the type provided in rolls, 6-inches minimum width, color-coded for electric lines (red), and communications (orange) with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Tape shall consist of top and bottom layers of B-721 polyethylene or polyester with a center metallic foil core suitable for locating by a conventional detector at the specified depth. Tape shall be by Thor Enterprises, Brady, Seton, or equal. Submit data sheets as specified under “SUBMITTALS”.

F. Conduit Location Markers: Conduits stubbed or capped-off underground shall have their location identified with a concrete marker 6" × 6" × 12" high with a flush brass plate set in the 6" face. Identification of the conduit shall be stamped or engraved into the plate and the marker set flush with finished grade. Show exact location of markers and identification markings on as-built drawings. Submit data sheets as specified under “SUBMITTALS”.

G. Excavated materials not required or unsuitable for backfill shall be removed from the project site. Provide sheeting and shoring as necessary for protection of work and safety of personnel. Remove water from excavations by pumping or other approved method.

H. Backfill shall be placed in layers not more than 6" thick and each layer shall be compacted. Backfilling shall progress as rapidly as the construction, testing and acceptance of the work permits. Backfill shall be free from roots, wood, scrap material, and other vegetable matter and refuse. Compaction of backfill shall be to 95 percent of maximum density. 80% of ASTM D method “D” maximum density.

I. Backfill around underground structures such as manholes or handholes shall consist of sand and gravel, free from large clods of earth or stones over one inch size. Backfill materials shall be placed symmetrically on all sides in loose layers not more than nine inches deep. Each layer shall be moistened and compacted with mechanical or hand tampers to 90% compaction.

3.04 CONDUIT BENDING

A. Changes in direction shall be made by bends in the conduit. These shall be made smooth and even without flattening the pipe or flaking the finish. Bends shall be of as long a radius as possible, and in no case smaller than NEC requirements.

B. Not more than four 90 degree bends will be allowed in one raceway run. Where more bends are necessary, a pull box shall be installed. All bends in 1-inch and smaller shall be made with a conduit bender and all larger sizes shall have machine bends.

3.05 CONDUIT SUPPORTS

A. Conduit shall be supported at intervals as required by the National Electrical Code. Where conduits are run individually, they shall be supported by approved conduit straps or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction. [No perforated straps or wire hangers of any kind will be permitted. Where individual conduits are routed, or above ceilings, they shall be supported by hanger rods and hangers]. Conduits installed exposed in damp locations shall be provided with clamp backs under each conduit clamp, to prevent accumulation of moisture around the conduits.

B. Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers. Hanger rods shall be fastened to structural steel members with suitable beam clamps or to concrete inserts set flush with surface. A reinforced rod shall be installed through the opening provided in the concrete inserts. Beam clamps shall be suitable for structural members and conditions. Rods shall be galvanized steel 3/8-inch diameter minimum. Each conduit shall be clamped to the trapeze hanger with conduit clamps.

C. All concrete inserts and pipe clamps shall be galvanized. All steel bolts, nuts, washers, and screws shall be galvanized or cadmium plated. Individual hangers, trapeze hangers and rods shall be prime-coated.

D. Openings through fire-rated floors and fire and/or smoke walls through which conduits or cables pass shall be sleeved and sealed by fire stop material to seal off flame, heat, smoke and fire gases. Fire-seal material shall have an hourly fire rating equal to or higher than the fire rating of the floor or wall through which the cable or conduit pass. Sleeves provide for communication system cable shall be filled with fire-seal material.

3.06 CONDUIT FITTINGS

A. Bushings and Lock Nuts: Where conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by lock nuts on the outside, and a lock nut and bushing on the inside of the box. All conduits shall enter the box squarely.

B. Furnish and install insulated bushings as per CEC on all conduits. The use of insulated bushings does not exclude the use of double lock nuts to fasten conduit to the box.

C. Couplings and connectors for rigid steel or IMC conduit shall be steel or malleable iron, threaded, rain- and concrete-tight. Transition from plastic to steel conduits shall be with PVC female threaded adaptors. Couplings and connectors exposed, installed in hollow construction or above ceilings must be threaded, or compression type.

D. Couplings and connectors for EMT shall be compression, watertight. Set screw connectors are not acceptable, except for systems below 120 volts.

E. Connectors for flexible metal conduit shall be steel or malleable iron with screw provided to clinch the conduit into the adapter body.

F. Install approved expansion fittings for conduits passing through all expansion and seismic joints.

3.07 BOXES

A. Boxes shall be installed where required to pull cable or wire, but only in finished areas by approval of the Architect. Boxes shall be rigidly attached to the structure, independent of any conduit support. Boxes shall have their covers accessible. Covers shall be fastened to boxes with machine screws to ensure continuous contact all around. Covers for surface mounted boxes shall line up evenly with the edges of the boxes.

B. Outlets are only approximately located on the plans and great care must be used in the actual location of the outlets by consulting the various detailed drawings and specifications. Outlets shall be flush with finished wall or ceiling, boxes installed symmetrically on such trim or fixture. Refer to drawings for location and orientation of all outlet boxes.

C. Furnish and install all plaster rings as may be required. Plaster rings shall be installed on all boxes where the boxes are recessed. Plaster rings shall be of a depth to reach the finished surface. Where required, extension rings shall be installed so that the plaster ring is flush with the finished surface.

D. All cabinets and boxes shall be secured by means of expansion shields and machine screws or standard precast inserts on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. All wall and ceiling mounted outlet boxes shall be supported by bar supports extending from the studs or channels on either side of the box. Boxes mounted on drywall or plaster shall be secured to wall studs or adequate internal structure.

E. Boxes with unused punched-out openings shall have the openings filled with factory made knockout seals.

F. Where emergency power and normal power are to be located in the same outlet box or 480V in a switch box, install partition barriers to separate the various systems.

G. All outlet boxes and junction boxes for Fire Alarm and Emergency systems shall be painted red.

END OF SECTION 26 05 33

SECTION 26 05 43 - UNDERGROUND PULL BOXES

PART 1 – GENERAL

1.01 SUMMARY

A. The provisions of Section 26 05 00 entitled Common Work Results for Electrical, General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with furnishing and installing underground pull boxes and manholes, as indicated on the drawings, specified herein, or reasonably required to complete the work.

PART 2 - PRODUCTS

2.01 GENERAL

A. Communication Pull Box: JENSON PRECAST Variable Depth Pull Box, 3672 DPB, 3’-8” x 6’-8” dimension.

B. Communication Pull Box Cover: JENSON PRECAST, Parkway, Hinged Cover, Style E, (2) Piece, with hold open assembly. Marked as “Communication”.

C. Electrical Pull Box: JENSON PRECAST Variable Depth Pull Box, 3048 DPB, 3’-2” x 4’-8” dimension.

D. Electrical Pull Box Cover: JENSON PRECAST, Parkway, Bolt Down Cover, (1) Piece, Style F, with hold open assembly. Marked as “Electrical”

PART 3 - PRODUCTS

3.01 INSTALLATION

A. Communication and Electrical Pull Boxes shall be installed so that elevation of cover shall be 6” above adjacent soil.

B. Installation of Wire and Cable:

1. Wire and cables when installed in underground pull boxes shall not be spliced. All wire and cable in underground pull boxes shall be continuous.
2. Wire and cable when installed in underground pull boxes shall be neatly strapped / looped together and anchored to side walls of junction box. The wire and cable shall be neatly strapped to the side walls of junction boxes to keep the floor of the junction box open.

C. Install as per manufacturers instructions.

END OF SECTION 26 05 43

SECTION 26 20 00 ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY

A. Drawings and general provisions of this contract, including General and Supplementary Conditions and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Electrical Distribution, as indicated on the drawings, specified herein, or reasonably required to complete the work.

1.02 SUBMITTALS

C. Comply with requirements of Section 01 33 00 – SUBMITTALS

D. Material List and Manufacturers' Literature

E. Shop Drawings

F. Operating and Maintenance Manuals.

1.03 ACCEPTABLE MANUFACTURERS

A. Switchboards, breakers, service/metering equipment, panelboards, transformers, and safety switches: General Electric, Siemens, Square D, Westinghouse, or equal.

B. Fuses: Bussman, Littel Fuse, Gould/Shawmut, or equal.

C. Motor Starters: Allen Bradley, Furnas, General Electric, Square D, Westinghouse, or equal.

D. Lighting Contractors: General Electric, Square D, Asco, or equal.

PART 2 - PRODUCTS

2.01 DRY-TYPE TRANSFORMERS – UNDER 600 VOLTS PRIMARY

A. Transformers shall be ventilated dry type Class H, 150°C. rise, self-cooled with KVA ratings as shown on the drawings. Single phase and thee phase transformers 10 KVA and below shall have two 5% full capacity taps below normal. Transformers above 10 KVA shall have two 2-1/2% full capacity primary taps above normal and two 2-1/2% full capacity primary taps below normal. Taps will be changed only when transformer is de-energized. The transformer core shall be cold-rolled, grain oriented silicon steel. Basic impulse level shall conform to ANSI Standard C57.12. Sound level shall not exceed 3 dB below ANSI and NEMA Standards. Impedance shall be approximately 4% for under 500 KVA and approximately 5.75% for 500 KVA and over.

B. The enclosure shall be fabricated from 14 gauge or thicker steel. For floor mounting type, the base shall be 11 gauge or heavier and suitable for rolling or skidding into position. The terminal compartment shall be at the bottom. Accessories for installation such as lifting rings, jacking plates and wall mounting tabs shall be provided as required. Construction shall be drip proof and rodent

proof. Where mounted outside, transformers shall be rain tight with non-ventilated enclosures. Finish shall be baked on enamel.

C. Ventilated transformers shall have front, bottom and/or side openings for cooling. Transformers shall be mounted on rubber isolation pads and connected with flexible conduits for sound attenuation. The Contractor shall ascertain that the transformers he proposes to use will fit in the space allowed.

D. A metal nameplate shall be installed by the manufacturer prominently on the outside of the enclosure. Nameplate shall have as a minimum the following information: Manufacturer, KVA, voltages, serial number, catalog number, type, impedance and wiring data.

2.02 SWITCHBOARDS – UNDER 600 VOLTS

A. All new switchboards shall be by the same manufacturer.

B. Sections shall be shipped connected together by the manufacturer, or separated and ready for field connection by the Contractor, in sizes that will allow them to be moved through the doors into their positions in the building.

C. Sections shall be free standing, with front access, as shown or required, of angle iron or formed steel framework with steel panels enclosing all except the bottom. No raw or sharp metal edges shall be visible. Sections shall be constructed to UL standards.

D. Finish shall be manufacturer's standard cataloged for indoor or outdoor use, as shown on the drawings. Finish shall be applied by the manufacturer.

E. Busing shall be copper or aluminum and shall be formed and braced to withstand the effects of a fault current of minimum 50,000 amperes symmetrical. Copper bussing shall be silver plated at joints, and be connected with bolts and lock washers torqued as recommended by the manufacturer. All joints shall be made by welding or use of bolts and Bellville washers made up tight. Main bussing shall extend through all sections of the switchboard, and shall be of a current carrying capacity equal to the current rating of the main protective device as shown on the drawings. Neutral bussing shall be rated 100%. Busses shall be spaced according to the UL and NEC standards for bare busbar. Provide top and bottom provisions for future crossbus and cable extension. The vertical bus shall be drilled and tapped to accommodate new and future breakers, switches and devices. Cross busses near the bottom of the boards shall be insulated or barriered.

F. A continuous copper ground bus shall be provided through all sections of the switchboard. All non-current carrying parts of the switchboard shall be solidly connected to this ground bus. The ground bus shall be sized to an ampacity of not less than 33% of the rating of the respective main bus.

G. With 70° temperature in the room where installed, the phase, neutral, and ground bus shall be sized and rated for 100% continuous current carrying capacity based upon an ampere per square inch formula. Bus current carrying capacity ratings and physical sizing shall not be based on temperature rise alone. Copper bus shall have a minimum conductivity of 1000A/square inch. The temperature in any interior part of the switchyard shall not exceed 115°F.

H. All lugs for cable connection shall be positive pressure bolted clamp type.

I. Exterior plates and blank spaces not presently utilized shall be held in place by rigid supports arranged to prevent screws and plates from falling against energized parts. Interiors shall be fastened to the enclosure by adjustable supports to provide for proper alignment.

J. Underground service pull section shall be top bussed and shall comply with the requirements of the serving utility.

K. Securely anchor switchboard to a channel iron base which shall be furnished complete by the switchboard manufacturer. Bases shall be drilled and tapped to receive the switchboard and shall be fastened securely to the pad. Fill the entire base with grout and finish smooth. Switchboards shall be secured in accordance with Section 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL.

L. Switchboards located outside shall have weatherproof enclosures and finish, and padlockable doors. Switchboards installed outdoors or exposed to weather shall have hinged front doors with vault type padlockable handles and three point latches. All openings shall be suitably designed to prevent the entry of weather, dust, animals and foreign matter.

M. Provide a nameplate for each switchboard section and each item on the face of the switchboard as specified in Section 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL. Switchboard submittal shall contain a nameplate schedule.

N. After installation, the boards shall be carefully cleaned. Any damaged paint shall be retouched with matching paint provided by the manufacturer of the switchboards.

O. When the equipment is energized, live parts shall be protected by faceplates which shall not be removed or left unplaced without the immediate presence of the Electrical Contractor.

P. Circuit breakers, switches, meters, ground fault protection, starters and other equipment to be included as an assembled part of a switchboard shall comply with the paragraphs where those items are specified.

2.03 CIRCUIT BREAKERS

A. General: Breakers 400 ampere frame and larger shall be solid state trip (SST) type unless other special types are indicated on the drawings. Breakers with smaller than 400 ampere frames may be thermal magnetic trip (TM) or SST type unless otherwise indicated on the drawings. Thermal magnetic breakers rated 200 ampere and larger shall have adjustable instantaneous trip. Mounting height of breaker operating handles shall not exceed 6-1/2 foot above floor (consider housekeeping pad for floor mounted gear when determining the measurement.

B. Solid state trip breakers (SST) shall be insulated or molded case type, ratings as indicated, equipped with ambient insensitive solid-state trips, with current sensors and solid-state logic circuits integral to the circuit breaker frame. Settings shall be sealable to prevent tampering.

C. Breakers 600 amp frame and smaller shall have the following settings:

1. Long time delay
2. Continuous ampere setting
3. Instantaneous pickup

D. Breakers 800 amp frame and above shall have the following settings:

1. Long time ampere rating
2. Long time delay
3. Long time pickup
4. Short time pickup
5. Short time delay
6. Instantaneous pickup

7. Ground fault pickup
8. Ground fault delay

E. Ground fault protection for solid state breakers shall be integral and shall have tripping devices, sensors and a test button allowing testing without tripping the breaker. Provide all other accessories shown, or needed for proper operation.

F. Short circuit interrupting capacity shall be as indicated on the drawings and shall in no case be less than 10,000 at 120/240 volts or 14,000 RMS at 480 volts RMS symmetrical amps at the applied voltage.

G. Breakers shall be molded case bolt-on type, except where other types are shown. Clamp-on, push-on, or plug-in type are not acceptable. Removable handle ties and dual, quad or tandem breakers are not acceptable. Mounting hardware, accessories, faceplates, and enclosures shall be provided as necessary for the intended use.

H. Ground fault circuit interrupter (GFCI) type circuit breakers hall occupy the same space in a panel as a conventional breaker of the same rating and shall have a push-to-test button the front. A ground current of 5 milliamps (±) or more shall trip the breaker in less than 1/40 second. Each outlet on a GFI circuit shall be tested after installation and results of the test submitted in writing to the Architect.

I. Submittal shall include interrupting capacities in RMS symmetrical amps at the applied voltage. Letter designations are not sufficient.

J. Light duty commercial/residential type thermal magnetic breakers. Use only in Panels (not in Power Panels). Westinghouse Quicklag or equal.

2.04 DISTRIBUTION PANELS

A. Distribution panelboards shall be metal-enclosed, dead front type with sections joined together to form one assembly. Assembly shall consist of group mounted devices arranged so that they may be removed or interchanged from the front of the panel without disturbing the adjacent devices. Provide full capacity bus full height of panel with filler panels for unused portion of panel. Ties between sections shall be bussed. Busbars shall be braced for the available short circuit current indicated.

B. General Electric CCB, Westinghouse type PR3 or PR4, or equal for 208/120V, or 480/277V panels.

C. Busbars shall be copper or aluminum. Provide copper equipment ground bus. When indicated on drawings, provide panel with neutral busbar sized for at least 100% of phase busbars.

D. Provide a nameplate for each panel indicating its designation (such as “DISTRIBUTION PANEL DP-1” in 1/4 inch high letters) as indicated on drawings, the voltage system (such as “208/120V-3PH-4W”), and origin of feeder (such as “FED FROM SWBD MSB”). Provide a nameplate for each circuit breaker unit indicating the load served (such as “PANEL A”).

2.05 PANELS

A. Panelboards for lighting and miscellaneous power shall be dead front safety type equipped with bolt-on circuit breakers of the numbers and sizes shown on the drawing and herein. Multiple pole breakers shall have an internal common trip. Tie handles will not be permitted. Breakers serving multi-wire branch circuits passing through fixtures shall be multiple pole breakers, even if indicated as single pole on the drawings. Breakers shall have a SWD listing. Provide GFCI type breakers as indicated on drawings and when required by Code.

B. General Electric type AQ, Westinghouse type PR1, or equal for 208/120V, and General Electric type AE, Westinghouse type PR2, or equal for 480/277V.

C. Busbars shall be copper or aluminum, braced for the available short circuit current, and have the capacities required on the plans by not less than the ampere frame size of the protective device supplying the panelboard. All panelboards shall be equipped with a copper equipment ground bus. When indicated in panel schedule, provide an oversized neutral comprised of split neutral busbars and each half shall have the same ampere rating as the phase busbars and be equipped with double lugs. Termination lugs shall be rated for 75°C.

D. Each branch circuit shall have a permanently fixed number. Provide a typewritten directory mounted in a metal frame with a clear plastic front cover on the inside of the cabinet door giving the circuit number and a complete description of all outlets controlled by each panel circuit breaker. Consult Architect for correct room and/or furniture system module designation scheme (not necessarily those shown on drawings). Mark spaces with pencil only.

E. Provide a nameplate for each panelboard indicating the panel designation (such as “PANEL 3A”) as indicated on drawings, the voltage system (such as 208/120V-3PH-4W”), and origin of feeder (such as “FED FROM SWBD MSA”).

F. Special panelboard construction or features shall be as shown on drawings. For circuit breakers, switches, contactors and other equipment to be included as an assembled part of the panelboard, refer to the paragraph where those items are specified.

G. Refer to Paint, Finishes and Colors subsection.

H. Doors shall be fastened to trim with concealed hinges and provided with flush type combination catch and lock. All locks shall be keyed alike. Mount floor standing panelboards on a base. Refer to Concrete Equipment Bases subsection.

2.06 MINI-POWER CENTERS

A. Mini-power centers shall be three phase units 480 volt primary and 120/208 volt; 3 phase secondary.

B. All transformers shall have a minimum of 2-5% full capacity primary taps below normal and shall be rated 115°C temperature rise above 40°C maximum ambient. All insulating materials are to be in accordance with current NEMA ST20 standards for a 185°C UL component recognized insulation system.

C. Transformers are to be encapsulated using a sand-epoxy resin mixture to provide maximum protection against moisture, dust and corrosive environments.

D. Package power supplies shall include integrally mounted and wired primary and secondary circuit breakers in accordance with the National Electric Code.

E. Branch circuit breakers shall be plug-on type, Square D type “Q0”, or equal. Trip indication shall be clearly shown by the breaker handle taking a position between “ON” and “OFF”.

F. A hinge access door shall be provided which maintains itself in the open position when desired and which has padlock provisions.

G. Mini-power centers shall be U.L. listed.

2.07 SAFETY SWITCHES

A. Externally operated switches shall be quick-make, quick-break, with interlocking cover. Switches and enclosures shall be heavy duty type. Provide Class J rejection clips if used with fuses. Switches used in indoor dry conditions shall have NEMA 1 enclosures. Switches exposed to wet or outdoor conditions shall have NEMA 3R enclosures.

B. Provide a nameplate on each disconnect switch as specified in "NAMEPLATES". Nameplate shall show item controlled, voltage, phase, and source of power.

C. In case of a substitution of material or equipment protected, the disconnect, fuses, circuit conductors, conduit, conduit and feeder circuit breaker shall be resized accordingly and provided at no additional cost.

2.08 FUSES

A. Fuses for feeders and motor branch circuits shall be time delay current limiting type with 200,000 AIC. The time delay shall be minimum 10 seconds at 500% load for 600A or smaller fuses and 4 seconds at 500% load for larger than 600A. 600 ampere and smaller fuses shall be Class J. Fuses larger than 600A shall be Class L.

B. Upon Owner's acceptance of the electrical distribution system, provide the Architect with spare fuses and cabinet to hold same as follows: Three fuses of each rating installed 601 amperes and larger, 10% of each type and rating installed 0 to 600 amperes but not less than three of each. Fuses shall be provided in a 24" x 30" 6"D spare fuse cabinet where noted on the drawings. Fuse cabinet shall have hinged, key lockable door with engraved nameplate. Written documentation shall be submitted by the Contractor and approved by the Owner Representative prior to completion of project.

C. Fuse sizes shown on drawings are for reference only based on specified mechanical/plumbing equipment. Final determination of fuse sizes shall be made by Contractor based on approved mechanical/plumbing equipment nameplate ratings.

D. Fuses shall be installed so that the rating can be clearly read from the front of the open switch without removing the fuse.

2.09 MOTOR STARTERS – INDIVIDUALLY MOUNTED

A. Starters used in indoor dry conditions shall have NEMA 1 enclosures. Starters exposed to wet or outdoor conditions shall have non-metallic NEMA 3R enclosures. Provide a nameplate for each starter unit indicating the load served (such as "EXH. FAN E-1").

B. Magnetic: Shall be combination starters. Provide with a motor circuit protector unless specifically indicated on drawings to be with a fused switch. Provide accessories (start/stop pushbuttons, H.O.A. switches, red neon pilot running lights, interlock contacts, control transformer, etc.) as required by this Division and by Division 15 – Mechanical plans and specifications. Confirm ratings (watts, volts, amps, etc.) with mechanical control system supplier prior to ordering of components. Each starter unit shall, as a minimum, have in its cover an overload reset, hand-off-auto selector switch and a red pilot running light. Equip each starter unit with the number of auxiliary N.O. and N.C. contacts required but at least four N.O./N.C. convertible contacts. Equip each starter with an overload relay in each under grounded wire. Select overload ratings to match the characteristics of the motors actually installed. Control voltage shall be per mechanical documents except for external mechanical control circuits. Source shall be unit transformers in each starter compartment. Transformer shall be 100 VA minimum rating.

C. Manual: Toggle type with integral melting alloy overload protection. Where shown on the drawings, fractional horsepower motors shall have toggle type manual starters with thermal overload protection in each phase. Provide a padlocking-off device on the handle, and where the motor is out of sight of the switch provide a pilot light in the cover to indicate switch is closed.

2.10 LIGHTING CONTACTORS

A. 20 amp, mechanically held with coil clearing feature or electrically held as indicated on drawings.

B. Separate enclosures shall be NEMA 1 for interior dry locations and NEMA 3R for exterior or damp locations, or as otherwise shown on the drawings, with finish as required for panelboards.

C. Contractors shall be selected and rated for the proper voltage, loads, and type of duty. Mounting shall be either in a separate compartment of the panelboard cabinet, or where wall space permits, in a separate cabinet adjacent to the panelboard. Compartments and cabinets shall conform to the specification for panelboard cabinet work and shall be sized for adequate mounting and wiring space.

D. New contractors or relays for existing switchboards or panelboards shall be by the same manufacturer as those existing in the board or by the manufacturers listed above.

2.11 DISCONNECTS

A. Acceptable manufacturers shall be Square D, General Electric, and Westinghouse or ITE.

B. All switches shall be heavy-duty type, externally operated, quick-make, quick-break, rated 600 volts or 240 volts as required, with the number of poles and ampacity as noted. All switches for motors shall be HP rated. Switches shall have NEMA-type 1 enclosures. Switches located where exposed to outdoor conditions shall have NEMA type 3R/12 enclosure. Switches generally shall be fused except where noted to be non-fused on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall conform to the requirements of the NEC and to the manufacturer's shop drawings and mounting instructions. Equipment base for floor standing equipment shall have an adequate number of anchor bolt holes to put the base in direct contact shear and tension with the mounting surface at all anchor bolt locations. Refer to Section 26 05 00 Common Work Results for Electrical, for seismic restraint requirements.

B. Disconnects:

1. Mount all switches to structure or U-channel support. U-channel supports shall be cleaned and painted to prevent rust.
2. Switches shall be accessible with proper clearances in front per NEC 110-16.

3.02 GROUNDING

A. Grounding and bonding shall be in accordance with Section 26 05 26 Grounding.

END OF SECTION 26 20 00

SECTION 26 27 26 – WIRING DEVICES

PART 1 – GENERAL

1.01 SUMMARY

A. Drawings and general provisions of the contact, including General and Supplementary Conditions and Division One, apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Wiring Devices, as indicated on the drawings, specified herein, or reasonably required to complete the work.

1.02 SUBMITTALS

A. Comply with requirements of Section 01 33 00 – SUBMITTALS.

B. Material List and Manufacturers' Literature.

1.03 CUTTING AND PATCHING

A. Perform drilling, cutting, and patching of the general construction work whether existing or new, which may be required for the installation. Patch with the same materials, workmanship and finish as the original work and accurately match all surrounding work. Such work shall be done by a craftsman accredited in the applicable trade and be acceptable to the Owner's representative.

PART 2 - PRODUCTS

2.01 WIRING DEVICES

A. Acceptable Manufacturers: Pass & Seymour, Hubbell, Leviton or equal.

B. Switches:

1. AC general use snap switches shall be toggle handle, quiet operating, specification grade UL listed and verified to meet Federal Specification W-S-896 and NEMA WD-1 heavy duty tests.
2. Switches shall be rated 120/277 volts 20 amps. Switches shall have HP ratings as follows: 20 amp rating – 1 HP @ 120V, 2 HP @ 240V.
3. Toggle handle color shall be selected by Architect.
4. Switches shall be constructed with oversized silver-cadmium alloy contacts, permanent lubrication, and binding head screws suitable for #10 AWG wire. Connection shall be made by wrapping the wire around the screw or tightening a screw clamp. Push-in type connections are not acceptable. Switches may have built-in pigtail connection in lieu of screw connection. Switches shall have means for grounding.
5. Switches shall be Pass & Seymour #20AC1, Hubbell #CSB1201, or equal.
6. Keyed and momentary contact switches, required but not listed, shall be of the same manufacturers and identical quality as those listed above.

C. Receptacle:

1. Receptacle outlets shall be Specification Grade or Hospital Grade Safety type of standard NEMA configuration.

2. General receptacle outlets shall be 20 amp, 125 volt, 2 pole, 3 wire. The attachment screw shall have an automatic grounding clip. A green grounding screw shall be mounted on the bridge which shall run around the back of a break and impact resistant plastic body. The bridge shall be securely locked to the body. Outlets shall be UL listed and verified to meet Federal Specification WC 596 and NEMA WD 1 heavy duty performance tests. Contacts shall be extra heavy duty copper alloy or bonze double wipe type. Outlets shall have binding head screws suitable for #10 AWG wire. Connection shall be made by wrapping the wire around the screw or tightening a clamp. Push-in type connections are not acceptable. Outlets may have built-in pigtail connection in lieu of screw connection.
3. Receptacle outlet fronts shall be selected by Architect.
4. Outlets shall be Pass & Seymour SG-63-H, Hubbell HBLSG63 or equal.
5. Ground fault circuit interrupter (GFCI) outlets shall be specification grade 20 amp duplex grounding receptacle suitable for mounting in a standard outlet box. A ground current of 5 milliamps ± shall trip the circuit open in less than 1/30 second. There shall be a test button and a reset button on the front. Each GFCI outlet shall be tested after installation and results of the test submitted in writing. GFI receptacles shall be Pass & Seymour #2091-SHG, Hubbell #GF5352 or equal.
6. Industrial type outlets shall be by Crouse-Hinds Appleton, or Russellstoll, and shall be rated for the amps, volts, poles, and wires indicated on the drawings.
7. Special power outlets, not listed above, shall be standard NEMA configuration as noted on drawings and shall be of at least equal grade and quality to those listed above.

D. Device plates:

1. Acceptable Manufacturers: Pass & Seymour, Hubbell, Leviton or equal.
2. Plates for flush wiring devices, including telephone outlets, shall be smooth, stainless steel in all lab areas. All other areas shall be white nylon. Wiring devices and device plates shall be the same manufacturer.
3. Provide switch and device plates with engraved designations wherever called for by words, set off in quotation marks near a switch location, or by symbol. If inscription is not detailed on drawings, request it from the Owner's representative. Engraving shall be in 1/8-inch high block type letters filled with black enamel.
4. Finish plates for all surface mounted devices shall be pressed steel galvanized. Cover plates for flush mounted junction boxes in finished areas shall be selected by Owner's representative.
5. For surface interior outlet and junction boxes of the pressed steel knockout type, use ½-inch raised galvanized steel plates for devices and flat galvanized steel for blank plates.
6. Provide a plate for each outlet, receptacle, switch, device and box.
7. Each switch, receptacle, device, etc. which is installed in an outlet box with coverplate shall have the panel and circuit number engraved with 1/8" high black filled lettering at top of coverplate.
8. Plates for exterior roof locations shall be metallic with gaskets and shall have lockable unlockable weatherproof spring loaded covers for devices, Pass & Seymour #WPH-26 or equal.
9. Plates for exterior wall locations shall be key lockable, heavy duty hinged type. Pass & Seymour #4600-26 or equal.
10. Ganged devices shall have gang plates exactly matching the arrangement and quantity of devices. All plates shall fit the box perfectly with no field modification necessary. Plates on surface mounted boxes shall not overhang the box. All plates shall be manufactured specifically for the type of outlet, device and box to which they are applied.

E. Electronic Time Switches:

1. Time switches shall be Wattstopper LP series or equal with relays as required to operate circuits as indicated on plans. The switch shall have a system time clock with astronomic feature and a group switching option.

PART 3 - EXECUTION

3.01 INSTALLATION OF OUTLETS

A. All outlets, wall switches or wiring devices may be located within a radius of twelve feet from original location shown on plans at no additional charge to the Owner if such request is made prior to installation of the rough-in for the item.

B. Accurately place outlet boxes independently and securely fasten to the structure and, in concealed work, provide with plaster rings and set flush with finished surface of walls or ceilings.

C. Coordinate the location and mounting heights of wall-mounted receptacles, fire alarm and signal devices switches with casework, shelving, furniture, and other equipment shown on Architectural and Interiors drawings and Americans with Disabilities Act (ADA), UBC, ANSI, and all other applicable codes governing the project. Conflict between electrical and architectural drawings shall immediately be brought to the attention of the Owner's representative for resolution before the installation of the devices.

D. Outlet and junction boxes for interior use shall be galvanized, one-piece pressed or welded steel, knockout type, except where other types of boxes are indicated or specified. In masonry or concrete construction waterproof boxes manufactured for that purpose shall be used. Plastic, fiber or composition boxes will not be permitted.

E. Protectively cover all devices, outlet boxes, cabinets, etc., before plastering and painting.

END OF SECTION 26 27 26

SECTION 26 50 00 – LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Lighting, as indicated on the drawings, specified herein, or reasonably required to complete the work.

1.02 SUBMITTALS

A. Comply with requirements of Section 01 33 00 – SUBMITTALS.

B. Material List including reflector type and each type of lamp and ballast.

C. Catalog cuts for each fixture and pole including complete photometric data in IES format.

D. Electronic ballast warranty.

1.03 GENERAL REQUIREMENTS

A. Provide U.L. listed and labeled lighting fixtures complete with lamps at light outlets indicated on the drawings. Each fixture shall bear the U.L. label, and shall comply with Code Requirements. Exterior fixtures shall be U.L. approved for damp locations in soffits and for wet locations elsewhere and shall be so labeled.

B. Design (including the frames) of recessed fixtures shall be compatible with the ceiling construction. Verify the type of ceiling and suspension method prior to ordering fixtures. Architect's favorable review of the shop drawings for both the ceiling system and the lighting fixtures, with "No Exception Taken" or "Approved" on the Architect's stamp, will not relieve the Contractor of the ceiling/lighting fixture compatibility requirement.

C. Fixtures are listed and described in the Fixture Schedule and in the following paragraphs. Fixture catalog numbers are to be used as a guide only and shall be understood to be followed by the words "except as modified by the total fixture description both text and pictorial". Provide accessories, features and adaptations necessary to meet the requirements of the description.

D. If the fixture designation is omitted from a light outlet, assume a fixture of the type used in similar areas in preparing the bid. Confirm type with Architect prior to ordering.

1.04 ACCEPTABLE MANUFACTURERS

A.	Electromagnetic	Advance, Valmont Electric
B.	Ballasts	Jefferson, Universal, Sola or equal
C.	Electronic Ballasts	Magnetek-Universal, Motorola, EBT or equal
D.	Lamps	Sylvania, General Electric, N.A. Phillips, Osram or equal

1.05 LAMP REPLACEMENT

A. Replace lamps which burn out after Owner's use or acceptance of the project (or of an area in the case of beneficial occupancy).

B. Lamps (except incandescent) which burn out with 120 days.

C. Incandescent lamps which burn out after usage which is less than 80% of rated life.

PART 2 - PRODUCTS

2.01 FINISH

A. Treat surface mounted fixtures and exposed trim of recessed fixtures with a rust-inhabitant process. This process shall be Bonderlite or Oakite Cryscoat or equal zinc phosphate bonding process. Refer to PAINT, FINISHES AND COLORS sections.

2.02 OPTICAL SYSTEMS

A. Lighting fixtures for use with HPS lamps shall have the optical system specifically designed for a clear HPS lamp of the wattage indicated.

2.03 BALLAST WIRING

A. Where multiple level switching of fluorescent fixtures is indicated on the drawings, wire ballasts for symmetrical grouping of lamps. For example in three lamp tandem fixtures, two inner and four outer lamps shall be switch controlled.

2.04 EXIT SIGN FIXTURES

A. Emergency exit sign fixtures with illumination by LED's (Light Emitting Diodes), fully enclosed within aluminum housing and providing even illumination of letters through an optical diffuser to meet or exceed requirements of NFPA Life Safety Coded 101 and the OSHA code. The power supply shall be dual input 120/277V 60 Hz. All components shall be solid state, with surge protection and short circuit protection and each LED shall be individually driven such that failure of one will not affect another.

2.05 BALLASTS

A. Emergency battery pack ballasts for fluorescent lighting fixtures shall consist of an automatic power failure device, test switch, pilot light, and fully automatic solid-state charge in a self-contained power pack furnished by the fixture manufacturer as an integral part of the fixture. Charger shall be either trickle, float, constant current or constant potential type, or a combination of these. Battery shall be no maintenance nickel cadmium type with capacity to supply power to one lamp for each fixture for 90 minutes minimum. Unit shall be capable of operating a dead fluorescent lamp.

B. Fluorescent HID ballasts and emergency battery pack ballasts shall be guaranteed for 3 years.

2.06 LAMPS

A. Provide lamps as listed below unless specifically indicated otherwise in the Lighting Fixture Schedule.

B. Incandescent General Service Lamps: Inside frosted, standard life, 130V.

2.07 FLUORESCENT LAMPS

A. Compact Fluorescent; 3500K degree color for interior locations.

B. 40 watt “Biax”; 3500K.

C. Rapid-start lamps; 3500K.

D. High Intensity Discharge (HID) Lamps:

1. Metal halide light fixtures that utilize a horizontal lamp configuration shall be provided with a clear lamp rated for horizontal operation.

E. Each type of lamp by only one manufacturer color consistency.

2.08 LIGHT TRANSMITTING PLASTICS

A. All plastic shall be 100% virgin acrylic. Pattern #12 lenses shall be minimum .125-inch thick overall with .08-in. prism depth.

2.09 LIGHTING CONTROL SYSTEM – MOTION SENSING

A. Motion sensing lighting control system shall be installed where shown to switch lighting fixtures ON when a room or area is entered and OFF after a preset time delay after sensing no motion or occupancy.

B. System shall consist of motion sensor units, switchpacks, wiring, and miscellaneous electrical hardware. Ceiling mounted sensing and switchpack units shall be manufacturers by Novitas, Watt-Stopper or equal. Wall switch type unit shall be provided by Novitas or equal.

2.10 EMERGENCY INVERTER SYSTEMS

A. Furnish and install interruptible 3600 VA emergency AC inverter system manufactured by Chloride, Emerg-Lite, Exide, Lithonia, or equal capable of serving a 2400 VA 277 volt 60 Hz connected load for a period of 90 minutes to 87.5 percent of output voltage. System shall be listed to UL Standard 924.

B. The entire system, including inverter, battery charger, transfer equipment and battery, shall be designed for maximum reliability in emergency service and shall be designed with modular construction for easy field replacement. System transfer time to emergency mode shall be no more than 50 milliseconds. All solid-state components shall be conservatively rated. Electronics shall carry a one year warranty.

C. The system shall be designed to operate from 277 volt 1-phase 60 Hz input voltage and supply the normally ON loads at 277 volts single phase 60 Hz.

D. Supply normally ON loads at 277 volts single-phase 60 Hz and also supply normally OFF loads at 120 volts single-phase 60 Hz, at Building.

E. Inverter:

1. The DC to AC inverter shall be of the solid state type with ferroresonsant output transformer to provide 120/277 volt 1-phase 60 Hz sine wave output such that the output voltage is regulated to

within ± 5% from 10% load to full load at unity power factor and the frequency is regulated within ± 1 Hz. Total harmonic distortion of the output shall be approximately 5% at full resistive load and nominal input.

2. System efficiency shall be at least 90% in the standby mode to minimize power consumption. Inverter efficiency shall be greater than 80% in emergency mode to insure maximum utilization of battery capacity and to minimize space.
3. To minimize power consumption, inverter shall not operate continuously; however, low level logic stage shall operate when AC supply is available to minimize interruption of power to load.
4. Self-protective features shall include short circuit protection, failsafe startup, automatic low battery shutdown, reverse input polarity protection and 5-minute operation at 130% of unit rating. The input power and control circuitry shall be separately fused.

F. Charger:

1. The battery charger shall be a solid state, constant voltage, current limited device incorporating internal red visual indicators to signal float and high charge mode. Charger shall be equipped with timed automatic equalize charge to periodically bring batteries up to full capacity. Charger shall be capable of recharging batteries in accordance with the requirements of UL 924.

G. Battery:

1. The Battery shall be sized to power the fully-loaded inverter for 90 minutes in accordance with UL requirement and shall be sealed, maintenance free lead calcium requiring no addition of water during service life. Expected service life shall be 10 years and warranty shall be a total of 10 years consisting of 1 years full replacement plus 9 years prorated replacement.

H. Controls:

1. Instrumentation and controls shall be suitable to determine that the system is operating in a satisfactory manner. As a minimum, these shall include utility power indicator, inverter bypassed indicator, DC battery voltmeter, AC output voltmeter, DC battery ammeter, system test switch, high-charge indicator.

I. Enclosure:

1. System electronics shall be enclosed in a free standing, 14-gauge, NEMA 1 sheet steel enclosure painted with key-lock hinged doors. Battery enclosures of similar construction shall be supplied as required. All electronics shall be mounted on easily removable modules with quick disconnect inter-wiring. All potentially hazardous components shall have safety covers and be properly marked with tags to indicate safe handling.

J. Accessories:

1. Inverter units shall be provided with output circuit breakers.
2. AC ammeter.

PART 3 – EXECUTION

3.01 FIXTURE MOUNTING

A. Provide fixture supports. Design (including the frames) of recessed fixtures shall be compatible with the ceiling construction. Verify the type of ceiling and suspension method prior to ordering fixtures. Architect favorable review of the shop drawings for both the ceiling system and the lighting fixtures,

with "No Exception Taken" or "Approved" on the Owner's representative's stamp, will not relieve the Contractor of the ceiling/lighting fixture compatibility requirement.

B. Mount pendant fixtures at the heights indicated on the drawings, unless otherwise directed by Architect.

C. Verify the ceiling or wall construction, voltage, and the mounting requirements of each fixture and provide plaster frames, special flanges, concrete pour housings, boxes, brackets, adapters, hangers, stems, canopies, special ballasts or lenses, and other materials necessary to properly purchase and mount the fixture.

D. Attach surface fixtures mounted on accessible panel type suspended ceilings to a main runner with a positive clamping device made of minimum 12 gauge steel. Rotational spring catches will not be permitted. Mount fixtures which are on combustible ceilings on spacers as required by Code unless Code approved for mounting directly on ceiling.

E. See "Seismic Restraints" under Section 26 05 00 – Common Work Results for Electrical.

3.02 FIXTURE LOCATIONS

A. Locate fixtures installed in Mechanical Equipment Rooms after ducts and piping are in place for maximum working space coverage. Connect with exposed conduit. Provide conduit with condulet fittings for boxes and offsets. Support fixtures from the structure independently of ducts or piping.

3.03 FIXTURE INSTALLATION

A. Provide outlet boxes for recessed fixtures in a manner approved by the Code. In non-accessible ceilings provide access to junction boxes, ballast, transformers, and battery packs through fixture apertures: no access panels in ceiling. Provide appropriately temperature rated insulation for branch wires to recessed fixtures.

B. Install lighting fixtures securely, level, plumb, aligned, and in straight rows. Lighting fixtures must be installed so they do not shift during relamping or adjustment.

C. Recessed Fixtures:

1. Supports: Provide seismic clips and bracing per Code. Refer to Section 26 05 00 Common Work Results for Electrical.
2. Holes for Recessed Fixtures
3. Minimum-width fixture trims are specified for this project. Cut holes to follow fixture housing exactly so no gaps will be visible after trims are installed.
4. Round holes in acoustic tiles: Pre-cut in center of tiles, using adjustable-diameter cutter on slow-speed drill press.
5. Install bottom of housing aligned with finished ceiling.
6. Keep ceiling insulation at least 3" away from fixture.
7. Install trims after painting of spaces. Install trims tightly, with no gaps, or light leaks. For exterior fixtures provide seals and gasketing to prevent insect entry into the fixtures. If soffits recessed fixtures are not available with a sealed housing, provide effective gasketing for the lens and for the lens trim/soffit surface interface.

D. Ceiling-Mounted and Pendant Fixtures:

1. Supports: Provide support for outlet boxes so fixtures can be installed securely, including seismic supports and restraints per Code.

2. Fixture weight less than 50 lb. at each suspension point: hang from strap or stud on outlet box.

END OF SECTION 26 50 00

SECTION 26 56 68 SPORTS FIELD LIGHTING

PART I - GENERAL

1.01 Related Documents

Drawings and general provisions of the bid documents, including general and supplementary conditions apply to this section.

1.02 Description of Work

A. The Sports Lighting section includes:
   1. Galvanized steel pole and luminaire mounting crossarms
   2. LED Luminaires, with appropriate glare/spill light control
   3. Remote driver enclosure
   4. Pole Foundations
   5. Control System

B. The purpose of this specification is to define the performance standards, product values and features, required manufacturer's service responsibilities, and design standards for Imperial Valley College Soccer/Track in Imperial, CA.

1.03 Submittals

A. It has been predetermined that these project specifications are the minimum acceptable criteria for this project. Musco Sports Lighting LLC, Total Light Control – TLC for LED™ technology is the only pre-approved equipment supplier.

B. Manufacturers requesting approval shall provide submittal information as per Section 1.03 D. Submittal information must be received 10 days prior to bid opening, approved manufacturers will be notified by addendum.

C. Submit each item in this article according to the conditions of the contract and specification section. Any deviations to the specification require the manufacturer to list and describe in detail such deviations. Failure to provide this information shall be grounds for immediate rejection.

D. Submittal information required:

   1. Light scans as per Section 1.04 of the specification.
   2. Spill scans as per Section 1.05 of the specification.
   3. Detailed warranty information as per Section 3.01 of the specification.
   4. Detail foundation design as described in Section 2.01
   5. Provide written information for the automated control system to include monitoring. Also provide examples of system reporting and access for numbers for personal contact to operate the system.
   6. The manufacturer must submit evidence in the form of a letter from a California Licensed structural engineer that the manufacturer has the ability to confirm to the California Title 24 structural design requirements. The manufacturer must provide five (5) similar pole submittal project reviews approved by the California Division of State Architecture's office in the past two (2) years. The examples are to include the D.S.A. file numbers.

7. Lighting Manufacturer will supply certified photometric reports from Independent Testing Lab (ITL) or a Certified Lab along with an aiming angle summary for verification.

1.04 Sports Lighting Performance

A. Illumination Levels and Design Factors: The illumination levels specified shall be based on light levels for 25 years. Light levels shall not drop below specified targeted lighting levels during the specified warranty period. Appropriate light loss factors shall be applied and submitted for the basis of design.

Area of Lighting	Light Levels	Uniformity	# of Points	Size of Area	Grid Spacing
Soccer Field	50fc	2:1	77	330’ x 210’	30’ x 30’
Track	30fc	4:1	48	N/A	30’ x 30’

1.05 Spill And Glare Analysis

A. Submitted spill/glare computer models shall depict the field test stations at **150’ from the field line.** The test stations shall be shown every 30’ along the line with the field lights on. Bidder shall submit, as described below:

1. Horizontal footcandles: No single point shall exceed 1.5 footcandles. Models shall represent readings taken with the meter positioned horizontal 36 inches above grade.

2. Maximum footcandles: No single point shall exceed 2.5 footcandles. Models shall represent readings taken with the test cell positioned 36 inches above grade and aimed at the brightest light source.

1.06 Materials

A. Pole Structural Steel

1. The pole shafts shall be high strength low alloy tapered tubular steel that is equal to current ASTM A595 standards, with galvanized coating inside and out. All connections of pole sections shall be by slip fitting the top section over the lower section by a length of at least 1.5 times the diameters.

2. Steel components of the poles shall be hot dip galvanized t current ASTM A-123. Steel portions of the pole shall be constructed such that all segments of the pole can be readily heated to like temperatures in commercially available galvanizing methods.

3. To avoid problems of galvanize adherence to differing steel alloys, all steel components used for the pole must be of the same type steel.

4. All exposed steel components of the pole shall be at least 18” above the surface of the ground to avoid exposure of the steel to the heavily moisture and oxygen laden air, both above and below the surface. There shall be a cap to cover the top of the pole so that rain will not enter the interior of the pole.

5. To avoid stress corrosion of the pole, there shall be no weld points of the steel portion of the pole within 18" of the ground. The pole shall be galvanized steel.

6. The poles for this project have been designed to withstand 110 mph winds based upon CBC-C standards. The premise of the wind speed criteria will be the 50 year mean recurrent isotach wind map. Applicable gust factors to be applied per code.

B. Foundation Design

1. The Manufacturer shall provide a stamped foundation design, prepared by a Structural Engineer, licensed in the State of California based on 2019 CBC, 100mph.

2. The foundation design shall be based upon recommendations contained in the Geotechnical Report furnished by the Owner. If a Geotechnical Report is not provided by the Owner, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by the 2010 CBC Table 1806.2.

3. It is the contractor's responsibility to notify the owner of soil conditions other than the design criteria. The owner shall then be responsible and absorb the additional costs associated with: Providing engineered foundation embedment design by a registered engineer in the State of California for soils other than specified soil conditions. Additional materials required to achieve alternate foundation. No direct burial steel poles allowed.

4. Lightning Protection: Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A. If grounding is not integrated into the structure, the Manufacturer shall supply grounding electrodes, copper down conductors and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be not less than 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

C. LED Sports Lighting Fixtures:

The lens is permanently sealed to keep optics away from harmful environmental elements. Fixture is vented and filtered to adapt to environmental elements. Heat sink with a unique convective air cooling design with high thermal conductivity and corrosion resistant construction. Machine mounted surface for maximum heat transfer of diode assembly and maintains low LED junction temperature during high wattage operation. Custom high power diode package with a metal core printed circuit board. The light control visors are factory aimed. Controls and directs more light onto the field which reduced glare and spill and enhances the on-field playability. Fixture is powder coated gray.

D. Remote Electrical Enclosure:

Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. Drivers are remote for ease of installation and servicing. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure.

E. Wire Harness: Spiral wound, abrasion protection sleeve, strain relief, plug-in connections

F. Energy Consumption: The average kWh consumption for the entire facility shall not exceed 35.36kW for the lighting system.

G. Controls and Monitoring System:

1. Factory assembled lighting control cabinet (LCC) – The LCC shall be assembled and wired by a UL listed panel builder. The LCC shall contain Contactors, Monitoring and Control System and door mounted Manual off-on-auto selector switches. The LCC shall arrive at the job site ready to attach to an existing wall, switchgear, or a free standing enclosure.

    a. Control Wire Terminations - The Control Wire Terminations shall include UL listed terminal blocks mounted on a DIN rail and 250 volt, 16 amp, touch safe type fuse holders.

    b. The ECE shall be constructed of aluminum and shall be powder coated gray. The cabinet door shall utilize a lockable, 3 point latching assembly that provides a NEMA 4 rated seal.

    c. Contactor Modules – Contactors shall be UL listed for lighting applications. They shall be rated at full capacity, be electrically held, utilize a 120 volt coil and be rated for operation in a ambient temperature range from -40 degrees C to +70 degrees C.

    d. Manual off-on-auto Selector Switches – For on site manual control, three position selector switches shall be factory mounted to the ECE door. The switches shall be keyed and maintain position, with make before break contacts. The switches shall be factory wired to control terminal blocks.

    e. Warranty – The LCC shall be covered under the standard warranty for the accompanying lighting equipment.

2. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The manufacturer shall notify the owner of outages within 24 hours, or the next business day. The controller shall determine switch position (manual or auto) and contactor status (open or closed). The Monitoring System shall be factory wired to control terminal blocks.

3. Remote Lighting Control System: The Lighting Control System shall allow owners and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs. The Light Control System shall be factory wired to control terminal blocks.

3.01 Warranty

A. 25-Year Warranty: Each manufacturer shall supply a signed warranty covering materials and labor for the entire system for 25 years from the date of shipment. Warranty shall specify light levels, system energy consumption, monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other manufacturers.

3.02 Field Technician

A. Manufacturer shall have available a local factory trained technician to provide project support including but not limited to: Lamp replacement, confirm luminaire, aiming points, troubleshoot, and educate customer maintenance personnel.

SECTION 28 31 10 - FIRE ALARM

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with the Fire Alarm System, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Furnish and install fire alarm devices to include all addressable signal initiating devices, audible and visual alarm devices, conduit, wire, fittings, and accessories required to provide a complete operating system.
2. Connect the new Simplex Fire Alarm control panel with the existing fire alarm system in the administration office. Provide all necessary relays, control modules and programming.
3. The specifications require the system to be Simplex. Any contractor requesting consideration for a substitute system shall provide the following documents to the Architect of Record ten (10) days prior to the bid:

    a. Documentation showing the contractor is a factory direct office of the equipment being considered for substitution. No independent distributors will be allowed.
    b. The contractor's UL Certificate qualifying the contractor for fire alarm installations.
    c. Full set of submittals and drawings incorporating the substituted equipment. This shall include location layout, battery calculations of the main control panel and any transponders, and line loss of the signal circuit.

1.02 REFERENCES

A. The latest editions of the publications listed below, form a part of this specification to the extent required by the references thereto:

1. 2016 California Building Code (CBC), Part 2, Title 24, CCR (2015 International Building Code, Vol. 1&2, and 2016 California Amendments)
2. 2016 California Electric Code (CEC), part 3, title 24, CCR(2014 National Electric Code 2016 California Amendments)
3. 2016 California Mechanical Code (CMC), Part 4, Title 24, CCR, (2015 IAPMO Uniform Mechanical Code and 2016 California Amendments)
4. NFPA #72 2016 Edition with California State Amendments
5. 2016 California Fire Code (CFC), Part 9 Title 24, CCR, (2015 International Fire Code and 2016 California Amendments)
6. Underwriters Laboratories, Inc (UL)

    50 Cabinets and Boxes
    268 Smoke Detectors, Combustion Products Types for Fire Protective Signaling Systems
    38 Manually actuated Signaling boxes for use with Fire Protective Signaling Systems
    521 Fire Detection Thermostats
    464 Signal Appliances, Audible

7. California State Fire Marshal Listing (CSFM)

B. Electrical Systems, as specified in Division 26.

C. Communications Systems, as specified in Division 27.

1.03 SUBMITTALS

A. In addition to the required submittals specified elsewhere, provide California State Fire marshal (CSFM) listings of all devices and equipment to be used.

B. Provide complete shop drawings of the fire alarm system including the following items on the plans for approval by the School District prior to the start of construction.

1. Complete battery load calculations, and line voltage drop calculations.
2. Conduit size, number, and type of wires to each device, terminal cabinets and enclosures.
3. Location, type and address of all system devices.
4. Reconfiguration (signal and initiating).
5. Complete riser diagrams and signal floor plan. Drawings shall contain State Fire Marshal approval.
6. Backboard layouts (with detailed dimensions).

PART 2 - PRODUCTS

2.01 FIRE ALARM CONTROL PANEL (FACP)

A. Fire Alarm Control Panel (FACP). The campus FACP is an existing Simplex 4100.

B. The system shall be controlled and supervised by a microprocessor based monitoring fire alarm control panel. The systems shall be addressable, field configurable, programmable and editable. The system shall continuously scan devices for change of status. Each device shall have it's own unique address, but shall also be grouped by building as a separate zone for remote annunciation and alarm report purposes.

C. The fire alarm control panel shall be housed in a lockable, code gauge steel cabinet with 80 character LCD display, master controller operator's panel, I indicating lamps, silence switch and reset switch mounted on cabinet front. The fire alarm control panel shall contain a voice tone generator and a sufficient number of amplifiers in order to provide evacuation tones and digital voice messages throughout the facility. Messages and tones are to be field programmable and initially set to temporal code when an alarm is initiated. An annunciator and message board shall be provided in the main lobby.

D. The fire alarm control panel shall come with standardized software for on-site customization of the system. The unit shall be capable of providing a 600 event historical log with zone or point selectable alarm verification.

E. The unit shall support 127 addressable points per module and one output point, SPST contact per zone. Provide the number of modules necessary to control and supervise fire alarm devices as shown on the Drawings, as well as to provide 25% spare capacity).

F. The fire alarm control panel shall be capable of providing a Walk Test.

G. The power feed for the FACP shall be 3-wire, 120volt, A.C. single phase (20A circuit) permanently labeled "FIRE ALARM CONTROL POWER", terminating at the master fire alarm control and

supervisory panel in the general office and originating at the main electrical switchboard of the building that contains the FACP. The label shall be red with 1/4" high white lettering. The circuit breaker must be provided with a lonc-on device.

H. In addition to the two A.C. circuits, the panel shall be equipped with a D.C. battery to activate an audible alarm and pilot light in case of a power failure on either A.C. circuit.

I. Batteries must drive signaling devices per current requirements NFPA 72. Battery calculations are required as part of the submittal. Provide type and wiring configuration of batteries. Submittal shall specify point to point on OHM's Law.

J. The master fire alarm panel shall be equipped with a manual pull lever type, supervised report station.

2.02 FIRE DETECTION DEVICES

A. With the exception of the manually operated report station required at themaster fire alarm panel and large assembly areas, the remainder of the school facility shall be equipped with approved, electronically supervised, automatic fire detection devices, such that every room, space, including concealed spaces, such as the attic spaces above ceilings, etc., is provided with approved coverage.

B. Automatic fire detection devices shall be True Alarm addressable analog smoke and heat detectors. Where used, heat detectors shall be fixed temperature x rate of rise, fixed at 135°F and a 15°F/min rate of rise. In janitor rooms equipped with kilns, devices shall be fixed at 170°F. Use Simplex True Alarm Photo-Electrical Smoke Detectors. Model #4098-9714 with 4098-9792 Base.

C. A 3/4" thick, fire resistive, plywood backboard shall be installed in the electric room for the fire alarm security, intercom and CCTV systems at each building. All fire alarm wiring shall terminate on U.L. approved strips on this backboard at a section clearly designated for fire alarm only. All wiring shall be labeled at termination strip. Wiring shall be configured such that all end of line resistors will be installed at terminal strip on signal backboards.

2.03 MANUAL FIRE ALARM STATIONS

A. Manual Fire Alarm Stations shall be an addressable double action, breakglass type with a key operated test-reset lock in order that they may be tested, and so designed that after Actual Emergency Operation, they cannot be restored to normal except by use of a key. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of one hundred feet, front or side. Manual Stations shall be constructed of die-formed satin-finished aluminum, with operating directions provided on the cover in depressed red letters. The word FIRE shall appear on each side of the stations in depressed letters, one-half inch in size or larger. Stations shall be suitable for semi-flush mounting on a standard single-gang box or switch plate and shall be provided with a terminal block for connection of Fire Alarm System Wiring. Pull Station shall be Simplex #4099-9021.

1. Manual Pull Stations shall comply with CBC Sections 11B-205 and 11B-403.

2.04 ALARM SPEAKER/STROBE DEVICES

A. Furnish and install where indicated on the drawings, alarm speaker/strobe devices. The audible/visual devices shall be a combination addressable speaker/strobe. The speaker shall be 25 or 70 vrms. The visual shall be rated at 24 vdc.

B. The audible shall be of rugged vandal-resistant construction. The visual section shall be a strobe using a Xenon flashtube in a clear housing with Solid State circuiting for maximum reliability and

efficiency. The strobe unit shall have a meantime between failure (MTBF) of 1,000 hours or greater. The strobe section shall have a minimum intensity rating of 8,000 peak candela with a flash rate of 1 minimum – 2 maximum flash per second, Per NFPA 72, 18.5.3.1)

C. The alarm speaker/strobe device shall be of the semi-flush type designed for mounting to a standard 4" square deep electrical outlet box. Each device shall be provided with a semi-flush accessory plate. Exterior speakers shall be weatherproof.

D. Synchronization Requirements: The strobes shall flash at a synchronized rate and the speakers shall sound with synchronized output.

E. Strobes shall comply with UL 1971.

2.05 HEAT DETECTOR DEVICES

A. Heat detectors shall be addressable, fixed temperature x rate of rise, fixed at 135°F and a 15°F/min rate of rise. In janitor rooms equipped with kilns, devices shall be fixed at 170°F. Heat Detector shall be True Alarm series. Simplex 4098 series.

2.06 SMOKE DETECTOR AND CARBON MONOXIDE DETECTOR DEVICES

A. Smoke detectors shall be True Alarm Analogue addressable, photo-electric. Per drawings.

B. Projected Beam Smoke Detectors shall be Fire Ray Reflective Beam Smoke Detectors. The system comprises of a single unit incorporating an infra-red Transmitter and Receiver. The signal is reflected by a prism and analyzed for smoke presence.

C. Carbon monoxide detectors shall be True Alarm Analogue addressable, photo-electric. Per drawings.
D. Smoke and carbon monoxide combination detectors shall be True Alarm Analogue addressable, photo-electric. Per drawings.

2.07 WIRING

A. All wiring shall be in accordance with the California Electrical Code (CEC), State Codes, National Fire Protection Association Standard 72, 2016 Edition with state amendments.

B. All underground conductors for communication circuits shall be West Penn Wire Aqua Seal Fire Alarm Cables. Part No AQZ93.

2. Description: 18/2 Stranded bae copper conductors, overall shield with Aquaseal tape and overall jacket.
3. NEC Rating: FPL – PLTC, NEC Article 760 and 725
4. Approvals: UL Listed-Direct Burial
5. Construction Paramaters

a. Conductor: 18 AWG Bare Copper
b. Stranding: 7x26
c. Insulation Material: PVC with Nylon
d. Insulation Thickness: Nylon .005" Nominal
e. Number of Conductors: 2 (1 Pair)
f. Sheild: 100% Aluminum Polyester Foil
g. Jacket Material: Sunlight / Moisture Resistant PVC
h. Jacket Thickness: 0.040" Nominal
i. Overall Cable Diameter: 0.310" Nominal

j. Aproximate Cable Weight: 48 lbs / 1M Nom.
k. Flame Rating: UL 1685 Vertical Tray

C. All underground conductors for power circuit shall be XHHW-2.

D. No splices allowed in underground wiring.

E. Interior, dry location wiring for low voltage initiating circuits shall be #18 AWG copper, twisted shielded pair minimum, signaling circuits shall be No. 14 AWG minimum, and wiring for 120 volt circuits shall be No. 12 AWG minimum unless detailed otherwise in drawings. All wiring shall be color coded, solid copper conductor. Use of power limited cable shall be restricted to controls listed for this purpose. Single conductors shall be type XHHW copper.

F. Twenty (20) percent spare conductors shall be provided from the main Fire Alarm Control Panel to each Fire Alarm (signal) Terminal backboard. These spares shall be terminated and marked at the Fire Alarm Cabinet and each Terminal backboard.

G. Wire markers shall be provided for each wire connected to equipment. The marker shall be of the taped bank type, of permanent material, and shall be suitable and permanently stamped with the proper identification. The markers shall be attached in a manner that will not permit accidental detachment. Changing of wire colors within circuits shall be unacceptable.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The installation shall be accomplished by factory authorized technicians. The factory technician shall be state certified as an FLS technician.

B. System shall be installed using material, supplies and methods of wiring previously covered under other sections.

C. Contractor shall provide a complete schematic of terminal to terminal wiring within the FACP and show destination of all wires leaving the FACP. These are to be submitted at the time of final inspection.

3.02 TESTS

A. Upon completion of installation, the system shall be subjected to operational tests, and when all necessary corrections have been accomplished, the Architect shall be advised and will schedule a final inspection test by a representative of the Owner.

B. The Contractor shall furnish all instruments, labor, and materials required for the tests and a qualified technician to conduct the tests. Any deficiencies found shall be corrected by the Contractor and system retested as necessary prior to final acceptance. Tests shall be per NFPA 72 and as a minimum shall include the following:

1. Operation of each signal initiating device. Special equipment required for testing ionization detectors and heat detectors shall be provided by the Contractor at the time of the test.
2. Operation of all features of the system under normal operation.
3. Operation of all supervisory features of the system.
4. Operation of all features of the system on standby power with primary powers “OFF”.

3.03 DOCUMENTATION

A. Contractor shall provide the following to DSA, the District, the Architect, and the local fire official at the time of final inspection:

1. As-builts of fire alarm system.
2. NFPA Certificate of Compliance stating that the system has been installed in accordance with approved plans and specifications and Codes.

END OF SECTION 28 31 10

SECTION 31 22 19 FINISH GRADING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Finish Grading, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Import top soil for finish grading.
2. Place and finish grade top soil.

1.02 DEFINITIONS

A. Definitions in this section include the following:

1. Fill: Soil materials used to raise existing grades.
2. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
3. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.03 PROJECT CONDITIONS

A. Soils Report: A geotechnical investigation report was made for this project and is on file at the District and Architects Office. Soils Report No. LE18097, dated 07/24/18. Landmark Consultants, Inc., 780 North 4th Street, El Centro, CA 92243. (760) 370-3000.

1. All General Contractors and Earthwork Sub-Contractors shall review the soils report prior to commencing any work.

B. It shall be the responsibility of the Contractor to examine the site of the work and to make all investigation necessary, both surface and subsurface, to determine the character of materials to be encountered and all other existing conditions affecting the work.

C. The School District shall obtain and pay for the services of a Soils Engineer, who shall be responsible for the review and testing of all import top soil. Contractor shall be responsible to notify Soils Engineer for testing of imported soil.

D. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.01 GENERAL

A. Import top soil required for finish grading shall be provided by the contractor from areas outside the site at contractor's expense. Import top soil shall conform to the requirements herein specified. All import top soil shall be tested and approved by geotechnical engineer prior to being hauled to the site.

B. Imported top soil shall be fertile surface soil (predominantly silt), free from rocks, sticks, obnoxious weeds, roots or seeds, toxic amounts of either acid or alkaline chemicals or other foreign material. Imported top soil shall be approved by Owner's Soil Engineer. Before delivery of top soil, furnish Architect with statement giving location of properties from which top soil is to be obtained and furnish sample.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Before work is started, verify the location and existence of all bench marks, survey corners and monuments. Protect all bench marks, survey corners and monuments, and if any become displaced, covered or destroyed, employ a civil engineer or surveyor registered in the State of California to reset those points. Permanently reset corners at grade or a maximum of 3" below grade.

B. Existing Grades: Verify the accuracy of the existing grades as shown on the drawings and report discrepancies to the Architect for verification.

C. Existing Utilities: Existing utilities shown on the drawings are shown from the best possible information available and shall be verified prior to the start of any work.

D. Unknown Utilities: In the event that utilities are encountered which are not indicated on the drawings, the existence of which is not known at the date of contract, the Contractor shall give notice in writing to the Architect. The Contractor shall not proceed until adequate investigation has been made, the line identified, and instructions issued as to how to proceed.

E. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3.02 PREPARATION OF EXISTING SOIL

A. Remove all loose or unsuitable soils. Remove all foreign material and any miscellaneous construction debris prior to finish grading.

3.03 FINISH GRADING

A. Grade the entire site to the required final grade elevations indicated on the drawings. Where no otherwise indicated, site areas shall be given uniform slopes between points for which finished grades are shown, or between such points and existing established grades. Perform cutting, filling, backfilling, and grading necessary to bring the entire area to grades shown on the drawings.

B. Finish subgrades shall allow for thickness and slopes of subsequent construction. Grade to provide uniform slope between elevation points or lines, or between such elevations and existing grades.

C. Grade Tolerance: The average plane of all graded areas shall conform to the grades indicated on the plans. Landscape and other large turf areas shall not very more than 0.1 feet from the specified grade. Cut and fill slopes shall not vary from the specified grade more than 0.5 foot measured at right angles to the slope.

3.04 EARTHWORK BALANCE

A. Provide and import additional select top soil material, if required, and remove from the site all excess and unsuitable soil.

3.05 CLEANING

A. Maintain the premises free from accumulation of debris, waste materials, unusable materials, together with excess equipment, tools and other implements of service resulting from operations under this contract.

B. Debris, waste, or unused construction materials shall not be left about the site, nor shall such refuse be used for fill or backfill.

3.06 PROTECTION OF EXISTING WORK

A. Protect existing paving, walks, trees, buildings and utilities from damage during installation of new work. Carefully examine the drawings and inspect the site to determine the proximity of such work.

END OF SECTION 31 22 19

SECTION 31 23 00 EXCAVATION AND FILL

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Excavation and Fill, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Excavate native soil.
2. Moisture condition existing native soil.
3. Import and compact engineered fill for sturctures
4. Import and compact engineered fill for concrete hardscape

1.02 DEFINITIONS

A. Definitions in this section include the following:

1. Backfill: Soil materials used to fill an excavation.
2. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
3. Excavation: Removal of material encountered above subgrade elevations.
4. Fill: Soil materials used to raise existing grades.
5. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
6. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.03 PROJECT CONDITIONS

A. Soils Report: A geotechnical investigation report was made for this project and is on file at the District and Architects Office. Soils Report No. LE22111 dated June 2022. Landmark Consultants, Inc., 780 North 4th Street, El Centro, CA 92243. (760) 370-3000.

1. All General Contractors and Earthwork Sub-Contractors shall review the soils report prior to commencing any work.

B. It shall be the responsibility of the Contractor to examine the site of the work and to make all investigation necessary, both surface and subsurface, to determine the character of materials to be encountered and all other existing conditions affecting the work.

C. The School District shall obtain and pay for the services of a Soils Engineer, who shall be responsible for the review and testing of all compaction. Contractor shall be responsible to notify Soils Engineer for testing of each phase of compaction.

D. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.01 GENERAL

A. Import materials required for fill or backfill shall be provided by the contractor from areas outside the site at contractor's expense. Import materials shall conform to the requirements herein specified and as required by the soils report. All import materials shall be tested and approved by geotechnical engineer prior to being hauled to the site.

B. All imported fill soils shall be non-expansive (Expansion Index less than 5) granular soils meeting the USCS classifications or SM, SP-SM, or SW-SM with a maximum rock size of 3 inches and 5 to 20% passing the No. 200 sieve and a minimum sand equivalent of 25.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clearing and Grubbing: At the time of construction, all existing pavement, debris and vegetation such as grass or tress on the site should be removed. Organic strippings should be hauled from the site and should not be incorporated into any engineered fills. Any trash, construction debris, concrete slabs, old pavement, landfill, and buried obstructions should be located by the grading contractor and removed under our observation. Evacuations resulting from site clearing hould be dish-shaped to the lowest depth of disturbance and backfilled with engineered fill as described below under continuous observations by the geotechnical engineers representative.

Native soil, free of concentrations of vegetation or other deleterious materials, may be used as engineered fill placed in lifts not exceeding 8 inches, moisture conditioned to 5 to 10% above optimum and compacted to 85 to 90% of ASTM D1557 maximum density.

B. Building Pad Preparation: To mitigate the effects of expansive soils on the proposed improvements the following soil preparation shall be implemented:

The exposed surface soil within the building pad/foundation ara shall be removd to a minimum depth of 3 feet below bottom of the building pad elevaiotn or existing natural surface grade (whichever is lower) extending five feet byond all exterior wall/column line (including concreted areas adjacent to the building). Prior to placement of the fill, the exposed subgrade shall be sacrified to a depth of 12 inches, uniformily moisture conditioned to 5 to 10% above optimum (clays), or a minimum of 2% below to 4% above optimum (sands) and recompacted to 85 to 90% (clays) or a minimum of 90% (sands) of the maximum density determined in accordance with ASTM D1557 methods.

It is possible that wet sandy soils will pump under equipment loads. Light earthmoving and compaction equipment shall be utilized for compacting soil at depth.

An engineered building support pad consisting of a minimum of 3 feet of non-expansive compacted granular soil, placed in maximum 8 inch lifts. (loose), compacted to a minimum of 95% of ASTM D1557 maximum density at 2% below to 4% above optimum moisture, shall be placed below the bottom of the slab. The on-site soils are not considered suitable material for fill.

C. Site Pad Preparation: To mitigate the effects of expansive soils on the proposed improvements the following soil preparation shall be implemented:

Area to receive site concrete the upper 24 inches shall be removed and replaced with granular fill compacted to a minimum of 90% of ASTM D1557 maximum density.

END OF SECTION 31 23 00

SECTION 31 23 33 – TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with Trenching and Backfilling, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes but is not limited to the following:

1. Excavation, backfill and compaction for utilities.

C. Related Section:

1. Section 33 11 16: Site Water Distribution Piping.
2. Section 33 31 00: Sanitary Sewerage Piping.

1.02 GENERAL PROVISIONS

A. Contractor is responsible for the accuracy of all layout work and grades. Erect sheeting, shoring and bracing as necessary for protection of persons, improvements, and excavations. Keep excavation free from water and other fluids until backfilling is completed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Backfill material shall be non-expansive granular soils that meet the USCS classifications of SM, SP-SM, or SW-SM, with a maximum rock size of 3 inches, and 5 to 20% passing the No. 200 sieve and a minimum sand equivalent of 20.

B. Select bedding sand shall be Class A screened fill sand with a maximum particle size of 1-1/2 inches, not to exceed 18 percent, free of expansive materials, debris, and organic matter.

PART 3 - EXECUTION

3.01 TRENCHING

A. Layout: Lay out route of each underground utility prior to trenching. Review drawings and coordinate with adjacent underground work to avoid conflicts.

B. Clearances: Maintain required horizontal and vertical depth clearances from structural footings or utility trenches running parallel to footings. Maintain area of footing bearing prism and in event that the utility cannot be relocated or its depth changed, proceed as directed by Architect. Where required, lowering of structural footings to maintain proper clearances for underground utilities trenching shall be accomplished as directed.

C. Excavate trenches for utilities to required lines, grades and elevations indicated on drawings and as specified. Hand trim changes in direction and bottoms of trenches. Provide shoring in trenches over 5 feet in depth and also in trenches where unstable soil conditions are encountered.

D. Pipe Trench Dimensions: Following requirements are considered minimal unless drawings indicate otherwise in order to provide adequate pipe clearances and bedding. Provide trenches wider than specified minimum where required to properly install particular type of piping. In event that utility company regulations, code requirements, or pipe manufacturer's recommendations differ from these provisions, most restrictive requirements shall take precedence. Pipe burial depth is from finish grade or pavement surface to top of pipe. Trench width shall be measured at top of pipe.

1. Pipe Burial Depths:

Sewer and Drainage:	24" + pipe O.D. + 3" bed
Gas:	30" + pipe O.D. + 4" bed
Water (Domestic)	
PVC:	30" + pipe O.D. + 4" bed

2. Trench Width:

Sewer & Drainage:	12" min., 18" max + pipe O.D. for 4" to 18" dia. pipe
Gas:	8" + pipe O.D.
Water (Domestic):	8" + pipe O.D.

E. Common Trench Requirements:

1. Copper piping or metal gas piping shall not be installed in a common trench with any other dissimilar.
2. Multiple parallel lines of piping in a common trench shall be separated a minimum of 12 inches, both horizontally and vertically, between individual pipes.
3. Domestic water piping shall not run parallel in a common trench with sewer of drainage lines.
4. Electrical power and communications conduit, etc. shall not be run in a common trench with sewer, drainage, water or gas piping.

F. Additional provisions for Underground Piping within Building Areas: Refer to applicable specification sections of Division 15 and as indicated on drawings.

G. Requirements for Underground Electrical and Communications Conduit, Ducts, etc.: Refer to applicable specification sections of Division 23 and as indicated on drawings.

3.02 BEDDING AND BACKFILLING OF TRENCHING

A. Bedding: Lay and bed pipe in compacted select bedding sand of thickness specified above, and backfill with same material to a height of 8” above top of pipe. Place in 8” layers and compact to a minimum relative density of 90 percent. Compact in a manner that will not displace or damage pipe.

1. Excavate under bell portions of the piping for uniform bearing.
2. Conduits and ducts which are laid in a single layer, parallel and in same horizontal plane and which are not concrete encased, shall have bedding as specified above. Select sand bedding for multi-layered banks of unencased conduit shall be water settled but not flooded to fill voids between conduits with sand.

B. Backfilling: Trenches above top of bedding, and concrete encased utilities, shall be backfilled with select backfill material at optimum moisture content, placed in 6 to 8 inch layers and compacted to a

minimum relative density of 90 percent. Trench backfill in pavement or other areas where compaction greater than 90 percent is required shall be compacted in accordance with those requirements to specified depth.

C. Do not backfill until installation has been approved. Promptly install pipe after trenching has been done to keep excavation open as short a time as possible.

D. Underground utility materials requiring special bedding and backfilling methods shall be installed as recommended in conjunction with these materials or as indicated on drawings.

3.03 PROTECTION OF WORK FROM FLOODING

A. Construct all temporary ditches and berms and supply and maintain adequate pumps, piping, and other equipment necessary to protect work, existing structures, and equipment, and to other property located on premises or adjacent thereto, from damage by flooding due to rain or subsurface water. Utility lines shall not be laid in trenches which contain water or that are muddy.

3.04 SITE CLEANUP

A. All excess and unsuitable excavated material shall be removed from site.

3.05 FIELD QUALITY CONTROL

A. Obtain Soils Engineer’s approval for excavation, fill materials, method of placing and compaction. Soils Engineer will perform tests to evaluate compliance with specifications.

END OF SECTION 31 23 33

SECTION 32 13 00 SITEWORK CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division 01 apply to this Section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Sitework Concrete, as indicated on the Drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following.

1. Cast-In-Place concrete sidewalks.
2. Curbs and gutters.
3. Interior and exterior raised concrete planters and benches.
4. Concrete Pavers

C. Related Sections:

1. Section 31 22 19 Finish Grading

1.02 REFERENCES

A. ASTM A185 – Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
B. ASTM A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
C. ASTM C33 – Concrete Aggregates.
D. ASTM C94 – Ready-mixed Concrete.
E. ASTM C150 – Portland Cement.
F. ASTM C171 – Sheet Materials for Curing Concrete.
G. ASTM C979 – Pigments for Integrally Colored Concrete.
H. ASTM D1751 – Preformed Expansion Joint Fillers for Concrete, Paving and Structural Construction.
I. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
J. Chapter 19A, California Building Code.

1.03 ACCESSIBILITY REQUIREMENTS

A. Concrete paving shall be stable, firm, and slip resistant and shall comply with CBC Section 11B-302 and 11B-403.
B. Stairs

1. The radius of curvature at the leading edge of the read shall be no greater than ½". Nosings that project beyond risers shall bave the underside of the leading edge curved or beveled. The maximum angle for a riser to slope under the tread shall be 30 degrees from vertical. Nosings shall extend 1 ¼" maximum over the tread below
2. Treads shall be 11" deep minimum. Risers shall be 7" high maximum and 4" high minimum. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Open risers are not permitted.

C. Detectable Warning Surfaces

1. Detectable warning surfaces shall comply with CBC Section 11B-705.1.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00, Submittal Procedures.

B. Layout Drawings: Provide layout drawing showing location of each type of pavement and construction, and dimensioned locations of expansion and control joints. Do not deviate from location of expansion joints and control joints shown on the drawings.

C. Design Mixtures: Provide design mix for each concrete mixture. Design mix shall include data substantiating the reliability of the proposed mix. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Each design mixture shall be stamped and signed by a registered professional engineer licensed in the state of California.
2. Indicate amounts of mixing water to be withheld for later addition at project site.

D. Product Data

1. Expansion material
2. Curing materials

E. Site Samples

1. Prepare samples indicating slab construction and finish, at the site, cast in the directed locations and orientations. Prepare a minimum 8 foot square sample of each texture and finish required for the project. Include a transverse expansion joint, control joints and edging. Where paving adjoins other material such as pavers, include one edge of sample constructed of the other materials.
2. Approved samples may be part of permanent construction if the sample meets all project requirements and is approved.

1.05 QUALITY ASSURANCE

A. Sitework Concrete work subject to the provisions of Section 01 45 24, Testing and Inspection Requirements, at the option of the Architect.

B. Maintain one copy of all records on site.

C. Acquire cement and aggregate from same source for all work.

D. Conform to Section 1904A.1of CBC and 5.13 of AC1 318-11 when concreting during hot weather.

E. Conform to Section 1904A.1of CBC and 5.12 of AC1 318-11 when concreting during cold weather. No pouring permitted below 40 degrees Fahrenheit.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded sleeves, utilities and components which are concealed from view.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Cement: ASTM C150 – Type V Portlant Type, one manufacturing plant only.

B. Aggregates: ASTM C33, single source for all materials.

C. Water: Clean, fresh and potable

2.02 ACCESSORIES

A. Expansion joints:

1. Expansion Joint Filler – ASTM D1751: Close cell bituminous saturated fiberboard, ½ inch thick; FIBER EXPANSION JOINT manufactured by The Burke Co., Montebello, CA, or approved equal.
2. Joint Devices: Integral extruded polystyrene plastic; ½ inch thick, with removable top strip exposing sealant trough; JOINT CAPS, manufactured by The Burke Company, or equal.
3. Sealant: Polyurethane two-component type, self leveling, for level surface application, UREXPAN NR-200, manufactured by the Pecora Corp., Harleysville PA, or equal. Color shall be selected by the Architect from manufacturer's standard list of colors.
4. Sealant Primer: As recommended by Sealant Manufacturer.

2.03 CONCRETE MIX

A. Mix and deliver concrete in accordance with Section 1905A, California Building Code.

1. Deliver concrete in transit mixers only. Mix concrete for 10 minutes minimum at a peripheral drum speed of approximately 200 feet per minute. Mix at jobsite minimum 3 minutes. Discharge loads in less than 1-1/2 hours or under 300 revolutions of the drum, whichever comes first, after water is first added.
2. Design Mix: Conform to 1904A.2 California Building Code.
3. A registered civil engineer 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 under this provision.
4. Selection of Concrete Proportions: Concrete proportions shall be determined in accordance with the provisions of ACI 318, Section 5.2.
5. Quantities of Materials: Provide Weighmaster's Certificate for each load of concrete.
6. Do not exceed 0.45 water-cement ratio, by weight.
7. Concrete shall be mixed by transit mixers only.

B. Required Strength: Minimum 4,500 psi for sitework concrete.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 40 ksi yield grade; deformed billet steel bars, uncoated finish.

B. Welded Steel Wire Fabric: Plain type, ASTM A185; in flat sheets; uncoated finish, 6 x 6 inch, No. 6 gage.

C. Tie Wire: Annealed steel, minimum 16 gage size.

D. Dowels: ASTM A615; 40 ksi yield grade, deformed steel, uncoated finish.

E. Fiber Reinforced Concrete

1. FIBERMESH 150: ASTM C 1116/C 1116M, Type III Fiber Reinforced Concrete. Manufactured by PROPOX CONCRETE SYSTEMS. 100% virgin homopolymer polypropylene multifilament fibers containing no reprocessed olefin materials. Provide 1.0 – 1.5 lbs. per cubic yard.
2. FIBERMESH 650: ASTM C 1116/C 1116M, Type III Fiber Reinforced Concrete. Manufactured by PROPOX CONCRETE SYSTEMS. Alloy polymer macro-synthetic fiber featuring e3 patented technology manufactured to an optimum gradation and highly oriented to allow greater surface area contact within the concrete resulting in increased interfacial bonding and flexural toughness efficiency. Provide a minimum of 3.0 lbs. per cubic yard

2.05 CURING MATERIALS

A. Polyethylene Film ASTM C171; 8 mil thick, clear, manufactured from virgin resin with no scrap or additives. POLYETHYLENE, No. 227, manufactured by The Burke Co., Montebello, CA, or equal.

B. Water: Potable and not detrimental to concrete.

C. Curing Compound: ASTM C309; wax resin base, WHITE PIGMENTED CURING COMPOUND, by The Burke Co., Montebello, CA, or equal.

2.06 COLORED CONCRETE

A. Provide colored concrete as marked on the AS (Architectural Site) Sheets. Colored concrete shall be as selected by Architect from the DAVIS COLORS color chart. Color Group: Standard.

2.07 PAVERS

A. Concrete Pavers shall be WAUSAU TILE Type 3, 24” x 24” x 2 ¾”. Provide (2) colors: FDX 5008 Tan and FDX 3008 Gray.

B. Pavers for ADA curb ramps shall be WAUSAU TILE ADA-1 Precast Concrete Truncated Domes, 24” x 24” x 2 ¾”. Color shall be Yellow 33538 per Federal Standard 595B.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site concerns.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer’s instructions.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer’s written instructions. Remove sharp projections.

3.03 PLACING CONCRETE (GENERAL)

A. Convey and deposit concrete in accordance with Section 1905A, California Building Code. Remove loose dirt from excavations.

B. Notify Job Inspector minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and accessories are not disturbed during concrete placement.

D. Ensure sub-base or base materials have been compacted or otherwise treated.

E. Install joint fillers, primer and sealant in accordance with manufacturer's instructions.

F. Place concrete continuously between predetermined expansion joints.

G. Do not interrupt successive placement; do not permit cold joints to occur. Avoid segregation of materials. Perform tamping and vibrating so as to produce a dense, smooth application free of rock pockets and voids. Do not use vibrators to move concrete horizontally.

H. Do not allow concrete to fall free from any height which will cause materials to segregate. Maximum height of free fall permitted in any case: 5 feet.

I. Defective Installation: Repair and clean at Contractor's expense all concrete damaged or discolored during construction. Where concrete requires repair before acceptance, the repair shall be made by removing and replacing entire section between joints and not by refinishing the damaged portion.

J. Proper curing of concrete surfaces is the responsibility of the Contractor. Concrete failing to meet specified strength shall be removed and replaced.

3.04 ON-SITE CONCRETE SIDEWALKS AND RAMPS

A. Forms, Wood: Free from warp, with smooth and straight upper edges, surfaced one side, minimum thickness 1-1/2 inches adequate to resist springing or deflection from placing concrete.

B. Forms, Metal: Gage sufficient to provide equivalent rigidity and strength.

C. Reinforcement: Unless indicated otherwise on the drawings, provide welded steel wire fabric, 6 inches by 6 inches, No. 6 gage at mid-height of sidewalks and ramps. Interrupt reinforcement at expansion joints.

D. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete for entire length of pour. Strike off upper surface to specified grades.

E. Expansion Joint: Locate joint filler as shown on drawings or at maximum 60 feet centers and where slabs join vertical surfaces. Install vertically, full depth of concrete leaving plastic cap at ½ inch depth at top for sealant application.

1. Provide ½ inch diameter greased steel dowels, 12 inches long at expansion joints with one end of dowel lubricated to allow for longitudinal movement. Spacing: 16 inches on center maximum, 6 inches from edges.
2. Remove plastic caps. Prime both sides of joint and apply self-leveling sealant. Provide smooth concave surface.

F. Control Joints – Saw Cut: After floating and finishing, saw cut concrete to a depth of: depth of concrete/4. Curved or non-aligned joints not acceptable. Sealant application not required. Space joints 12 ft maximum oc both ways or as patterned on the drawings.

G. Finish:

1. Screed concrete to required grade, float to a smooth, flat, uniform surface. Edge all headers to ¼ inch radius. Edge expansion joints to ¼ inch radius. Steel trowel to hard surface.
2. Grades less than 6 percent: After final troweling, apply a medium hard broom finish transverse to centerline or direction of traffic.
3. Grades 6 percent or more: Apply slip resistant heavy broom finish and remark as necessary after final finish to assure neat uniform edges, joints and score lines.
4. Walkway grades in excess of five percent shall conform to Section 1133B.7, California Building Code.

H. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over slab areas and maintain wet for 7 days.
2. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive paving units of any kind.

3.05 RAISED PLANTER, BENCHES AND SIMILAR SITE STRUCTURES

A. Forms: Suitable material and type, size, shape, quality and strength to insure construction as designed, true to line and sufficiently rigid to resist deflection during placing of concrete. Clean forms of all dirt, mortar and foreign matter before use.

B. Reinforcement: Refer to drawings for size and spacing. Place accurately and hold in position, using metal chairs, spacers, metal hangers, supporting wires and other devices of sufficient strength to resist crushing under full load. Clean reinforcing steel of mortar, oil, dirt, loose or thick rust and coatings.

C. Coordinate installation of conduits or other inserts.

D. Finish: Provide a smooth, straight, plumb and acceptable finish without burrs or form marks. Cement sacking is not acceptable.

E. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over slab areas and maintain wet for 7 days.
2. Spread polyethylene film over slab areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator. Do not apply liquid curing compound to surfaces scheduled to receive paving units or finish of any kind.

3.06 CURB AND GUTTER

F. Subgrade Preparation: Subgrade material, base material and compaction requirements as approved by the Geotechnical Engineer.

G. Forms: Single face type required, cut to conform exactly with face batter and radius, sufficiently rigid to resist springing or deflection from concrete placement. Clean forms of all loose dirt, mortar or similar materials and apply a light coating of oil or other suitable material prior to concrete placement.

1. Slip Forms: contractor's option upon approval of the Architect.

H. Reinforcement: Refer to drawings for size and spacing. Interrupt reinforcement at expansion joints.

I. Concrete Placement: Dampen subgrade to retain moisture in concrete mix. Tamp and spade to consolidate concrete to entire length of pour. Strike off upper surface to specified grades. Cut drain pipies to conform to curb batter.

J. Expansion Joints: Locate joint filler as shown on drawings, or at maximum 20 foot centers. Trim off excess filler material flush to finish surface. No sealant application required.

K. Finish: Trowel to a smooth and even finish with a fine hair broom applied parallel with the line of the work. Round all edges to ½ inch radius. No Contractor identification permitted.

L. Curing: Cure surfaces utilizing one of the following methods:

1. Spraying: Spray water over curb and gutter and maintain wet for 7 days.
2. Spread polyethylene film over areas, lapping edges and sides, minimum 6 inches and sealing with pressure sensitive tape; cover with plywood or otherwise protect film from damage; maintain in place for 7 days.
3. Apply liquid curing compound at rate of 200 sf per gallon, using power sprayer equipped with agitator.

END OF SECTION 32 13 00

SECTION 33 11 16 - SITE WATER DISTRIBUTION PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of Work: The work under this section includes furnishing all labor, materials, and equipment and performing all operations in connection with the Site Water Distribution Piping, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes but is not limited to:

1. Water piping.
2. Valves and valve boxes.
3. Hydrants with valves.
4. Lateral services extended to 5-feet from building.
5. Connections of laterals to existing mains.
6. Connection of building water system to laterals 5-feet from building.
7. Testing and sterilization.

C. Related Work Not in This Section:

1. Section 31 23 33: Trenching and Backfilling.

1.02 SUBMITTALS

A. Material List: Submit list of materials proposed for use accompanied by manufacturer's latest printed literature with technical data.

B. Certificates: Manufacturer's certification that materials meet specified requirements.

1.03 QUALITY ASSURANCE

A. Comply with the following codes and regulations:

1. Plumbing code: Applicable portions of California Plumbing Code pertaining to plumbing materials, construction, and installation of products.
2. ANSI: Applicable American National Standards pertaining to products and installation of domestic water piping systems.
3. American Water Works Association (AWWA) where noted.
4. UL and FM: Provide valves used in fire protection piping, which are UL listed and FM approved.
5. Greenbook Section 306.
6. Local fire department regulations pertaining to fire protection systems.
7. NFPA 24 2016 edition.

B. Manufacturers: Firms regularly engaged in manufacture of water piping systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

C. Inspection and Testing:

1. Refer to Section 31 23 33, Trenching and Backfill for Compaction of Trenching.

1.04 RECORD DRAWINGS

A. Provide complete record drawings showing dimensioned locations and depths of all piping, and exact locations of all accessories.

PART 2 - PRODUCTS

2.01 PIPE

A. Poly Vinyl Chloride (PVC) Plastic Pipe: Manufactured of material conforming to ASTM D1784, class 12454B, designated as PVC 1120 in ASTM D1795.

1. Pipe 4 inches through 12 inches diameter: Pipe, couplings, and fittings 4 inch through 12 inch diameter shall conform to requirements of AWWA C900, Class 150, CIOD pipe dimensions only, elastomeric gasket joint only, unless otherwise indicated or specified.

2.02 FITTINGS AND SPECIALS

A. For Poly Vinyl Chloride (PVC) Pipe:

1. For Pipe 4 inch through 12 inch diameter: Fittings and specials shall be cast iron, bell end in accordance with AWWA C110, 150 psi pressure rating unless otherwise indicated or specified, except that profile of bell may have special dimensions as required by pipe manufacturer, or may be fittings and specials of same material as pipe with elastomeric gaskets, all in conformance with requirements of AWWA C900. Cast-iron fittings and specials shall be cement-mortar lined (standard thickness) in accordance with ANSI A21.4. Fittings shall be for bell and spigot pipe or plain end pipe, or as applicable.

2.03 JOINTS

A. PVC Pipe: Joints for pipe, fittings and couplings for pipe shall match the specified pipe. Joints connecting pipe of differing materials shall be made in accordance with manufacturer’s recommendation.

2.04 VALVES

A. Gate valves shall be designed for a working pressure of not less than 150 psi and conform to AWWA C509. Valve connections shall be as required for piping in which they are installed. Valves shall have a clear waterway equal to full nominal diameter of valve, and shall be opened by turning counterclockwise. Operating nut or wheel shall have an arrow cast in the metal, indicating direction of opening.

1. Valves 3 inches and larger shall be iron body, bronze mounted, and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.
2. Cast iron wedge shall have sealing surfaces of the wedge permanently bonded with resilient material to meet ASTM tests for rubber to metal bond ASTM D429. All body bolts shall be type 316, stainless steel. Valves shall be Mueller “RS” or equal. All underground valves shall be NS and all above ground valves shall be OS&Y.

B. Check valves: Swing type spring loaded, 200 psig working pressure, seat readily and tightly with the face of the closure elements made of a non-corrodible material such as bronze composition conforming to ASTM B62.

C. Valve Boxes: Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. Cast-iron boxes shall be extension type with slide-type adjustment and with flared base. Minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be standard product of a manufacturer of precast concrete equipment. Word "WATER" shall be cast in cover. Boxes shall be of such length as will be adapted, without full extension, to depth of cover required over pipe at valve location. The valve box and the installation of the gate valve shall conform to AWWA C509.

2.05 FIRE HYDRANTS AND APPURTENANCES

A. Fire hydrants: Conforming to AWWA Specifications C503, wet barrel design, equipped with a 6" flange inlet connection, two 2-1/2" outlet and a 4" suction outlet with National Standard thread. Provide 6" diameter bury, with joint to match pipe joints. The extension piece of the hydrant shall be of such length that the hydrant barrel bottom flange or top hydrant bury shall be 3" above the top of the sidewalk or curb grade. Apply two coats of paint (OSHA "Yellow" #633). The outlets of all fire hydrants, including operating nuts and threads, shall be as approved by the serving fire department. Apply a field coat of paint to all hydrants after installation.

B. Post indicators: U.L. approved type.

C. Tracer Wire for Non-Metallic Piping: Tracer wire shall be bare copper or aluminum wire not less than 0.10 inch in diameter and shall be provided in sufficient length to be continuous over all runs of non-metallic piping.

D. Pipe bedding and backfill shall conform to requirements of Subsections 306-1.2 and 306-1.3 of the Standard Specifications.

E. Thrust blocks: Portland cement concrete conforming to requirements of Section 03 31 13.

PART 3 – EXECUTION

3.01 TRENCH EXCAVATION

A. Perform all excavation for the construction of trenches and all additional excavation required for structures forming a part of the pipeline. Trench excavation shall conform to the requirements of Section 31 23 16 of Standard Specifications.

B. Trenches shall be inspected by the Soils Engineer before proceeding with the work.

3.02 INSTALLATION OF PIPE

A. Handling: Pipe and accessories shall be handled to insure delivery to trench in sound, undamaged condition. Particular care shall be taken not to injure pipe coating or lining. If coating or lining of any pipe or fitting is damaged, repair shall be made by Contractor at his expense in a satisfactory manner. No other pipe or material of any kind shall be placed inside a pipe or fitting after coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on bare ends of pipe, Interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, pipe shall be examined for defects. Material found to be defective before or after laying shall be replaced with

sound material without additional expense to the Owner. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place. Poly vinyl chloride pipe and fittings shall be handled and stored in accordance with manufacturer's recommendations.

B. Cutting of Pipe: Cutting of pipe shall be done in a neat and workmanlike manner without damage to pipe. Unless otherwise recommended by manufacturer, cutting shall be done with an approved-type mechanical cutter. Wheel cutter shall be used when practicable. Copper tubing shall be cut square and all burrs shall be removed.

C. Sewer and Irrigation Lines: Where location of water pipe is not clearly defined in dimensions on drawings, water pipe shall not be laid closer horizontally than 10'-0" clear from a sewer or irrigation line except where bottom of water pipe will be at least 12 inches above top of sewer or irrigation pipe, in which case water pipe shall not be laid closer horizontally than 6'0" from sewer or irrigation. Where water lines cross under gravity flow sewer lines, sewer pipe for a distance of at least 10'-0" each side of crossing shall be fully encased on concrete or shall be made of pressure pipe with no joint located within 3'-0" horizontally of crossing.

D. Joint Deflection:

1. Flexible Plastic Pipe: Maximum offset in alignment between adjacent pipe joints shall be recommended by manufacturer, but in no case shall it exceed 5 degrees.

E. Placing and Laying:

1. Pipe and accessories shall be carefully lowered into trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of water-line materials be dropped or dumped into trench, care shall be taken to avoid abrasion of pipe coating. Except where necessary in making connections with other lines, pipe shall be laid with bells facing in direction of laying. Full length of each section of pipe shall rest solidly upon pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has grade or joint disturbed after laying shall be taken up and relied. Pipe shall not be laid in water or when trench conditions are unsuitable for work. Water shall be kept out of trench until jointing is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter pipes or fittings. Where any part of coating or lining is damaged, repair shall be made by Contractor at his expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as indicated.
2. PVC shall be installed in accordance with AWWA M23.

F. Jointing:

1. PVC Pipe: Pipe 4 inch through 12 inch diameter shall have elastomeric gasket joints as specified in AWWA C900. Jointing procedure shall be as specified for pipe less that 4 inch diameter with configuration utilizing elastomeric ring gasket.
2. Connections between different types of pipe and accessories shall be made with transition fittings approved by the Owner.

G. Service Lines: Service lines shall include pipeline connecting building piping to water distribution lines at a point approximately 5'-0" outside building. All valves shall be provided with extension service boxes of lengths required. Service lines shall be constructed in accordance with following requirements:

1. Service lines 2 inches in size shall have a gate valve.
2. Service lines larger than 2 inches shall be connected to main by a rigid connection and shall have a gate valve.

3.03 SETTING OF FIRE HYDRANTS AND VALVES AND VALVE BOXES

A. Fire hydrants shall be located and installed as indicated. Each hydrant shall be connected to main with a 6 inch branch line, unless otherwise shown, having at least as much cover as distribution main. Hydrants shall be set plumb with pumper nozzle facing roadway and with center of lowest outlet not less than 18 inches above finished surrounding grade, and operating nut not more than 48 inches above finished surrounding grade. Hydrant shall be set upon a slab or concrete not less than 4 inches thick and 15 inches square. Concrete thrust blocks shall be installed at all fire hydrants as shown on drawings.

B. Valves and valve boxes shall be installed where indicated or specified and shall be set plumb. Valve boxes shall be centered on valves. Boxes shall be installed over each outside gate valve unless otherwise indicated. Earth fill shall be carefully tamped around each valve box to undisturbed trench face.

C. Valves and hydrants after delivery shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and hydrant or valve shall be fully opened and fully closed to insure that all parts are in working condition.

3.04 THRUST BLOCKS

A. Plugs, caps, tees and bends of deflecting 22-1/2 degrees or more, either vertically or horizontally, on water lines 6 inches in diameter or larger, and fire hydrants shall be provided with thrust blocking, or metal tie rods and clamps or lugs, as directed. Valves shall be securely anchored or shall be provided with thrust blocking to prevent movement. Thrust blocking shall be concrete of a mix not leaner than 1 cement: 2-1/2 sand: 5 gravel, and having a compressive strength of not less than 2,000 psi after 28 days. Blocking shall be placed between solid ground and hydrant or fitting to be anchored. Unless otherwise indicated or directed, base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. Sides of thrust blocks not subject to thrust may be poured against forms. Area of bearing shall be as indicated or as directed. Blocking shall be placed so that fitting joints will be accessible for repair. Steel rods and clamps shall be protected by galvanizing or by coating with bituminous paint.

B. The area of the thrust blocks shall conform to the following table:

Size	Fitting	Area
10 inch	90 degree ell	13.68 square feet
	45 degree ell	7.41 square feet
	Valves, tees, dead ends	9.68 square feet
8 inch	90 degree ell	9.10 square feet
	45 degree ell	4.92 square feet
	Valves, tees, dead ends	6.43 square feet
6 inch	90 degree ell	5.29 square feet
	45 degree ell	2.86 square feet
	Valves, tees, dead ends	3.74 square feet

3.05 HYDROSTATIC TEST

A. Where any section of a water line is provided with concrete thrust blocking for fitting or hydrants, hydrostatic tests shall not be made until at least five (5) days after installation of concrete thrust blocking unless otherwise approved. Method proposed for disposal of waste water from hydrostatic tests and disaffection shall be submitted to the Architect for approval prior to performing hydrostatic tests.

B. Pressure Tests: After pipe is laid, joints completed, fire hydrants permanently installed, and trench partially backfilled leaving joints exposed for examination, newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for one hour to a hydrostatic pressure test of 200 psi. Each valve shall be opened and closed several times during test. Exposed pipe, joints, fittings, hydrants, and valves shall be carefully examined during partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants, and valves discovered in consequence of this pressure test shall be removed and replaced with sound material, and test shall be repeated until test results are satisfactory. Piping and specials requiring replacement disclosed by hydrostatic tests and all work connected therewith shall be at Contractor's expense.

C. Leakage Test: Leakage test shall be conducted after pressure tests have been satisfactorily completed. Duration of each leakage test shall be at least two hours; and during test, water line shall be subjected to 200 psi pressure. Leakage is defined as quantity of water to be supplied into the newly laid pipe, or any valved or approved section thereof necessary to maintain specified leakage test pressure after pipe has been filled with water and the air expelled. No piping installation will be accepted until leakage is less than number of gallons per hour as determined by formula:

L = 0.000135 IND (P raised to ½ power) for all pipe materials.

1. In which L equals allowable leakage in gallons per hour; N is number of joints in length of pipeline tested; D is nominal diameter of pipe in inches; and P is average test pressure during leakage test, in psi gauge.
2. If any test of pipe discloses leakage greater than that specified in foregoing table, defective joints shall be located and repaired until leakage is within specified allowance.

D. Time for Making Test: Except for joint material setting or where concrete reaction backing necessitates a five day delay, pipelines jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill. Cement-mortar lined pipe may be filled with water as recommended by manufacturer before being subjected to pressure test and subsequent leakage test.

E. Concurrent Hydrostatic Tests: Contractor may elect to conduct hydrostatic tests using either or both of the following procedures. Regardless of sequence of tests employed, results of pressure tests, leakage tests, and disinfection shall be satisfactory as specified. All replacement, repair, or retesting required shall be accomplished by Contractor.

1. Pressure test and leakage test may be conducted concurrently.
2. Hydrostatic tests disinfection may be conducted concurrently, using water treated for disinfection to accomplish hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of unit, disinfection shall be reaccomplished.

3.06 DISINFECTION

A. Before acceptance of potable water operation, each unit of completed water line shall be disinfected as prescribed by AWWA C651 and Section 22 00 00, Paragraph 3.12 – Sterilization. Unit will not be accepted until satisfactory bacteriological results have been obtained. The system shall not be

connected to CSA 64's facilities prior to disinfection and acceptance by the General Manager of CSA 64.

3.07 CLEANING

A. At all times, maintain premises free from accumulation of debris, waste materials, unusable materials, together with excess equipment, tools and other implements of service resulting from work of this section.

B. Debris, waste, or unused construction materials shall not be used for fill or backfill.

END OF SECTION 33 11 16

SECTION 33 31 00 SANITARY SEWERAGE PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Provisions of General Conditions, Supplementary Conditions, and Division One apply to this section.

B. Scope of work: The work under this section includes furnishing all labor, materials, and equipment, and performing all operations in connection with Sanitary Sewerage Piping, as indicated on the drawings, specified herein, or reasonably required to complete the work. The work includes, but is not limited to the following:

1. Sanitary sewer work as follows:

a. Sanitary sewer pipe and fittings.
b. Lateral services extended to 5-feet from building.
c. Connections of laterals to existing mains or municipal sewer system.
d. Connection of building sewer system to laterals 5-feet from building.

C. Related Section:

1. Section 31 23 33: Trenching and Backfilling

1.02 SUBMITTALS

A. Layout Drawings: Submit drawings for layout of piping systems. Indicate locations of fittings and other accessories on layout drawings; detail cleanouts. Do not deliver pipe, fittings, and accessories until layout drawings have been approved.

B. Manufacturer’s Data: Submit manufacturer’s standard drawings or catalog cuts of the following items:

1. Fittings.
2. Joints and couplings.
3. Piping.

C. Standards Compliance: Submit manufacturer’s certificates of conformance or compliance for each of the following materials which are specified to conform to publications referenced under paragraph “Materials” in this section:

1. Pipe and fittings, including factory-applied linings.
2. Pipe joint materials.

1.03 QUALITY ASSURANCE

A. All tests required by the applicable referenced publications shall have been performed, whether specified in that publication to be mandatory or otherwise. For tests which are not specified in the referenced publication to be performed at definite intervals, during manufacture, the tests shall have been performed within three years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

1.04 RECORD DRAWINGS

A. Provide complete record drawings showing dimensioned locations and depths of all piping, and exact locations of all accessories.

1.05 INSPECTION AND TESTING

A. Inspection: Soils engineer will inspect and test the backfilling work of this section. Notify soils engineer prior to commencement of work.

B. Testing: Soils engineer will make tests to determine degree of compaction in accordance with Section 31 23 33, Trenching and Backfilling.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Sewer pipe shall be polyvinyl chloride (PVC) plastic pipe, as indicated on the drawings.

2.02 MATERIALS

A. Pipe and Fittings:

1. PVC Plastic Piping: Conform to ASTM D3033 or D3034, shall be SDR 35, with ends suitable for elastomeric gasket joints.

B. Pipe jointing materials:

1. For polyvinyl chloride plastic piping: Joints shall conform to ASTM D3212. Gaskets shall conform to ASTM F477.

C. Cleanouts: In accordance with the drawings, of the sizes and at locations indicated. Cleanouts shall be iron body type with extra heavy bronze plugs. Cleanouts shall be as manufactured by Acorn Engineering Co., J.R. Smith Mfg. Co., or F.A. Zurn Mfg. Co., as follows:

1. Areas Surfaced with Concrete: Acorn No. 120-11, Smith No. 4240, or Zurn Z-1326-10 with non-skid polished nickel bronze cover set flush with surface.
2. Area Surfaced with Asphaltic Concrete Paving and Non-Surfaced Areas: Acorn No. 120-10, Smith No. 4240, or Zurn Z-1326-10 with extra heavy cast iron non-skid cover.

D. Yard boxes shall be concrete, approximately 12 inches wide, 18 inches long, and 12 inches deep or larger (outside dimensions) as required. Covers for yard boxes in paved areas shall be checkered cast iron covers. Other covers shall be plain concrete covers.

2.03 PIPE JOINTS

A. As specified by manufacturer.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Location of Piping: Where the location of the sewer is not clearly defined by dimensions on the drawings, lay sewer line not closer horizontally than 10 feet from a water main or service line. Where sanitary sewer lines pass above water lines, encase sewer in concrete for a distance of 10 feet on each side of the crossing, or substitute rubber-gasketed pressure pipe for the pipe being used for the same distance. Where sanitary sewer lines pass below water lines, lay pipe so that no joint in the sewer line will be closer than 3 feet, horizontal distance, to the water line. Install a continuous length of tracer wire for the full length of nonmetallic pressure pipe. Attach wire to top of pipe in such a manner that it will not be displaced during construction operations.

B. Survey Line and Grade: Grade controls and survey lines shall be provided by a licensed land surveyor obtained by the Contractor.

C. Pipe Laying and Jointing: Each pipe and fitting will be inspected before and after installation and those found defective will be rejected. Provide proper facilities for lowering sections of pipe into trenches. Lay non-pressure pipe with the bell or groove ends in the upgrade direction. Adjust spigots in bells and tongues in grooves to give a uniform space all around. Blocking or wedging between bells and spigots or tongues and grooves will not be permitted. Replace by one of the proper dimensions any pipe or fitting that does not allow sufficient space for proper caulking or installation of joint material. At the end of eah day's work, close open ends of pipe temporarily with wood blocks or bulkheads.

D. Connections to Existing Lines: Make connections to existing lines in an approved manner. Conduct work so that there is minimum interruption of service to existing line.

3.02 EXCAVATION AND TRENCHING

A. Perform necessary trenching, excavation, shoring, and backfilling required for proper laying of pipe lines in accordance with Section 31 23 33. Trenching and Backfilling. Bottoms of trenches shall be cut to grade, and bell holes shall be excavated to insure the pipes bearing for their entire length upon the outside periphery of the lower third of the pipe.

3.03 INSTALLATION OF PIPE

A. Construct pipe lines of full length sections of pipe specified. Short sections allowed only when run requires less than one full length of pipe.

B. Install horizontal sewer and drainage pipe to a uniform grade between elevations indicated on the drawings or ¼ inch per foot minimum where not indicated.

C. Sewer lines shall be installed prior to the installation of any other utility lines within the area.

D. Sewer pipe shall be constructed beginning at the lowest point of connection or discharge, and laying the pipe continuously upstream. Lay bell and spigot pipe with the bell end upstream.

3.04 SPECIAL REQUIREMENTS FOR INSTALLATION OF PVC PLASTIC PIPING

A. Install pipe and fittings in accordance with the general requirements for installation of pipelines and with the requirements of UNI-B-5 for laying and joining pipe and fittings.

B. Make joints with the gaskets previously specified for joints with this piping; assemble these joints in accordance with the requirements of UNI-B-5 for assembly of joints. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

3.05 INSTALLATION OF CLEANOUTS

A. Install cleanouts at all locations where shown on drawings. Cleanouts in lines up to and including 8 inches shall be the same size as the pipeline. In lines larger than 8 inches, use an 8 inch riser.

B. After lines are tested and approved, each cleanout plug shall be removed, coated with approved emulsified lead paste, and replaced so as to be gas and water tight.

3.06 YARD BOXES

A. Provide yard boxes for all cleanouts except in concrete paved areas. Yard boxes shall be set flush with finished grade. A 4-inch thick concrete pad shall be poured under all yard boxes.

3.07 BACKFILL AND COMPACTION

A. Perform in accordance with requirements of Section 31 23 33, Trenching and Backfilling, and with Section 306-1.3 of the Greenbook. In backfilling the trench, take all necessary precautions to protect the pipe from damage or shifting.

3.08 CONNECTIONS TO EXISTING MAINS

A. Where connections are made between new work and existing mains, the connections shall be made by using special couplings, Rockwell Clamp and Coupling-Tapping Sleeves, and other fittings to suit the on-site conditions. Methods of connections to existing mains shall be as required by local codes.

3.09 FIELD TESTS AND SURVEYS

A. General: Conduct field tests in presence of Architect, as specified herein.

1. Pipelines: Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line.

a. Leakage Tests: Test lines for leakage by exfiltration test. Fill the line to be tested with water so that the head will be at least 4 feet above top of pipe at upper end of pipeline section being tested. Allow filled pipeline to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, re-establish the head and measure amount of water needed to maintain this water level during a two-hour test period. Amount of leakage, as measured by either infiltration or exfiltration test shall not exceed 0.2 gallon per inch of diameter per hour per 100 feet of pipeline. When leakage exceeds the amount specified, make satisfactory correction and retest pipeline section in the same manner as previously specified. Correct all visible leaks regardless of leakage test results.

b. Deflection Testing: Make a deflection test an entire length of installed plastic pipeline on completion of all work adjacent to and over the pipeline, including leakage tests, backfilling, placement of fill, grading, paving, concreting, and any other superimposed loads. Deflection of pipe in the installed pipeline under all external loads shall not exceed 4.5 percent of the normal inside diameter of pipe. Testing may be by either pull-through device or deflection measuring device.

B. Provide verification survey for complete pipeline, manholes and accessories. Show locations of lines, invert elevations, and locations of manholes.

3.10 CLEANUP

A. Upon completion of work, leave the site clean and clear of debris and construction materials.

END OF SECTION 33 31 00