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GENERAL CONDITIONS (51 PAGES)

*If the following items are not returned at the time of the bid opening, the bidder will be declared nonresponsive

+Items which successful bidder must submit after the award
NOTICE CALLING FOR BIDS

District: SOUTH ORANGE COUNTY COMMUNITY COLLEGE DISTRICT

Project: BID NO. 2031: BGS Fire Repairs Project

Bid Deadline: 2:00 P.M., February 24, 2015

Mailing Address & Place of Bid Receipt:
South Orange County Community College District
Health Sciences Building, 3rd Floor, Room HS-357
Purchasing & Facilities Planning Department
28000 Marguerite Parkway
Mission Viejo, CA  92692

NOTICE IS HEREBY GIVEN that the South Orange County Community College District, of Orange County, California, acting by and through its Governing Board, hereinafter referred to as "DISTRICT," will receive up to, but not later than, the above-stated time, sealed bids for the award of a contract for the above Project.

Project’s Preliminary Cost Estimate: BGS Fire Repairs Project. $565,590

Complete description, specifications and general conditions may be viewed at the Office of the Director of Facilities Planning and Purchasing Department at the above address, telephone (949) 582-4678 or previewed on-line at www.socccd.edu at the Bids link. Interested bidders may purchase complete bid documents from Repro X-press, 18207 McDurmott St., Suite I, Irvine, CA 92614, Phone: (866) 364-8569, Fax: (949) 336-7757. Payment will not be refunded, and the Project Documents are not required to be returned.

There will be a mandatory job walk and conference at 9:00am, on Wednesday, February 11, 2015 starting in BGS Building, Saddleback College, 28000 Marguerite Parkway, Mission Viejo, CA. Any bidder failing to attend the entire pre bid conference shall be deemed a non-responsive bidder and will have his bid returned unopened.

In accordance with the provisions of California Business and Professions Code Section 7028.15 and Public Contract Code Section 3300, the DISTRICT requires that the bidder possess the following classification of contractor’s license at the time the bid is submitted: Class B License required. Any bidder not so licensed at the time of the bid opening will be rejected as non-responsive.

Time is of the essence. Failure to complete the work within the time set forth in the bid documents will result in the imposition of liquidated damages for each day of delay in the amount set forth in the Information for Bidders.

Each bid shall be accompanied by a bid security in the form of cash, a certified or cashier's check or bid bond in an amount not less than ten percent (10%) of the total bid price, payable to the DISTRICT. In the
event the successful bidder fails to enter into the contract and execute the required documents, the bid security shall be forfeited. The successful bidder shall furnish a satisfactory Performance Bond and a Payment Bond in amounts not less than one hundred percent (100%) of the total bid price.

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

The California Department of Industrial Relations has determined the general prevailing rates of per diem wages for the locality in which the work is to be performed for the Project. Copies of these wage rate determinations, entitled Prevailing Wage Scale, are maintained at the DISTRICT office and are available at the following website: www.dir.ca.gov. It shall be mandatory upon the successful bidder to whom the contract is awarded, and upon any subcontractor listed, to pay not less than the said specified rates to all workers employed by them for the Project. These requirements will be enforced through our Labor Compliance consulting firm.

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

The general prevailing rate of per diem wages is based upon a working day of eight (8) hours. The rate for holiday and overtime work shall be at least time and one-half.

Pursuant to Section 22300 of the Public Contract Code, the Agreement will contain provisions permitting the successful bidder to substitute securities for any monies withheld by the DISTRICT to ensure performance under the Agreement or permitting payment of retention earned directly into escrow.

Prequalification is a requirement for bidding this project. Prequalification documents will be distributed at the mandatory job walk and conference.

Questions regarding this RFQ & P may be directed to Jim Rogers via email at jrogers39@saddleback.edu.

Brandye K. D’Lena
Executive Director
Facilities Planning & Purchasing

PUBLISH: OC REGISTER
February 3, 2015 &
February 10, 2015
**INFORMATION FOR BIDDERS**

**WARNING:**
READ THIS DOCUMENT CAREFULLY. DO NOT ASSUME THAT IT IS THE SAME AS OTHER SIMILAR DOCUMENTS YOU MAY HAVE SEEN, EVEN IF FROM THE SAME DISTRICT.

1. **Preparation of Bid Form.** Bids shall be submitted on the prescribed Bid Form, completed in full. All bid items and statements shall be properly and legibly filled out. Numbers shall be stated both in words and in figures where so indicated, and where there is a conflict in the words and the figures, the words shall control over the numbers. The signatures of all persons shall be in longhand and in ink. Prices, wording and notations must be in ink or typewritten.

2. **Form and Delivery of Bids.** The bid must conform and be responsive to all Project Documents and shall be made on the Bid Form provided, and the complete bid, together with any and all additional materials as required, shall be enclosed in a sealed envelope, addressed and hand delivered or mailed to the DISTRICT at:

   South Orange County Community College District  
   Health Science Building, 3rd Floor  
   28000 Marguerite Parkway  
   Mission Viejo, CA, 92692

and must be received on or before the bid deadline (Public Contract Code Section 20112). The envelope shall be plainly marked in the upper left hand corner with the bidder's name, the Project designation and the date and time for the opening of bids. **It is the bidder's sole responsibility to ensure that its bid is received prior to the bid deadline.** In accordance with Government Code Section 53068, any bid received after the scheduled closing time for receipt of bids shall be returned to the bidder unopened. At the time and place set forth for the opening of bids, the sealed bids will be opened and publicly read aloud. However, if prequalification of bidders is required pursuant to Public Contract Code Section 20111.5 only those sealed bids received from prequalified bidders shall be opened and publicly read aloud.

3. **Bid Security.** Each bid shall be accompanied by a bid security in the form of cash, a certified or cashier's check or bid bond in the amount of not less than ten percent (10%) of the total bid price payable to the DISTRICT and shall be given as a guarantee that the bidder, if awarded the contract, will execute the Agreement within ten (10) working days after notice of award of the contract, and will furnish, on the prescribed forms, a satisfactory Faithful Performance Bond in an amount not less than one hundred percent (100%) of the total bid price and separate Payment (labor and material) Bond in an amount not less than one hundred percent (100%) of the total bid price, furnish certificates and endorsements evidencing that the required insurance is in effect, the Workers’ Compensation Certificate, Drug-Free Work Place Certification, the Criminal Records Check Certification, Contractor’s Certificate Regarding Non-Asbestos Containing Materials, and the Disabled Veteran Business Enterprises Certification, if applicable, all within ten(10) working days of the notice of award of the contract or as otherwise requested in writing by the DISTRICT. It is understood and agreed that should bidder fail or refuse to return these documents as required by the DISTRICT, the bid security shall be forfeited to the DISTRICT. If the Bidder elects to furnish a bid bond as its Bid Security, the Bidder shall use the bid bond form included in the Project Documents.
4. **Signature.** Any signature required on Project Documents must be signed in the name of the bidder and must bear the signature of the person or persons duly authorized to sign these documents. Where indicated, if bidder is a corporation, the legal name of the corporation shall first be set forth, together with two signatures: one from among the chairman of the board, president or vice president and one from among the secretary, chief financial officer, or treasurer. Alternatively, the signature of other authorized officers or agents may be affixed, if duly authorized by the corporation. Such documents shall include the title of such signatories below the signature and shall bear the corporate seal. Where indicated, in the event that the bidder is a joint venture or partnership, there shall be submitted with the bid certifications signed by authorized officers of each of the parties to the joint venture or partnership, naming the individual who shall sign all necessary documents for the joint venture or partnership and, should the joint venture or partnership be the successful bidder, who shall act in all matters relative to the Project for the joint venture or partnership. If bidder is an individual, his/her signature shall be placed on such documents.

5. **Modifications.** Changes in or additions to any of the bid documents, summary of the work bid upon, alternative proposals, or any other modifications which are not specifically called for by the DISTRICT may result in the DISTRICT’S rejection of the bid as being nonresponsive. No oral, telephonic, facsimile or electronic modification of any of the bid documents will be considered.

6. **Erasures, Inconsistent or Illegible Bids.** The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction is authenticated by affixing the initials of the person(s) signing the bid in the margin immediately adjacent to the correction. In the event of inconsistency between words and numbers in the bid, words shall control numbers. In the event that DISTRICT determines that any bid is unintelligible, illegible or ambiguous, the DISTRICT may reject such bid as being nonresponsive.

8. **Withdrawal of Bids.** Any bid may be withdrawn, either personally or by written request signed by the bidder, at any time prior to the scheduled closing time for receipt of bids. The bid security for a bid withdrawn prior to the scheduled closing time for receipt of bids, in accordance with this paragraph, shall be returned. No bidder may withdraw any bid for a period of ninety (90) calendar days after the date set for the opening of bids.

9. **Agreement and Bonds.** The Agreement which the successful bidder will be required to execute and the payment bond required in accordance with Civil Code Section 3247, are included in the Project Documents. The payment bond shall be in the amount not less than one hundred percent (100%) of the amount of the contract in
accordance with Civil Code Section 3248. The successful bidder will also be required to furnish a separate faithful performance bond in the amount of one hundred percent (100%) of the contract and in the form included in the Project Documents, which shall remain in full force and effect through the guarantee period as specified in the General Conditions. All bond premiums shall be at bidder’s cost.

10. **Interpretation of Project Documents.** If any bidder is in doubt as to the true meaning of any part of the Project Documents, or finds discrepancies in, or omissions from the Project Documents, a written request for an interpretation or correction thereof must be submitted to the DISTRICT no later than four (4) days before bid deadline. No requests shall be considered after this time. The bidder submitting the written request shall be responsible for its prompt delivery. Any interpretation or correction of the Project Documents will be made solely at DISTRICT’s discretion and only by written addendum duly issued by the DISTRICT, and a copy of such addendum will be hand delivered or mailed or faxed to each bidder known to have received a set of the Project Documents. No person is authorized to make any oral interpretation of any provision in the Project Documents, nor shall any oral interpretation of Project Documents be binding on the DISTRICT. If there are discrepancies of any kind in the Project Documents, the interpretation of the DISTRICT shall prevail. Submittal of a bid without a request for clarification shall be incontrovertible evidence that the bidder has determined that the project documents are acceptable and sufficient for bidding and completing the work; that bidder is capable of reading, following and completing the work in accordance with the project documents; and that bidder agrees that the project can and will be completed according to the DISTRICT’s timelines and according to the progress schedule to be submitted by the successful bidder incorporating the DISTRICT’s timelines for completion of the project.

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

12. **Award of Contract.** The DISTRICT reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding process. The award of the contract, if made by the DISTRICT, will be by action of the Governing Board and to the lowest responsive and responsible bidder. If two identical low bids are received from responsive and responsible bidders, the DISTRICT will determine which bid will be accepted pursuant to Public Contract Code Section 20117. In the event an award of the contract is made to a bidder, and such bidder fails or refuses to execute the Agreement and provide the required documents within fifteen (15) working days after the notice of award of the contract to bidder, the DISTRICT may award the contract to the next lowest responsive and responsible bidder or reject all bidders.

13. **Alternate Bids.** If alternate bids are called for, the DISTRICT will award the contract to the lowest responsive and responsible bidder based on the lowest total of the bid prices on the base contract without consideration of the prices on the additive or deductive items.

14. **Competency of Bidders.** In selecting the lowest responsive and responsible bidder, consideration will be given not only to the financial standing but also to the general competency of the bidder for the performance of the Project. By submitting a bid, each bidder agrees that the DISTRICT, in determining the successful bidder and its eligibility for the award, may consider the bidder’s experience and facilities, conduct and performance under other contracts, financial condition, reputation in the industry, and other factors which could affect the bidder’s performance of the Project. To this end, each bid shall be supported by a statement of the bidder’s experience on the form entitled “INFORMATION REQUIRED OF BIDDER.”

The DISTRICT may also consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for
those portions of the work. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the DISTRICT. In this regard, the DISTRICT may conduct such investigations as the DISTRICT deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of the bidder, proposed subcontractors, and other persons and organizations to do the work to the DISTRICT’s satisfaction within the prescribed time. The DISTRICT reserves the right to reject the bid of any bidder who does not pass any such evaluation to the satisfaction of the DISTRICT.

15. **Bidder’s Prequalification.** Only Bid Proposals submitted by Prequalified Bidders will be considered. A Bid Proposal submitted by a Bidder who is not prequalified will be deemed a non-responsive Bid Proposal and will be rejected by the District. A Bidder who has not completed the Prequalification Application and has not been deemed a “Qualified Bidder” must complete the Prequalification Application and submit the Prequalification Application to the District (via the Project Manager) by the date and in the manner set forth in the Prequalification Application. The failure to submit a completed Prequalification Application on or prior to such date will render the Bid Proposal of the Bidder untimely submitting a completed Prequalification Application to be non-responsive and rejected. If the District determines that any information provided by a Bidder in the Prequalification Application is false or misleading, or is incomplete so as to be false or misleading, the District may reject the Bid Proposal submitted by such Bidder as being non-responsive. **Pre-qualification documents will be issued at the Job Walk on Tuesday, February 11, 2015.**

16. **Listing Subcontractors.** Each bidder shall submit, on the form furnished with the Project Documents, a list of the proposed subcontractors on this Project as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code Section 4100, et seq.). If alternate bids are called for and the bidder intends to use different or additional subcontractors, a separate list of subcontractors must be submitted for each such alternate bid. If the bidder fails to specify a subcontractor for any portion of the work in excess of one half (1/2) of one percent (1%) of the bidder’s total bid, the bidder agrees that he/she is fully qualified to perform that work and agrees to perform that portion of the work. Violation of this requirement (including the procurement of a subcontractor for the Project if no subcontractor is specified) can result in the DISTRICT invoking the remedies of Public Contract Code Sections 4110 and 4111.

17. **Bid Protest.** Any bidder may file a bid protest. The District must be informed of any intent of a bid protest within three (3) business days of bid opening. An e-mail address shall be provided and by filing the protest, protesting bidder consents to receipt of e-mail notices for purposes of the protest and protest related questions and protest appeal, if applicable. A formal protest must be submitted in writing to the District’s office, before 4:00 p.m. of the fifth (5th) business day following the opening of Bidder’s Envelopes. The bid protest must set forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest; any matters not set forth in written bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and credible evidence. Any bid protest not conforming to the foregoing shall be rejected by the District without recourse. The protest must include the name, address, and the telephone number of the person representing the protesting party.

Provided that the bid protest is filed in strict conformity with the foregoing, the District’s Executive Director of Facilities Planning & Purchasing shall review and evaluate the basis of the bid protest and make a determination. Once the bid protest is received, the apparent lowest responsible bidder will be notified of the protest and the evidence presented. If appropriate, the apparent low bidder will be given an opportunity to rebut the evidence and present evidence that the apparent low bidder should be allowed to perform the Work. If deemed appropriate by the District, an informal hearing will be held. District will issue a written decision within fifteen (15) calendar days of receipt of the protest, unless factors beyond the District’s reasonable control prevent such resolution. The decision on the bid protest will be copied to all parties involved in the protest.
If the determination is unacceptable to the bid protestor, the bid protestor will notify the District’s Executive Director within three (3) business days of receiving the determination that they require a reconsideration. The Vice Chancellor, Business Services shall review and evaluate the basis of the bid protest and make a secondary determination and issue a written response to the appeal, or if appropriate, appoint a Hearing Officer to conduct a hearing and issue a written decision. The written decision of the Vice Chancellor, Business Services, or the Hearing Officer shall be rendered with fifteen (15) calendar days and shall state the basis for the decision. This determination will be final and not subject to appeal or reconsideration by the District.

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

The procedure and time limits set forth in this paragraph are mandatory and are Bidder’s sole and exclusive remedy in the event of a Bid protest. Bidder’s failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted from another Bidder, but must timely pursue its own protest.

18. **Insurance and Workers’ Compensation.** The successful bidder shall be required to furnish certificates and endorsements evidencing that the required insurance is in effect. DISTRICT may request that such certificates and endorsements are completed on DISTRICT provided forms. In accordance with the provisions of Section 3700 of the Labor Code, the successful bidder shall secure the payment of compensation to all employees. The successful bidder who has been awarded the contract shall sign and file with DISTRICT prior to performing the work, the Workers’ Compensation Certificate included as a part of the Project Documents. Labor Code Section 1861.

19. **Contractor’s License.** If, at the time and date of the contract execution, bidder is not properly licensed to perform the Project in accordance with Division 3, Chapter 9, of the Business and Professions Code and the Project Documents, such bid will be rejected as nonresponsive. (Public Contract Code Section 3300) Pursuant to Business and Professions Code Section 7028.15, no payment shall be made for work or materials under the contract unless and until the Registrar of Contractors verifies to the DISTRICT that the bidder was properly licensed at the time the bid was submitted. Any bidder not so licensed is subject to penalties under the law and the contract will be considered void and DISTRICT shall have the right to bring an action against the unlicensed bidder awarded the contract for recovery of all compensation paid under the contract. (Business and Professions Code Section 7031(b)) If the license classification specified hereinafter is that of a “specialty contractor” as defined in Section 7058 of the Business and Professions Code, the specialty contractor awarded the contract for this work shall construct a majority of the work, in accordance with the provisions of Business and Professions Code Section 7059. The bidder may not use the contractor license of a third party for this bid.

20. **Anti-Discrimination.** In connection with all work performed under this Project, there shall be no unlawful discrimination against any prospective or active employee engaged in the work because of race, color, ancestry, national origin, religious creed, sex, age, marital status, physical disability, mental disability, or medical condition. The successful bidder agrees to comply with applicable Federal and State laws including, but not limited to, the California Fair Employment and Housing Act, beginning with Government Code Section 12900 and Labor Code Section 1735. In addition, the successful bidder agrees to require like compliance by any subcontractors employed on the Project by such bidder.
21. **Hold Harmless and Indemnification.** The successful bidder awarded the contract will be required to indemnify and hold harmless the DISTRICT, its Governing Board, officers, agents, and employees as set forth in the Agreement.

22. **Substitutions.** Should the bidder wish to request any substitution for the materials, process, service, or equipment specified, the bidder shall be required to comply with Article 30 of the General Conditions.

23. **Surety Qualifications for Bonds.** Bidders shall ensure all surety companies have a minimum rating of "A-VIII," as rated by the current edition of Best's Key Rating Guide, published by A.M. Best Company, Oldwick, New Jersey 08858. Only California admitted surety insurers will be acceptable for the issuance of bonds. (Code of Civil Procedure Section 995.311) DISTRICT shall verify the status of the surety by one of the following ways: (1) printing out information from the website of the California Department of Insurance confirming the surety is an admitted surety insurer and attaching it to the bond, or (2) obtaining a certificate from the county clerk for the county in which the DISTRICT is located that confirms the surety is an admitted surety insurer and attaching it to the bond. Any admitted surety insurer who cannot satisfy the minimum rating specified above, but who satisfies the following requirements set forth in Code of Civil Procedure Section 995.660 shall be accepted and approved for the issuance of bonds:

   (a) There must be on file in the office of the county clerk, for the county in which the DISTRICT is located, an unrevoked appointment, power of attorney, bylaws, or other instrument, duly certified by the proper authority and attested by the seal of the insurer authorizing the person who executed the bond to do so for and on behalf of the insurer within ten (10) calendar days of the insurer’s receipt of a request to submit such document from the DISTRICT, and an original or certified copy of the document must be submitted to the DISTRICT.

   (b) A certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner must be submitted to the DISTRICT within ten (10) calendar days of the insurer’s receipt of a request to submit such document from the DISTRICT.

   (c) A certificate from the clerk of the county that the certificate of authority of the insurer has not been surrendered, revoked, cancelled, annulled, or suspended, and in the event it has, whether renewed authority has been granted must be submitted to DISTRICT within ten (10) calendar days of the insurer’s receipt of a request to submit such document from the DISTRICT.

   (d) Copies of the insurer’s most recent annual statement and quarterly statement filed with the California Department of Insurance must be submitted to the DISTRICT within ten (10) calendar days of the insurer’s receipt of a request to submit the statements.

24. **Liquidated Damages.** All work must be completed within the time limits set forth in the Project Documents. It is agreed that damages for the failure to complete the Project described herein within the time limits required are impossible to ascertain. Should the work not be completed within the specified time for completion, the successful bidder awarded the contract shall be liable for liquidated damages, payable to the DISTRICT, in an amount of Two Thousand Seven Hundred and Fifty Dollars ($2,750) for each consecutive calendar day of delay in completion. Such damages shall be deducted from any payments due or to become due to the successful bidder. Government Code Section 53069.85, Civil Code Section 1671.

25. **Drug-Free Workplace Certification.** Pursuant to Government Code Sections 8350, et seq., the successful bidder will be required to execute a Drug-Free Workplace Certification upon execution of the Agreement. The bidder will be required to take positive measures outlined in the certification in order to ensure the presence of a drug-free workplace. Failure to abide with the conditions set forth in the Drug-Free Workplace Act could result in penalties including termination of the Agreement or suspension of payment thereunder.
26. **Non-collusion Affidavit.** In accordance with the provisions of Section 7106 of the Public Contract Code, each bid must be accompanied by a non-collusion affidavit properly notarized.

27. **Escrow Agreement.** Public Contract Code Section 22300 permits the substitution of securities for any monies withheld by a public agency to ensure performance under a contract. At the request and expense of the successful bidder awarded the contract, securities equivalent to the amount withheld as retention shall be deposited with the DISTRICT, or with a state or federally chartered bank in California as the escrow agent, who shall then pay such monies to the successful bidder. The DISTRICT retains the sole discretion to approve the bank selected by the successful bidder to serve as escrow agent. Upon satisfactory completion of the contract, the securities shall be returned to the successful bidder. Securities eligible for investment shall include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit. The successful bidder shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

In the alternative, under Section 22300, the successful bidder may request DISTRICT to make payment of earned retentions directly to the escrow agent at the expense of the successful bidder. Also at the successful bidder's expense, the successful bidder may direct investment of the payments into securities, and the successful bidder shall receive interest earned on such investment upon the same conditions as provided for securities deposited by successful bidder. Upon satisfactory completion of the contract, successful bidder shall receive from the escrow agent all securities, interest and payments received by escrow agent from DISTRICT pursuant to the terms of Section 22300.

The successful bidder who elects to receive interest on monies withheld in retention by the DISTRICT shall, at the request of any subcontractor performing more than five percent (5%) of the successful bidder’s total bid, make that option available to the subcontractor regarding any monies withheld in retention by the successful bidder from the subcontractor. If the successful bidder elects to receive interest on any monies withheld in retention by the DISTRICT, then the subcontractor shall receive the identical rate of interest received by the successful bidder on any retention monies withheld from the subcontractor by the successful bidder, less any actual pro rata costs associated with administering and calculating that interest. In the event that the interest rate is a fluctuating rate, the rate for the subcontractor shall be determined by calculating the interest rate paid during the time that retentions were withheld from the subcontractor. If the successful bidder elects to substitute securities in lieu of retention, then, by mutual consent of the successful bidder and subcontractor, the subcontractor may substitute securities in exchange for the release of monies held in retention by the successful bidder. Public Contract Code Section 22300(d)(1).

The successful bidder wishing to utilize Public Contract Code Section 22300 and enter into an Escrow Agreement shall complete and execute the form Escrow Agreement included in the Project Documents and submit it to the DISTRICT.

28. **Change Orders.** All change order requests must be submitted in the form set forth in the Project Documents and pursuant to Article 60 of the General Conditions. The amount of allowable charges submitted pursuant to a change order shall be limited to the charges allowed under Article 60 of the General Conditions. Indirect, consequential and incidental costs, project management costs, extended home office and field office overhead, administrative costs and profit and other charges not specifically authorized under Article 60 of the General Conditions will not be allowed.

29. **Tobacco-Free Policy.** The successful bidder shall agree to enforce a tobacco-free work site.

30. **Lead.** Pursuant to the Lead-Safe Schools Protection Act (Education Code Sections 32240, et seq.) and other applicable law, the successful bidder shall not use lead-based paint, lead plumbing and solders, or other
potential sources of lead contamination in the construction of any new school facility or the modernization or renovation of any existing school facility.

31. The number of executed copies of the Agreement, the Faithful Performance Bond, and the Payment Bond required is TWO (2).

32. **Prevailing Wage.** This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) and awarded (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
BID FORM

Name of Bidder: _____________________________________________________________

To: South Orange County Community College District, acting by and through its Governing Board, herein called the "DISTRICT."

1. The undersigned Bidder, having become familiarized with all the following documents including but not limited to the Notice Calling for Bids, Information for Bidders, Bid Form, Bid Security, Designation of Subcontractors Form, Information Required of Bidder, all prequalification forms pursuant to Public Contract Code Section 20111.5, if any, Noncollusion Affidavit, Workers’ Compensation Certificate, Faithful Performance Bond, Payment Bond, Agreement, Escrow Agreement, Drug-Free Workplace Certification, Criminal Records Check Certification, Change Order Forms, Shop Drawing Transmittal Form, all insurance requirements, Guarantee forms, Contractor’s Certificate Regarding Non-Asbestos Containing Materials, Disabled Veteran Business Enterprises Certification, if applicable, General Conditions and Supplemental Conditions, if any, Special Conditions, if any, drawings, specifications, and all modifications, addenda and amendments, if any (hereinafter Project Documents), the local conditions affecting the performance of the work and the cost of the work at the place where the work is to be done, hereby proposes and agrees to be bound by all the terms and conditions of the Project Documents and agrees to perform, within the time stipulated, the work, including all of its component parts, and everything required to be performed, and to provide and furnish and pay for any and all of the labor, materials, tools, expendable equipment, and all applicable taxes, utility and transportation services necessary to perform the work and complete in a good workmanlike manner all of the work required in accordance with laws, codes, regulations, ordinances and any other legal requirements governing the work, in connection with the following:

Project: BGS Fire Repairs Project, Saddleback College
Project No.: Bid No. 2031

all in strict conformity with the Project Documents, including Addenda Nos. ___, ___, ____ and _____, on file at the office of the Director of Facilities Planning and Purchasing of said DISTRICT for the following sums:

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<th>Numeric</th>
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<td>BASE BID</td>
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<tr>
<td>ALLOWANCE: Refer to Supplemental Conditions-Example here</td>
<td>$ 50,000.00</td>
</tr>
<tr>
<td>$ Fifty Thousand and no/100</td>
<td>$</td>
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<tr>
<td>BID TOTAL (INCLUDING ALLOWANCE)</td>
<td>$</td>
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</tbody>
</table>
Each individual bid term shall be determined from visiting the work site, reviewing the drawings and specifications and all portions of the Project Documents, and shall include all items necessary to complete the work, including the assumption of all obligations, duties, and responsibilities necessary to the successful completion of the Project, and the furnishing of all materials and equipment required to be incorporated in and form a permanent part of the work, and the furnishing of tools, equipment, supplies, transportation, facilities, labor, superintendence, and services required to perform and complete the work, all as per the requirements of the Project Documents, whether or not expressly listed or designated.

2. It is understood that the DISTRICT reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding process. Bidder agrees that this bid shall remain open and not be withdrawn for the period specified in the Information for Bidders.

3. The required bid security is attached.

4. The required list(s) of proposed subcontractors is attached hereto, and the undersigned represents and warrants that such list(s) is complete and in compliance with the Subletting and Subcontracting Fair Practices Act. Public Contract Code Sections 4100, et seq.

5. It is understood and agreed that if written notice of the award of a contract is mailed, faxed, or delivered to the bidder, the bidder will execute and deliver to the DISTRICT the Agreement and will also furnish and deliver to the DISTRICT the Faithful Performance Bond and a separate Payment Bond as specified, and certificates and endorsements of insurance, the Workers’ Compensation Certificate, Drug-Free Work Place Certification, the Criminal Records Check Certification, Contractor’s Certificate Regarding Non-Asbestos Containing Materials, and the Disabled Veteran Business Enterprises Certification, if applicable, within 10 working days of the notice of award of the contract, or as otherwise requested in writing by the DISTRICT. It is understood that should bidder fail or refuse to return these documents as required by the DISTRICT, the bid security shall be forfeited to the DISTRICT. The bidder further agrees that the work shall be commenced by the bidder, if awarded the contract, on or before the fifth day after receiving the DISTRICT’s Notice to Proceed, and shall be completed by the bidder in the time specified by the DISTRICT.

6. Communications conveying notice of award of the contract, requests for additional information or other correspondence should be addressed to the bidder at the address stated below.

7. The name(s) of all persons interested in the bid as principals are as follows:

8. In submitting this bid, the bidder offers and agrees that if the bid is accepted, it will assign to DISTRICT all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Business & Professions Code Section 16700, et seq.) arising from purchases of goods, materials, or services by the bidder for sale to the DISTRICT pursuant to the bid. Such assignment shall be made and become effective at the time the DISTRICT tenders final payment under the contract. (Public Contract Code Section 7103.5; Government Code Section 4450, 4451 and 4552).

9. The undersigned hereby warrants that the bidder has an appropriate license, License No. ___________________, Class License B Required, at the time of the bid opening, that such license entitles bidder to provide the work, that such license will be in full force and effect throughout the duration of performance of this
Project. Bidder shall be nonresponsive if the Bidder is not licensed as required by the DISTRICT at the time of the bid opening. Any and all subcontractors to be employed by the undersigned shall have appropriate licenses at the time of the bid opening.

10. The bidder hereby certifies that it is, and at all times during the performance of work hereunder shall be, in full compliance with the provisions of the Immigration Reform and Control Act of 1986 (“IRCA”) in the hiring of its employees, and the bidder shall indemnify, hold harmless and defend the DISTRICT against any and all actions, proceedings, penalties or claims arising out of the bidder's failure to comply strictly with the IRCA.

11. It is understood and agreed that if requested by the DISTRICT, the bidder shall furnish a notarized financial statement, references, and other information required by the DISTRICT sufficiently comprehensive to permit an appraisal of bidder's ability to perform the Project.

12. The undersigned hereby warrants that all work, except work of a maintenance period, shall be completed within 120 consecutive calendar days from the date specified on the Notice to Proceed issued by the District. Time is of the essence. The undersigned agrees that failure to complete the work within the time set forth herein will result in the imposition of liquidated damages for each consecutive calendar day of delay in the amount of Two Thousand Seven Hundred and Fifty Dollars ($2,750). (Government Code Section 53069.85)

13. The required non-collusion affidavit properly notarized is attached as required by Public Contract Code Section 7106. Bidder understands and agrees that failure to submit a completed and signed affidavit will render the bidder automatically nonresponsive.

14. It is understood and agreed that all change order requests must be submitted in the form set forth in the Project Documents and pursuant to Article 60 of the General Conditions. The amount of allowable charges submitted pursuant to a change order shall be limited to the charges allowed under Article 60 of the General Conditions. Indirect, consequential and incidental costs, project management costs, extended home office and field office overhead, administrative costs and profit and other charges not specifically authorized under Article 60 of the General Conditions will not be allowed.

15. The Information Required of Bidder form has been fully completed and is attached hereto.
The undersigned hereby declares that all of the representations of this bid are made under penalty of perjury under the laws of the State of California.

**Individual**

Name: __________________________________________

Signed by: ______________________________________

Print Name: _____________________________________

Date: __________________________________________

Business Address: __________________________________

________________________________________________________________________

Telephone: _______________________________________

**********************************************************************

**Partnership**

Name: __________________________________________

Signed by: ______________________________________

Print Name: _____________________________________

Date: __________________________________________

Business Address: __________________________________

________________________________________________________________________

Telephone: _______________________________________

**********************************************************************

**Corporation**

Name: __________________________________________

Schools Legal Service of O.C.  
June 2012  
Bid Forms  
Page 15
(a ______ Corporation\(^1\))

Business Address: ____________________________________________

___________________________________________________________

Telephone: _________________________________________________

Signed by: _________________________________________________ President, Date: _____________

Print Name: ________________________________ President

Signed by: _________________________________________________ Secretary, Date: ________________

Print Name: ________________________________ Secretary

[Seal]

---

\(^1\) A corporation awarded the contract shall furnish evidence of its corporate existence and evidence that the officer signing the Agreement and bonds is duly authorized to do so.
Joint Venturer

Name: ____________________________________________

Signed by: ________________________________________, Joint Venturer

Print Name: ________________________________________

Date: ____________________________________________

Business Address____________________________________
____________________________________________________

Telephone: ________________________________________

Other Parties to  If an individual: ____________________________________________

Joint Venture: (Name)

Signed by: ________________________________________

Print Name: ________________________________________

Date: ____________________________________________

Doing Business as: ______________________________________

Business Address: ______________________________________
____________________________________________________

Telephone: ________________________________________
If a Partnership: ____________________________________________________________________________

                      (Name)

Signed by: ______________________________________________________________________________

Print Name: _______________________________________________________________________________

Date: _____________________________________________________________________________________

Business Address: __________________________________________________________________________

__________________________________________________________________________________________

Telephone: ________________________________________________________________________________

If a Corporation: __________________________________________________________________________

                      (a_________________ Corporation)

Signed By: ______________________________________________________________________________

Print Name: _______________________________________________________________________________

Date: _____________________________________________________________________________________

Title: ____________________________________________________________________________________

Date: ____________________________________________________________________________________

Business Address: __________________________________________________________________________

__________________________________________________________________________________________

Telephone: ________________________________________________________________________________
Bid Bond No.: _____

BID BOND

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

KNOW ALL PERSONS BY THESE PRESENT, that we ________________________________

________________________ as Principal, and ________________________________ as Surety, a California admitted surety insurer, are held and firmly bound unto the ___ South Orange County Community College District, hereinafter called the DISTRICT, in the sum of ________ PERCENT (___ %) OF THE TOTAL AMOUNT OF THE BID of the Principal submitted to the said DISTRICT for the work described below for the payment of which sum in lawful money of the United States, well and truly to be made, we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of this obligation is such that whereas the Principal has submitted the accompanying bid dated ________, 200_, for

_____________________________________________________________________________

_____________________________________________________________________________

NOW, THEREFORE, if the Principal shall not withdraw said bid within the period specified therein after the opening of the same, or, if no period be specified, within sixty (60) days after said opening; and if the Principal is awarded the contract, and shall within the period specified therefore, or, if no period be specified, within 10 working days after the notice of award of the contract, or as otherwise requested in writing by the DISTRICT, enter into a written contract with the DISTRICT, in accordance with the bid as accepted and give bonds with good and sufficient surety or sureties, as may be required for the faithful performance and proper fulfillment of such contract and for the payment for labor and materials used for the performance of the contract, furnish certificates and endorsements evidencing the required insurance is in effect and furnish and deliver to the DISTRICT the Workers’ Compensation Certificate, Drug-Free Work Place Certification, the Criminal Records Check Certification, Contractor’s Certificate Regarding Non-Asbestos Containing Materials, and the Disabled Veteran Business Enterprises Certification, if applicable, then the above obligation shall be void and of no effect, otherwise the bond amount shall be forfeited to the DISTRICT.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.
In the event suit is brought upon this bond by the DISTRICT and judgment is recovered, the Surety shall pay all costs incurred by the DISTRICT in such suit, including reasonable attorney's fees to be fixed by the court.

IN WITNESS HEREOF, the parties have executed this bond under their several seals this ___ day of ___, 200___, the name and corporate seal of each corporate party being hereto affixed and duly signed by its undersigned authorized representative.

(Corporate Seal of Principal, if Corporation)

Principal (Proper Name of Bidder)

By: ________________________________
Signature

______________________________
Print Name

______________________________
Title
(Corporate Seal of Surety)  Surety

(Attach Attorney-in-Fact Certificate and Required Acknowledgements)  By: __________________________

                                          Signature

                                          __________________________
                                          Print Name

                                          __________________________
                                          Title

                                          __________________________
                                          Address

                                          __________________________
                                          Telephone No.

                                          __________________________
                                          Facsimile No.
DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Public Contract Code Section 4100 et. seq.) and any amendments thereof, each bidder shall set forth below: (a) the name and the location of the place of business of each subcontractor who will perform work or labor or render service to the bidder (prime contractor) in or about the construction of the work or improvement to be performed under this contract or a subcontractor licensed by the State of California who, under subcontract to the bidder (prime contractor), specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications in an amount in excess of one-half of one percent of the bidder's (prime contractor's) total bid and (b) the portion of the work which will be done by each subcontractor. The bidder (prime contractor) shall list only one subcontractor for each such portion as is defined by the bidder (prime contractor) in this bid.

If a bidder (prime contractor) fails to specify a subcontractor or if a bidder (prime contractor) specifies more than one subcontractor for the same portion of work to be performed under the contract in excess of one-half of one percent of the bidder's (prime contractor's) total bid, bidder shall be deemed to have agreed that bidder is fully qualified to perform that portion, and that bidder alone shall perform that portion. Violation of this requirement (including the procurement of a subcontractor for the Project if no subcontractor is specified) can result in the DISTRICT invoking the remedies of Public Contract Code Sections 4110 and 4111.

No bidder (prime contractor) whose bid is accepted shall (a) substitute any subcontractor, (b) permit any subcontractor to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the bidder's (prime contractor's) total bid as to which the original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act. Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the bidder's (prime contractor's) total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, only after a finding reduced to writing as a public record of the DISTRICT awarding this contract setting forth the facts constituting the emergency or necessity.
BGS Fire Repairs Project, Saddleback College  
Project No.: Bid No. 2031

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<tr>
<th>Type of Trade, Labor or Service</th>
<th>Name &amp; License # of Subcontractor, License Expiration Date (Indicate if a Disabled Veteran Business Enterprise)</th>
<th>Complete Address (Name of City is not sufficient) and Telephone No.</th>
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Bidder agrees that within twenty-four (24) hours of the bid opening, Bidder shall provide the DISTRICT with the license number (if applicable), expiration date of license, complete address and telephone numbers of each listed subcontractor if such information is not available at the time of the bid opening.
Dated: ______________________

Name of Bidder

By: ______________________

(Signature of Bidder)

Print Name: ______________________

Address ____________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Telephone: ______________________

FAX: ______________________
INFORMATION REQUIRED OF BIDDER

The Bidder shall furnish all the following information. Bidder shall carefully read and answer all questions to ensure completeness and accuracy. Failure to comply with this requirement may cause rejection of the bid. Additional sheets may be attached if necessary. "You" or "your" as used herein refers to the bidder and any of its owners, officers, directors, shareholders, principals, responsible managing officer (RMO) or responsible managing employee (RME). DISTRICT has discretion to request additional information depending on the Project.

(1) Bidder name and address (Post Office Box Number not sufficient):

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(2) Telephone: _______________ Fax No.: ____________________________
Electronic Mail: ______________________________________________________________________________________

(3) Individual _____ Partnership _________ Corporation _________ Joint Venture _________ (check one)

(4) Bidder’s License No. ______________________________________________________
Name of License holder ______________________________________________________

(5) Have you ever been licensed under a different name or different license number?
Yes ___ No ___ If “Yes,” give name and license number.

________________________________________________________________________

________________________________________________________________________

(6) Names and titles of all your owners, officers, principals, responsible managing officers and responsible managing employees:

________________________________________________________________________

Name ___________________________ Title ___________________________

________________________________________________________________________

________________________________________________________________________
7) Number of years as a contractor in this type of construction work: ______________________

8) Person who inspected work site:
   Name and Title: ________________________________
   Date of Inspection: ________________________________

9) How many years experience have you had in school construction work?
   (a) as a general contractor? ________________________________
   (b) as a subcontractor? ________________________________

10) How many years experience have you had in public construction work?
    (a) as a general contractor? ________________________________
    (b) as a subcontractor? ________________________________

11) Have you ever been terminated from a school or any public construction project prior to the completion of the project? Yes ______ No _________ If the answer is “Yes,” give dates, names and addresses of school/public agency and details.

12) Have you ever been barred from bidding on any school or public construction project? Yes ___ No ___ If the answer is “Yes,” give dates, names and addresses of school/public agency and details.

13) Have you ever defaulted on any school or public construction project that resulted in a claim to a surety? Yes ___ No _________ If the answer is “Yes,” give dates, names and addresses of school/public agency and details.
(14) Have you been assessed damages (i.e., liquidated damages) for any public construction project in the past ten (10) years? Yes ________ No ________ If the answer is “Yes,” give dates, names, and addresses of public agency and details.

______________________________________________________________

______________________________________________________________

(15) Have you ever brought any claim(s) against a public agency? Yes ____ No ____ If the answer is “Yes,” please explain in detail name of public agency, nature of the claim and outcome.

______________________________________________________________

______________________________________________________________

(16) Have you ever failed to complete a school or public construction project in the last ten (10) years? Yes ______ No _______ If the answer is “Yes,” provide name of public agency and details

______________________________________________________________

______________________________________________________________

(17) Have you been in litigation or arbitration or dispute of any kind on a question or questions relating to a public construction project during the past ten (10) years? Yes , No ____ If the answer is “Yes,” provide name of public agency and details.

______________________________________________________________

______________________________________________________________

(18) List the names, addresses and telephone numbers of three Architects or Engineers whose jobs you have worked on in the past five (5) years.

<table>
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<tr>
<th>Name</th>
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</tbody>
</table>

(19) Do you now or have you ever had any direct or indirect business, financial or other connection with any officer, employee or consultant of the DISTRICT or Architect?
Yes __________ No __________ If so, please elaborate.

__________________________________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________________________________
__________________________________________________________________________________________________________________________________________________

(20) List at least five (5) of your most recent school construction projects.

(1)__________________________________________________________________________________________________________________________________________________

(2)__________________________________________________________________________________________________________________________________________________

(3)__________________________________________________________________________________________________________________________________________________

(4)__________________________________________________________________________________________________________________________________________________

(5)__________________________________________________________________________________________________________________________________________________

(21) Are you currently under contract for another project? Yes __________ No __________ If the answer is “Yes,” please provide the following information:

(a) Project Number 1:

Name of Project: ____________________________________________________________________________________________

Detailed Description: ______________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Name of Project Owner: ____________________________________________________________________________________

Contract Amount: ______________________________________________________________________________________

Completion Date: ______________________________________________________________________________________

(b) Project Number 2:

Name of Project: __________________________________________________________________________________________

Detailed Description: ______________________________________________________________________________________

__________________________________________________________________________________________________________________________________________________

Name of Project Owner: ____________________________________________________________________________________
Contract Amount: ______________________________________________________________________

Completion Date: _____________________________________________________________________

(c) Project Number 3:

Name of Project: _____________________________________________________________________

Detailed Description: __________________________________________________________________

____________________________________________________________________________________

Name of Project Owner: __________________________________________________________________

Contract Amount: _____________________________________________________________________

Completion Date: _____________________________________________________________________

(d) Project Number 4:

Name of Project: _____________________________________________________________________

Detailed Description: __________________________________________________________________

____________________________________________________________________________________

Name of Project Owner: __________________________________________________________________

Contract Amount: _____________________________________________________________________

Completion Date: _____________________________________________________________________

(e) Project Number 5:

Name of Project: _____________________________________________________________________

Detailed Description: __________________________________________________________________

____________________________________________________________________________________

Name of Project Owner: __________________________________________________________________

Contract Amount: _____________________________________________________________________

Completion Date: _____________________________________________________________________
Are there projects not listed above that will be undertaken during the duration of DISTRICT’s Project?  

Yes ☐  No ☐

If the answer is “Yes,” please provide the following information:

(a) Project Number 1:

Name of Project: ____________________________

Detailed Description: ____________________________

__________________________

Name of Project Owner: ____________________________

Contract Amount: ____________________________

Completion Date: ____________________________

(b) Project Number 2:

Name of Project: ____________________________

Detailed Description: ____________________________

__________________________

Name of Project Owner: ____________________________

Contract Amount: ____________________________

Completion Date: ____________________________

(c) Project Number 3:

Name of Project: ____________________________

Detailed Description: ____________________________

__________________________

Name of Project Owner: ____________________________

Contract Amount: ____________________________

Completion Date: ____________________________

(d) Project Number 4:
Name of Project: ____________________________________________________________

Detailed Description: _______________________________________________________

Name of Project Owner: _______________________________________________________

Contract Amount: ___________________________________________________________

Completion Date: _____________________________________________________________

(e) Project Number 5:

Name of Project: ____________________________________________________________

Detailed Description: _______________________________________________________

Name of Project Owner: _______________________________________________________

Contract Amount: ___________________________________________________________

Completion Date: _____________________________________________________________

(23) Additional information required: _________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(24) List of References - Public construction projects of similar nature in a school/community college/university within the last five (5) years. DISTRICT has discretion to require more than five (5) references.

1. Name: _________________________________________________________________

Address and Telephone: ____________________________________________________

Contact Person: ____________________________________________________________

Description of Project: _____________________________________________________

Dates of commencement and completion of Project: _____________________________
Contract Amount: __________________________________________

Architect: ________________________________________________

Architect’s Address and Telephone: ___________________________

_________________________________________________________

DSA or public agency inspector: _______________________________

Address and Telephone: ____________________________________

_________________________________________________________

2. Name: _________________________________________________

Address and Telephone: ____________________________________

_________________________________________________________

Contact Person: __________________________________________

Description of Project: ____________________________________

Dates of commencement and completion of Project: _____________

_________________________________________________________

Contract Amount: _________________________________________

Architect: ________________________________________________

Architect’s Address and Telephone: ___________________________

_________________________________________________________

DSA or public agency inspector: _______________________________

Address and Telephone: ____________________________________

_________________________________________________________

3. Name: _________________________________________________

Address and Telephone: ____________________________________

_________________________________________________________
Contact Person: __________________________________________

Description of Project: __________________________________

Dates of commencement and completion of Project: ________________

________________________________________________________________

Contract Amount: ____________________________________________

Architect: _________________________________________________

Architect’s Address and Telephone: ______________________________

________________________________________________________________

DSA or public agency inspector: _________________________________

Address and Telephone: ______________________________________

________________________________________________________________

4. Name: ___________________________________________________

Address and Telephone: ______________________________________

________________________________________________________________

Contact Person: _____________________________________________

Description of Project: _______________________________________

Dates of commencement and completion of Project: ________________

________________________________________________________________

Contract Amount: ____________________________________________

Architect: _________________________________________________

Architect’s Address and Telephone: ______________________________

________________________________________________________________

DSA or public agency inspector: _________________________________

Address and Telephone: ______________________________________
5. Name: ____________________________________________________________

Address and Telephone: ______________________________________________

____________________________________________________________________

Contact Person: ______________________________________________________

Description of Project: ________________________________________________

Dates of commencement and completion of Project: _________________________

____________________________________________________________________

Contract Amount: _____________________________________________________

Architect: _______________________________________________________________________

Architect’s Address and Telephone: _________________________________________

____________________________________________________________________

DSA or public agency inspector: ___________________________________________

Address and Telephone: _________________________________________________

____________________________________________________________________

I certify and declare under penalty of perjury under the laws of the State of California that the foregoing responses to the Information Required of Bidder are true and correct.

________________________________________

Signature

________________________________________

Print Name

________________________________________

Title

________________________________________

Date
Note: DISTRICT may wish to expand the scope of the “Information Required of Bidder” form and include additional questions.
NONCOLLUSION DECLARATION

(Public Contract Code Section 7106)

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].

________________________________________
Signature

________________________________________
Print Name

Non Collusion Declaration Must be Notarized
WORKERS’ COMPENSATION CERTIFICATE

Labor Code Section 3700.

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

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

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

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

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

Name of the Contractor

By: ____________________________
    Signature

Print Name

Title

Date

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

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the South Orange County Community College District (sometimes referred to hereinafter as “DISTRICT”) has awarded to ____________________________ (hereinafter designated as the “CONTRACTOR” or “Principal”), an agreement for the work described as follows:

_________________________ (hereinafter referred to as the “Public Work”); and

WHEREAS, said CONTRACTOR is required to furnish a bond in connection with said Contract, and pursuant to California Civil Code Section 3247;

NOW, THEREFORE, We, ________________________________, the undersigned CONTRACTOR, as Principal; and ________________________________, a corporation organized and existing under the laws of the State of ________________, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the South Orange County Community College District and to any and all persons, companies, or corporations entitled to file stop notices under California Civil Code Section 3181, or any person, company, or corporation entitled to make a claim on this bond, in the sum of ____________________ Dollars ($_____________), said sum being not less than one hundred percent (100%) of the total amount payable by said DISTRICT under the terms of said Contract, for which payment will and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, its heirs, executors, administrators, successors, or assigns, or subcontractor, shall fail to pay any person or persons named in Civil Code Section 3181; or fail to pay for any materials, provisions, or other supplies, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code, with respect to work or labor thereon of any kind; or shall fail to deduct, withhold, and pay over to the Employment Development Department, any amounts required to be deducted, withheld, and paid over by Unemployment Insurance Code Section 13020 with respect to work and labor thereon of any kind, then said Surety will pay for the same, in an amount not exceeding the amount herein above set forth, and in the event suit is brought upon this bond, also will pay such reasonable attorneys’ fees as shall be fixed by the court, awarded and taxed as provided in California Civil Code Sections 3247 et seq.

This bond shall inure to the benefit of any person named in Civil Code Section 3181 giving such person or his/her assigns a right of action in any suit brought upon this bond.

It is further stipulated and agreed that the Surety of this bond shall not be exonerated or released from the obligation of the bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, or specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described; or pertaining or relating to the furnishing of labor, materials, or equipment therefor; nor by any change or modification of any terms of payment or extension of time for payment pertaining or relating to any scheme or work of improvement herein above described; nor by any rescission or attempted rescission of the contract, agreement or bond; nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond; nor by any fraud practiced by any person other than the claimant seeking to recover on the bond; and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given; and under no circumstances shall the Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the DISTRICT and the CONTRACTOR or on the part of any DISTRICT named in such bond; that the sole condition of recovery shall be that the claimant is a person described...
in California Civil Code Sections 3110 and 3112, and who has not been paid the full amount of his or her claim; and that the Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

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

PRINCIPAL/CONTRACTOR:

______________________________

By: __________________________

SURETY:

______________________________

By: __________________________

Attorney-in-Fact
IMPORTANT: THIS IS A REQUIRED FORM.

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

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

Any claims under this bond may be addressed to:

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

__________________________________________  ______________________________________

__________________________________________  ______________________________________

Telephone:_____________________________  Telephone: _____________________________

STATE OF CALIFORNIA

COUNTY OF

On this ______ day of ________, in the year ________, before me, ________________, a Notary Public in and for said State, personally appeared ________________________, known to me to be the person whose name is subscribed within the instrument as the Attorney-in-Fact of the ______________________ (Surety) and acknowledged to me that he subscribed the name of the ______________________ (Surety) thereto and his own name as Attorney-in-Fact.

______________________________  (SEAL)

Notary Public in and for said State

Commission expires:____________________

NOTE: A copy of the power-of-attorney to local representatives of the bonding company must be attached hereto.
CONTRACT PERFORMANCE BOND (CALIFORNIA PUBLIC WORK)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the South Orange County Community College District (sometimes referred to hereinafter as “DISTRICT”) has awarded to __________________________________ (hereinafter designated as the “CONTRACTOR” or “Principal”), an agreement for the work described as follows:

________________________________________ (hereinafter referred to as the “Public Work”); and

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

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

NOW, THEREFORE, we, ______________________________________, the undersigned CONTRACTOR, as Principal, and __________________________________, a corporation organized and existing under the laws of the State of ________________, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the South Orange County Community College District in the sum of ________________________ Dollars ($_______________), said sum being not less than one hundred percent (100%) of the total amount payable by said DISTRICT under the terms of said Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

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

The Surety, for value received, hereby stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any change, extension of time, alteration in or addition to the terms of the contract or to the work to be performed there under or the specifications accompanying the same, nor by any change or modification to any terms of payment or extension of time for any payment pertaining or relating to any scheme of work of improvement under the contract. Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond (either by total exoneration or pro tanto) by any overpayment or underpayment by the DISTRICT that is based upon estimates approved by the Architect. The Surety stipulates and agrees that none of the aforementioned changes, modifications, alterations, additions, extension of time or actions shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, modifications, alterations, additions or extension of time to the terms of the contract, or to the work, or the specifications as well notice of any other actions that result in the foregoing.
As a condition precedent to the satisfactory completion of the contract, the above obligation shall hold good for a period of One (1) year(s) after the acceptance of the work by DISTRICT, during which time if Contractor/Principal shall fail to make full, complete, and satisfactory repair and replacements and totally protect the DISTRICT from loss or damage made evident during the period of One (1) year(s) from the date of completion of the work, and resulting from or caused by defective materials or faulty workmanship, the above obligation in penal sum thereof shall remain in full force and effect. The obligation of Surety hereunder shall continue so long as any obligation of Contractor remains.

Whenever Principal shall be, and is declared by the DISTRICT to be, in default under the Contract, the Surety shall promptly either remedy the default, or shall promptly complete the Contract through its agents or independent contractors, subject to acceptance and approval of such agents or independent contractors by DISTRICT as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages; or, at DISTRICT’s sole discretion and election, Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by DISTRICT of the lowest responsible bidder, arrange for a contract between such bidder and the DISTRICT and make available as Work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the “balance of the Contract price” (as hereinafter defined), and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term “balance of the Contract price,” as used in this paragraph, shall mean the total amount payable to Principal by the DISTRICT under the Contract and any modifications thereto, less the amount previously paid by the DISTRICT to the Principal, less any withholdings by the DISTRICT allowed under the Contract.

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

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

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

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

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

PRINCIPAL/CONTRACTOR:

By: _______________________________
SURETY:

By: ______________________________

Attorney-in-Fact

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

The total amount of premium charged: $__________________________ (This must be filled in by a corporate surety).
IMPORTANT: THIS IS A REQUIRED FORM.

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

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

Any claims under this bond may be addressed to:

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

Telephone: ______________________  Telephone: ______________________

STATE OF CALIFORNIA  )
COUNTY OF  ) ss.

On this _______________ day of _______________, in the year __________, before me, _________________________________, a Notary Public in and for said State, personally appeared _________________________________, known to me to be the person whose name is subscribed within the instrument as the Attorney-in-Fact of the (Surety) and acknowledged to me that he subscribed the name of the (Surety) thereto and his own name as Attorney-in-Fact.

______________________________  (SEAL)
Notary Public in and for said State

Commission expires: ______________________

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

THIS AGREEMENT, dated the ________ day of ______________, 20____, in the County of Orange, State of California, is by and between South Orange County Community College District, (hereinafter referred to as "DISTRICT"), and ___________________________, (hereinafter referred to as "CONTRACTOR").

The DISTRICT and the CONTRACTOR, for the consideration stated herein, agree as follows:

1. CONTRACTOR agrees to complete the Project known as _______________________________ according to all the terms and conditions set forth in the Project Documents, including but not limited to the Notice Calling For Bids, Information for Bidders, Bid Form, Bid Security, Designation of Subcontractors, Information Required of Bidder, all prequalification forms submitted pursuant to Public Contract Code Section 20111.5, if any, Non-collusion Affidavit, Workers' Compensation Certificate, Faithful Performance Bond, Payment Bond, Escrow Agreement, if applicable, Drug-Free Workplace Certification, Change Orders, Shop Drawing Transmittals, Insurance Certificates and Endorsements, Guarantees, Contractor's Certificate Regarding Non-Asbestos Containing Materials, Disabled Veteran Business Enterprises Certification, if applicable, General Conditions, Supplemental Conditions, if any, Special Conditions, if any, Drawings, Specifications, and all modifications, addenda and amendments thereto by this reference incorporated herein. The Project Documents are complementary, and what is called for by any one shall be as binding as if called for by all.

2. CONTRACTOR shall perform within the time set forth in Paragraph 4 of this Agreement everything required to be performed, and shall provide, furnish and pay for all the labor, materials, necessary tools, expendable equipment, and all taxes, utility and transportation services required for construction of the Project. All of said work shall be performed and completed in a good workmanlike manner in strict accordance with the drawings, specifications and all provisions of this Agreement as hereinabove defined and in accordance with applicable laws, codes, regulations, ordinances and any other legal requirements governing the Project. The CONTRACTOR shall be liable to the DISTRICT for any damages arising as a result of a failure to fully comply with this obligation, and the CONTRACTOR shall not be excused with respect to any failure to so comply by any act or omission of the Architect, Engineer, Inspector, Division of State Architect, or representative of any of them, unless such act or omission actually prevents the CONTRACTOR from fully complying with the Project Documents, and unless the CONTRACTOR protests at the time of such alleged prevention that the act or omission is preventing the CONTRACTOR from fully complying with the Project Documents. Such protest shall not be effective unless reduced to writing and filed with the DISTRICT within three (3) working days of the date of occurrence of the act or omission preventing the CONTRACTOR from fully complying with the Project Documents.

3. DISTRICT shall pay to the CONTRACTOR, as full consideration for the faithful performance of this Agreement, subject to any additions or deductions as provided in the Project Documents, the sum of ____________________________ Dollars ($_______________________).

4. The work shall be commenced on or before the _____________(______) day after receiving the DISTRICT'S Notice to Proceed and shall be completed within ______________(______) consecutive calendar days from the date specified in the Notice to Proceed.

5. **Time is of the essence.** If the work is not completed in accordance with Paragraph 4 above, it is understood that the DISTRICT will suffer damage. It being impractical and infeasible to determine the amount of
actual damage, in accordance with Government Code Section 53069.85, it is agreed that CONTRACTOR shall pay to DISTRICT as fixed and liquidated damages, and not as a penalty, the sum of $_____________ Dollars for each calendar day of delay until work is completed and accepted.

Time extensions may be granted by the DISTRICT as provided in Article 64 of the General Conditions. Liquidated damages shall be imposed as set forth in Article 64 of the General Conditions.

6. Termination for Cause or Non-appropriation. In the event CONTRACTOR defaults in the performance of the Agreement as set forth in General Conditions Article 13(a) or if there is a non-appropriation of funds or insufficient funds as set forth in General Conditions Article 13(d), then this Agreement shall terminate or be suspended as set forth in General Conditions Article 13.

Termination for Convenience. DISTRICT has discretion to terminate this Agreement at any time and require CONTRACTOR to cease all work on the Project by providing CONTRACTOR written notice of termination specifying the desired date of termination. Upon receipt of written notice from DISTRICT of such termination for DISTRICT’s convenience, CONTRACTOR shall:

(i) Cease operations as directed by DISTRICT in the notice;
(ii) Take any actions necessary, or that DISTRICT may direct, for the protection and preservation of the work; and
(iii) Not terminate any insurance provisions required by the Project Documents.

In case of such termination for DISTRICT’s convenience, CONTRACTOR shall be entitled to receive payment from DISTRICT for work satisfactorily executed and for proven loss with respect to materials, equipment, and tools, including overhead and profit for that portion of the work completed. In the case of Termination for Convenience, DISTRICT shall have the right to accept assignment of subcontractors. The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the DISTRICT.

7. Hold Harmless and Indemnification. To the fullest extent permitted by law, the CONTRACTOR, at the CONTRACTOR’s sole cost and expense, agrees to fully defend, indemnify and hold harmless, the DISTRICT, including but not limited to any of its governing board members, officers, employees, Construction Manager, Architect, and all other Agents and Representatives, from and against any and all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, anticipated losses of revenues, and expenses, including any fees of accountants, attorneys or other professionals, arising out of, in connection with, resulting from or related to, or claimed to be arising out of, in connection with, resulting from or related to any act or omission by the CONTRACTOR or any of its officers, agents, employees, subcontractors, sub-subcontractors, any person performing any of the work pursuant to a direct or indirect contract with the CONTRACTOR or individual entities comprising the CONTRACTOR, in connection with or relating to, or claimed to be in connection with or relating to the work, this Agreement, or the Project, including but not limited to any costs or liabilities arising out of or in connection with:

(a) failure to comply with any applicable law, statute, code, ordinance, regulation, permit or orders;
(b) any misrepresentation, misstatement or omission with respect to any statement made in the Project Documents or any document furnished by the CONTRACTOR in connection therewith;
(c) any breach of duty, obligation or requirement under the Project Documents;
(d) any failure to coordinate the work of other contractors;
(e) any failure to provide notice to any party as required under the Project Documents;
(f) any failure to act in such a manner as to protect the DISTRICT and the Project from loss, cost, expense or liability; or

(g) any failure to protect the property of any utility company or property owner.

This indemnity shall survive termination of the contract or final payment thereunder. This indemnity is in addition to any other rights or remedies which the DISTRICT may have under the law or under the Project Documents. In the event of any claim or demand made against any party which is entitled to be indemnified hereunder, the DISTRICT may in its sole discretion reserve, retain or apply any monies due to the CONTRACTOR under the Project Documents for the purpose of resolving such claims; provided, however, that the DISTRICT may release such funds if the CONTRACTOR provides the DISTRICT with reasonable assurance of protection of the DISTRICT’s interests. The DISTRICT shall in its sole discretion determine whether such assurances are reasonable.

8. CONTRACTOR shall take out, prior to commencing the work, and maintain, during the life of this Agreement, and shall require all subcontractors, if any, whether primary or secondary, to take out and maintain the insurance coverages set forth below and in Articles 16, 17, 18 and 19 of the General Conditions. CONTRACTOR agrees to provide all evidences of coverage required by DISTRICT including certificates of insurance and endorsements.

Public Liability Insurance for injuries including accidental death, to any one person in an amount not less than $2,000,000

Subcontractors of every tier $1,000,000

and

Subject to the same limit for each person on account of one accident, in an amount not less than $2,000,000

Subcontractors of every tier $1,000,000

Property Damage Insurance in an amount not less than $2,000,000

Subcontractors of every tier $1,000,000

Course of Construction Insurance without exclusion or limitation in an amount not less than $2,000,000

Excess Liability Insurance (Contractor only) $2,000,000

Insurance Covering Special Hazards: The following special hazards shall be covered by rider or riders to above-mentioned public liability insurance or property damage insurance policy or policies of insurance, or by special policies of insurance in amounts as follows:

Automotive and truck where operated in amounts as above

Material hoist where used in amounts as above
Waiver of Subrogation

Contractor waives (to the extent permitted by law) any right to recover against the District, and its respective elected officials, officers, employees, agents, and representatives for damages to the Work, any part thereof, or any and all claims arising by reason of any of the foregoing, but only to the extent that such damages and/or claims are covered by property insurance and only to the extent of such coverage (which shall exclude deductible amounts) actually carried by the District.

The provisions of this section are intended to restrict each party to recovery against insurance carriers only to the extent of such coverage and waive fully and for the benefit of each, any rights and/or claims which might give rise to a right of subrogation in any insurance carrier. The District and the Contractor shall each obtain in all policies of insurance carried by either of them, a waiver by the insurance companies there under of all rights of recovery by way of subrogation for any damages or claims covered by the insurance.

Additional Insured Endorsement Requirements.

The Contractor shall name, on any policy of insurance required the District, their officers, employees, Construction Manager, Architect, and all other Agents and Representatives as additional insureds. Subcontractors shall name the Contractor, the District, their officers, employees, Construction Manager, Architect, and all other Agents and Representatives as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance that is applicable to the loss, such other insurance shall be on an excess or contingent basis. The insurance provided by the Contractor must be designated in the policy as primary to any insurance obtained by the District. The amount of the insurer’s liability shall not be reduced by the existence of such other insurance.

Public Contract Code Section 22300 permits the substitution of securities for any retention monies withheld by the DISTRICT to ensure performance under this Agreement. At the request and expense of the CONTRACTOR, securities equivalent to the monies withheld shall be deposited with the DISTRICT, or with a state or federally chartered bank in California as the escrow agent, who shall then pay such monies to the CONTRACTOR. The DISTRICT retains the sole discretion to approve the bank selected by the CONTRACTOR to serve as escrow agent. Upon satisfactory completion of the Agreement, the securities shall be returned to the CONTRACTOR. Securities eligible for investment shall include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit. The CONTRACTOR shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

In the alternative, under Section 22300, the CONTRACTOR may request DISTRICT to make payment of earned retention monies directly to the escrow agent at the expense of the CONTRACTOR. Also at the CONTRACTOR's expense, the CONTRACTOR may direct investment of the payments into securities, and the CONTRACTOR shall receive interest earned on such investment upon the same conditions as provided for securities deposited by CONTRACTOR. Upon satisfactory completion of the Agreement, CONTRACTOR shall receive from the escrow agent all securities, interest and payments received by escrow agent from DISTRICT pursuant to the terms of Section 22300.

If CONTRACTOR is a corporation, the undersigned hereby represents and warrants that the corporation is duly incorporated and in good standing in the State of____________________, and that____________________, whose title is____________________, is authorized to act for and bind the corporation.

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

12. This Agreement constitutes the entire agreement of the parties. No other agreements, oral or written, pertaining to the work to be performed, exists between the parties. This Agreement can be modified only by an amendment in writing, signed by both parties and pursuant to action of the Governing Board of the District. This Agreement shall be governed by the laws of the State of California.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed.

DISTRICT

By: ________________________________
    Signature

CONTRACTOR

By: ________________________________
    Signature

Print Name

Print Name

Title

Title

Contractor's License No.

Tax ID/Social Security No.

(CORPORATE SEAL OF CONTRACTOR,
if corporation)
ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into, as of ________________________, 20____, by and between South Orange County Community College District, whose address is 28000 Marguerite Parkway, Mission Viejo, CA 92692 hereinafter called “DISTRICT;” ________________________________, whose address is ________________________________, hereinafter called “Contractor;” and, ________________________________, whose address is ________________________________, hereinafter called “Escrow Agent.”

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

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by DISTRICT pursuant to the Agreement entered into between the DISTRICT and Contractor for ______________________ in the amount of ______________________, dated ______________________ (hereinafter referred to as the “Agreement”). Alternatively, on written request of the Contractor, the DISTRICT shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for retention earnings, the Escrow Agent shall notify the DISTRICT within ten (10) days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Agreement between the DISTRICT and Contractor. Securities shall be held in the name of DISTRICT, and shall designate the Contractor as the beneficial owner.

(2) The DISTRICT shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the DISTRICT makes payment of retainments earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time the escrow created under this Escrow Agreement is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the DISTRICT pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the DISTRICT. These expenses and payment terms shall be determined by the DISTRICT, Contractor and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the DISTRICT.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the DISTRICT to the Escrow Agent that DISTRICT consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The DISTRICT shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days’ written notice to the Escrow Agent from the DISTRICT of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the DISTRICT.
(8) Upon receipt of written notification from the DISTRICT certifying that the Agreement is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Agreement, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.

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

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

On behalf of DISTRICT: On behalf of Contractor:

<table>
<thead>
<tr>
<th>Title</th>
<th>Title</th>
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<tr>
<td>Name</td>
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<tr>
<td>Signature</td>
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<tr>
<td>Address</td>
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</tbody>
</table>
On behalf of Escrow Agent:

Title

Name

Signature

Address

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

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

DISTRICT

Title

Name

Signature

CONTRACTOR

Title

Name

Signature

Escrow Agent

Title

Name

Signature
GUARANTEE

Guarantee for____________________. We hereby guarantee that the____________________, which we have installed in____________________, has been done in accordance with the Project Documents and that the work as installed will fulfill the requirements included in the Project Documents. The undersigned agrees to repair or replace any or all of such work, together with any other adjacent work which may be displaced in connection with such repair or replacement, that may prove to be defective in workmanship or material within a period of one (1) year from the date of completion of the Project, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of the undersigned's or undersigned surety's failure to commence and pursue with diligence said repairs or replacements within ten (10) calendar days after being notified in writing by the DISTRICT, the undersigned authorizes the DISTRICT to proceed to have said defects repaired or replaced and made good at the expense of the undersigned and surety who hereby agree to pay the costs and charges therefore immediately upon demand. (General Conditions Article 47(d))

____________________________________
Name of Contractor

By: ________________________________
Signature of Contractor

____________________________________
Print Name

____________________________________
Title

Contractor shall provide copy of this Guarantee to Contractor's surety.
Guarantee (continued)

Name of Subcontractor
(if work performed by subcontractor)

By: ____________________________
Signature of Subcontractor

____________________________________
Print Name

____________________________________
Title

Representatives to be contacted for service:

Name: ______________________________

Address: ____________________________

____________________________________

Telephone: ___________________________
SHOP DRAWING TRANSMITTAL

The procedure governing shop drawing submittals is contained in the General Conditions. In addition, all Supplemental Conditions, Special Conditions and Specifications must be followed by the CONTRACTOR.

Failure to comply with all requirements will constitute grounds for return of the shop drawing for proper resubmittal. CONTRACTOR shall sequentially number each submittal.

Date: ___________________________  Submittal No.: ___________________________

From: ___________________________  To: ___________________________

Project Name: ___________________________

This is a(n):  
Original  
Submittal  
2nd Submittal  
[ ] Submittal

Subject of Submittal:  
Equipment Specification
Designation:  Section(s):

Complete either (a) or (b)  
Check One:

(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (no exceptions).

(b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except for the following deviations (List deviations on an attached sheet).

(continued on next page)
The CONTRACTOR has reviewed and approved not only the field dimensions but the construction criteria and has also made written notation regarding any information in the shop drawings that does not conform to the Project Documents. This shop drawing has been coordinated with all other shop drawings received to date by CONTRACTOR and this duty of coordination has not been delegated to subcontractors, material suppliers, the ARCHITECT, or the engineers on this Project.

Signature of Contractor or Supplier
DRUG-FREE WORKPLACE CERTIFICATION

This Drug-Free Workplace Certification is required pursuant to Government Code Sections 8350, et seq., the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract for the procurement of any property or services from any State agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract awarded by a State agency may be subject to suspension of payments or termination of the contract and the contractor may be subject to debarment from future contracting, if the state agency determines that specified acts have occurred.

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

a) publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition;

b) establishing a drug-free awareness program to inform employees about all of the following:

1) the dangers of drug abuse in the workplace;

2) the person's or organization's policy of maintaining a drug-free workplace;

3) the availability of drug counseling, rehabilitation and employee-assistance programs;

4) the penalties that may be imposed upon employees for drug abuse violations;

c) requiring that each employee engaged in the performance of the contract be given a copy of the statement required by subdivision (a) and that, as a condition of employment on the contract, the employee agrees to abide by the terms of the statement.

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

I also understand that if the DISTRICT determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of Section 8355, that the contract awarded herein is subject to suspension of payments, termination, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350, et seq.
I acknowledge that I am aware of the provisions of Government Code Section 8350, et seq. and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

__________________________
NAME OF CONTRACTOR

__________________________
Signature

__________________________
Print Name

__________________________
Title

__________________________
Date
CHANGE ORDER NO. (ADDITIVE)

PROJECT: ________________________________________________________________

TO: ________________________________________________________________

You are hereby directed to provide the extra work necessary to comply with this Change Order.

DESCRIPTION OF CHANGE: __________________________________________________________

COST (This cost shall not be exceeded):

Original contract price: $ ________________
Change Order amount: $ ________________
New contract price: $ ________________

TIME FOR COMPLETION:

Original completion date: ________________
Time for completion of
Change Order: ________________
New completion date: ________________

Contractor agrees to perform the above-described work in accordance with the above terms and in compliance with applicable sections of the Project Documents. The amount of the charges under this Change Order is limited to the charges allowed under Article 60 of the General Conditions. The adjustment in the contract sum, if any, and the adjustment in the contract time, if any, set out in this Change Order shall constitute the entire compensation and/or adjustment in the contract time due Contractor arising out of the change in the work covered by this Change Order, unless otherwise provided in this Change Order.

No additions or deletions to this Change Order shall be allowed, except with written permission of District. Contractor accepts the terms and conditions stated above as full and final settlement of any and all claims arising from this Change Order.

(continued on next page)
This Change Order is hereby agreed to, accepted and approved.

CONTRACTOR

By: _______________________________
    Signature

Print Name

Title

Date

ARCHITECT

By: _______________________________
    Signature

Print Name

Title

Date

DISTRICT

By: _______________________________
    Signature

Print Name

Title

Date
CHANGE ORDER NO. ____________________ (DEDUCTIVE)

PROJECT: ____________________________________________________________

TO: ________________________________________________________________
You are hereby directed to comply with this Change Order.

DESCRIPTION OF CHANGE: __________________________________________

____________________________________________________________________

____________________________________________________________________

COST (This cost shall be deleted.):

- Original contract price: $ _________________
- Change Order amount: $ _________________
- New contract price: $ _________________

TIME FOR COMPLETION:

- Original completion date: _________________
- Time for completion of
  - Change Order: _________________
- New completion date: _________________

Contractor agrees to deduct the above-described work in accordance with the above terms and in compliance with applicable sections of the Project Documents. Contractor agrees to the adjustment in the contract sum, if any, and the adjustment in the contract time, if any, set out in this Change Order.

No additions or deletions to this Change Order shall be allowed, except with written permission of District. Contractor accepts the terms and conditions stated above as full and final settlement of any and all claims arising from this Change Order.

(continued on next page)
This Change Order is hereby agreed to, accepted and approved.

CONTRACTOR

By: ______________________________

Print Name

Title

Date

DISTRICT

By: ______________________________

Print Name

Title

Date

ARCHITECT

By: ______________________________

Signature

Print Name

Title

Date
CONTRACTOR’S CERTIFICATE REGARDING NON-ASBESTOS CONTAINING MATERIALS

Per Article 70 of the General Conditions.

Certification for _______________________. We hereby certify that no Asbestos, or Asbestos Containing Materials shall be used in this Project or in any tools, devices, clothing, or equipment used to affect the ______________________ which we have installed in the South Orange County Community College District under Project/Bid No. ___

(a) The Contractor further certifies that he/she has instructed his/her employees with respect to the above mentioned standards, hazards, risks and liabilities.

(b) Asbestos and/or asbestos containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite and actinolite.

(c) Any or all material containing greater than one-tenth of one percent (.1%) asbestos shall be defined as asbestos containing material.

(d) Any disputes involving the question of whether or not material contains asbestos shall be settled by electron microscopy. The costs of any such tests shall be paid by the Contractor if the material is found to contain asbestos.

(e) All work or materials found to contain asbestos or work or material installed with asbestos containing equipment will be immediately rejected and this work will be removed at no additional cost to the District.

__________________________  __________________________
Date                      Name of Contractor

By: ____________________________
   Signature

__________________________
Print Name

__________________________
Title
PROJECT MANUAL
for:

BGS Building Fire Damage Repair

Saddleback College
28000 Marguerite Parkway
Mission Viejo, CA 92692

Prepared By:

R²A Architecture
2900 Bristol Street, Suite E-205
Costa Mesa, CA 92626
(714) 435-0380

14002.00
09-09-2014
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for:

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Prepared By:

R²A Architecture
2900 Bristol Street, Suite E-205
Costa Mesa, CA 92626
(714) 435-0380

14002.00
09-09-2014
Seals Page

ARCHITECT

R2A Architecture
2900 Bristol Street, Suite E-205
Costa Mesa, CA 92626-7909
P: (714) 435-0380
F: (714) 435-0383

Architect of Record: Etienne G. Runge
License: C28482
Expiration: 10-31-2015
KNA Consulting Engineers, Inc.
9931 Muirlands Boulevard
Irvine, CA  92618
P: (949) 462-3200
F: (949) 462-3201

Structural Engineer of Record: David R. Nelson
License: 2553
Exp. Date: 3/31/2016
MECHANICAL - PLUMBING ENGINEER

IDS Mechanical Engineers, Inc.
1 Peters Canyon Road, Suite 130
Irvine, CA 92606
P: (949) 387-8500
F: (949) 387-0800

Mechanical Engineer of Record: Maysoon Sheabaan
License: 34347
Expiration: 12-31-2014
ELECTRICAL ENGINEER

OMB Electrical Engineers
8825 Research Drive
Irvine, CA 92618
P: (949) 753-1553
F: (949) 753-1992

Electrical Engineer of Record: Jeffery C. Overmyer
License: E8964
Expiration: 03-31-2016
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ARTICLE 1

DEFINITIONS

1.1. Basic Definitions

   a. **Acceptance**. The point that the Work as a whole is accepted by the Board of Trustees.

   b. **Action of the Governing Board**. A vote of a majority of the members in a lawful meeting.


   d. **Addenda**. The changes in Plans, Specifications, Drawings, and/or Project Documents which have been authorized in writing by the DISTRICT or ARCHITECT, and which alter, explain or clarify the Project Documents prior to the bid deadline.

   e. **Agents & Representatives**. All project participants employed by or holding contract with the DISTRICT other than the CONTRACTOR.

   f. **Agreement**. Includes collectively all Project Documents.

   g. **Applicable Laws**. All statutes, ordinances, rules, regulations, policies and guidelines enacted by Governmental Authorities (including, without limitation, Environmental Laws and Disability Laws), codes adopted or promulgated by Governmental Authorities (including, without limitation, building and health and safety codes), lawful orders of Governmental Authorities and common law, including but not limited to, principles of equity applied by the courts of the State of California, which are in effect at the time the Work is performed.

   h. **Application for Payment**. CONTRACTOR’S itemized application for Progress Payment or Final Payment prepared, submitted and substantiated for review and approval by DISTRICT in accordance with the requirements of the Contract Documents.

   i. **Approval**. Written authorization by ARCHITECT or DISTRICT.

   j. **ARCHITECT**. Architect of Record/individual or representative acting as the licensed architect that has responsibility for preparing the Construction Documents and whose professional certification stamp will appear on the Construction Documents.

   k. **Award of Contract**. The action of the Board of Trustees duly approving the DISTRICT’S entering into the Agreement with the CONTRACTOR.

   l. **Board of Trustees**. The governing board of the South Orange County Community College District.

   m. **Change Order**. A written instrument, signed in accordance with the requirements of the General Conditions, setting forth the agreement of DISTRICT and CONTRACTOR on the terms of the contract adjustment.

   n. **Concurrent Delay**. The portion of two or more delays affecting the critical path to Completion that are overlapping or co-existent

   o. **CONTRACTOR**. Those mentioned as such in the Agreement. They are treated throughout the Project Documents as if they are of singular number and neuter gender.
p. **Construction Documents.** The Division of the State Architect stamped Drawings and Specifications for the Project, including all addenda and construction change directives (CCDs).

q. **Contract Documents.** The following collection of documents governing the CONTRACTOR’S performance of the Work:

1. Notice Calling for Bids
2. Information for Bidders
3. Bid Form
4. Designation of Subcontractors Form
5. Noncollusion Affidavit
6. Workers’ Compensation Certificate
7. Faithful Performance Bond
8. Payment Bond
9. Agreement
10. Escrow Agreement
11. Drug Free Workplace Certification
12. Change Orders
13. Insurance Forms
14. Guarantee Forms
15. Contractor’s Certificate Regarding Non-Asbestos Containing Materials
17. General Conditions
18. Supplemental and Special Conditions (if applicable)
19. Drawings, Specifications and all modifications addenda and amendments
20. Reference documents
21. Labor Compliance Program documents
22. Those documents, or portions or provisions of documents that, although not listed in subparagraphs a through above, are expressly cross-referenced therein or attached thereto.

r. **Date of Commencement of Construction.** The starting date set forth in the Notice to Proceed, from which is measured the Contract Time for completion of the Work. If no Notice to Proceed is issues, then the DATE OF Commencement of Construction shall be the date the CONTRACTOR actually commences Work at the Site as noted in final construction progress meeting minutes.

s. **Day.** Defined as business day unless otherwise noted.

t. **Defective Work.** Work by CONTRACTOR or its subcontractors that contains, includes or constitutes materials, equipment labor, workmanship, construction services or other construction performed or provided by the CONTRACTOR or its subcontractor that is (a) faulty, omitted, incomplete, or deficient or (b) does not conform to Applicable Laws, the Contract Documents, or the requirements of any inspection, reference standard, test, code or approval specified in the Contract Documents.

u. **Department of Industrial Relations.** The Department of Industrial Relations of the State of California.
v. **Disability Laws.** All applicable federal, state, local or municipal laws, rules, orders, regulations, statutes, ordinances, codes, decrees or requirements of any Government Authority, for persons with disabilities, including, without limitation, the Americans With Disabilities Act (42 U.S.C. §§ 12101, et seq.) and the Fair Housing Amendments Act of 1988 (42 U.S.C. §§ 3604 et seq.).

w. **DISTRICT.** The Governing Board of the South Orange County Community College District for a community college district organized under the laws of the State of California, acting through its Chancellor, Vice Chancellor(s) or their designees designated by him/her to act on his/her behalf.

x. **Drawings.** The graphic and pictorial portions of the Project Criteria or Construction documents showing the design, location and dimensions of the Work, including Plans elevations, details, schedule and diagrams. The term “Drawings” is used interchangeably with “Plans”.

y. **DSA.** The Division of the State Architect in the Department of General Services for the State of California.

z. **Environmental Laws.** All applicable federal, state, local or municipal laws, rules orders, regulations, statutes, ordinances, codes, decrees, or requirements of any Governmental Authority, which regulate, relate to, or impose liability or standards of conduct concerning any Hazardous Substance (including, without limitation, the use, handling, transportation, production, disposal, discharge or storage thereof), occupational or environmental conditions on, under, or about the Site or Existing Improvements (including, without limitation, soil, groundwater, and indoor and ambient air conditions), or occupational health or industrial hygiene (but only to the extent related to Hazardous Substances on, under, or about the Site of Existing Improvements), as now or may at any later time be in effect, including without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. §§ 9601 et seq.]; the Resource Conservation and Recovery Act of 1976 [42 U.S.C. §§ 6901 et seq.]; the Clean Water Act (also known as the Federal Water Pollution Control Act) [33 U.S.C. §§ 1251 et seq.]; the Toxic Substances Control Act [15 U.S.C.A. §§ 2601 et seq.]; the Hazardous Substances Transportation Act [49 U.S.C. §§ 1801 et seq.]; the Insecticide, Fungicide, Rodenticide Act [7 U.S.C.A §§ 136 et seq.]; the Superfund Amendments and Reauthorization Act [42 U.S.C.A. §§ 6901 et seq.]; the Clean Air Act [42 U.S.C. §§ 7401 et seq.]; the Safe Drinking Water Act [42 U.S.C.A §§ 300f et seq.]; the Solid Waste Disposal Act [42 U.S.C. §§ 6901 et seq.]; the Surface Mining Control and Reclamation Act [30 U.S.C.A. §§ 1201 et seq.]; the Emergency Planning and Community Right to Know Act [42 U.S.C §§ 11001 et seq.]; the Occupational Safety and Health Act [29 U.S.C. 655 and 657]; the Residential Lead-Based Paint Exposure Act (Title X of the Housing and Community Development Act of 1992) [15 U.S.C. §§ 2681 et seq.]; the Lead-Based Paint Poisoning Prevention Act [42 U.S.C. §§ 4821 et seq.]; and all similar federal, state or local laws, rules orders, regulations, statutes, ordinances, codes, decrees or requirement.
aa.  **Escrow Agent.** The entity serving as escrow agent pursuant to California Public Contract Code §22300 in connection with the deposit of securities or retention.

bb.  **Existing Improvements.** All improvements that, as of the Award of Contract date are located above or below the surface of the ground at the Site, including but not limited to existing buildings, utilities, infrastructure improvements and other facilities.

c.  **Extra Work.** Labor, materials, equipment, services or other work, not reasonably inferable from the design and other information set forth in the Contract Documents, the performance of which requires the expenditure by the CONTRACTOR or additional and unforeseen costs of performance. References to Extra Work shall not be interpreted to mean or imply that the CONTRACTOR is entitled to contract adjustment unless such Extra Work is accepted through written instruction by the DISTRICT.

d.  **General Conditions.** The herein set forth general terms and conditions governing performance of the Work.

e.  **Governmental Authority.** The United States, the State of California, the County of Orange, the City in which the Project is located, any other local (other than county, regional, state or federal political subdivision, authority, agency, department, commission, board, bureau, court, judicial or quasi-judicial body, and any legislative or quasi-legislative body, or instrumentality of any of them, which exercises jurisdiction over the Project, Work, Site, CONTRACTOR or DISTRICT, including, without limitation, any Governmental Authorities (including, without limitation, DSA) having jurisdiction to review and approve or reject the Construction Documents, Contract Documents or the Work based on compliance or non-compliance with Applicable Laws.

ff.  **Hazardous Substance.** Either of the following: (1) any chemical, material or other substance defined as or included within the definition of “hazardous substances,” “hazardous wastes,” “extremely hazardous substances,” “toxic substances,” “toxic material,” “restricted hazardous waste,” “special waste,” “contamination” or words of similar import under any Environmental Law, including, without limitation, the following: petroleum (including crude oil or any fraction thereof), asbestos, asbestos-containing materials, polychlorinated biphenyls (“PCBs”) and PCB-containing materials, whether or not occurring naturally; or (2) any substance that because of its quantity, concentration or physical or chemical characteristics poses a significant present or potential hazard to human health and safety or to the environment, and which has been determined by any governmental Authority to be a hazardous waste or hazardous substance.

g.  **Inspector of Record.** A certified inspector approved by the Office of Regulations Services of the Division of State Architect for the Department of General Services of the State of California to inspect the Work pursuant to the Field Act (California Education Code §§ 81130.3 et seq.) and applicable provisions of the California Code of Regulations with a class rating sufficient for the Work.

hh.  **Lean Scheduling.** Using a reverse phase schedule, subcontractors plan the project starting with the last work activity and work backwards to ensure that each subcontractor consider
what work must be done prior to any scheduled activity thus ensuring adequate durations are in place for late activities, possible constraints are identified early and all participating trades have buy-in during Project planning.

ii. **Locality.** Where the work is performed means the county and city in which the work is done.

jj. **Notice of Completion.** A “notice of completion” as defined in California Civil Code §3093 means the written notice by DISTRICT and approved by the Board of Trustees confirming the date that the Work is finally completed by CONTRACTOR

kk. **Notice to Proceed.** The written notice issued by the DISTRICT to the CONTRACTOR to begin the Work.

ll. **Plans.** The graphic and pictorial portions of the Project Criteria or Construction Documents showing the design, location and dimensions of the Work, including plans elevations, details, schedules and diagrams. The term “Plans” is used interchangeably with “Drawings”.

mm. **Project.** The planned undertaking as provided for in the Project Documents by DISTRICT and CONTRACTOR.

nn. **Project Documents.** Collectively, to wit: Notice Calling for Bids, Information for Bidders, Bid Form, Bid Security, Designation of Subcontractor form, Information Required of Bidder, all prequalification forms submitted pursuant to Public Contract Code Section 20111.5, if any, Noncollusion Affidavit, Workers’ Compensation Certificate, Faithful Performance Bond, Payment Bond, Agreement, Escrow Agreement, Drug-Free Workplace Certification, Change Order forms, Shop Drawing Transmittals form, Insurance Certificates and Endorsements, Guarantee form, Contractor’s Certificate Regarding Non-Asbestos Containing Materials, General Conditions, Supplemental Conditions, if any, Special Conditions, if any, Drawings, Specifications, and all modifications, addenda and amendments thereto. The Project Documents are complementary, and what is called for by any one shall be as binding as if called for by all.

oo. **Provide.** Shall include "provide complete in place," that is, "furnish and install."

pp. **Record Documents.** The collection of documents assembled and prepared by CONTRACTOR (including, without limitation, the Record Drawings and Specifications, warranties, guaranties, maintenance and operations manuals and other documents both hard copy and electronic format) that are to be maintained by the CONTRACTOR on the Site and delivered to the DISTRICT upon Final Completion of the work showing the condition of the Work as actually built. For purposes of these Contract Documents, the Record Drawings and Specifications **must utilize Building Information Modeling (BIM) technology** and are defined to include both hard copy and electronic format marked by CONTRACTOR to show the condition, location and placement of the Work as actually built, including, without limitation, the locations, lengths and dimensions of mechanical, electrical, plumbing, HVAC or similar portions of the Work that are depicted diagrammatically in the Contract Documents.
qq. **Safety Orders.** Those orders issued by the Division of Industrial Safety and OSHA safety and health standards for construction.

rr. **Schedule of Values.** A detailed, itemized breakdown of the Contract Sum, which provides for an allocation of the dollar values to each of the various parts of the Work.

ss. **Shop Drawing.** As used herein shall be understood to include, but not be limited to, detail design calculations, fabrication and installation drawings, lists, graphs and operating instructions.

tt. **Site.** (1) The parcel of land identified in the Contract Documents on which the Project is to be constructed and such additional parcels as may be purchased by DISTRICT for such construction; (2) all areas adjacent to such parcels that may be used by CONTRACTOR for staging, storage, parking or temporary offices; and (3) all land areas, both private and public, adjacent to such parcels on which Work is required to be performed under the Contract Documents, Applicable Laws or permits relating to the Project.

uu. **Specifications.** The portion of the Construction Documents consisting of the written requirement for materials, equipment, standards and workmanship for the Work and performance of related services.

vv. **Standards, Rules, and Regulations.** Recognized printed standards that shall be considered as one and a part of these Specifications within limits specified.

ww. **Subcontractor.** Those parties having a direct contractual relationship with CONTRACTOR and one who furnishes material worked to a special design according to Plans, Drawings, and Specifications, but does not include one who merely furnishes material not so worked.

xx. **Surety.** The person, firm, or corporation that executes as a California admitted surety insurer, the CONTRACTOR'S Bid Security, faithful performance bond and payment bond per California Insurance Code §995.120.

yy. **Work.** Labor or materials (including, without limitation, equipment and appliances) or both, incorporated in, or to be incorporated in the Project by the CONTRACTOR or subcontractor.

zz. **Workers.** Laborer, worker, or mechanic employed by the CONTRACTOR or subcontractor.

aaa. **Working day.** A business day.

1.2. **Correlation, Interpretation and Intent of Contract Documents**

a. **Technical Words.** Unless otherwise stated in the Contract Documents, technical words and abbreviations contained in the Contract Documents are used in accordance with commonly understood construction industry meanings and non-technical words and abbreviations are used in accordance with their commonly understood meanings.

b. **Incidental Items.** The naming of any material or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and labor therefore, in accordance with first-class practices of the trade involved, unless specifically noted otherwise.
c. **Applicable Laws.** Compliance with Applicable Laws shall be considered as a part of the Work.

d. **Singular, Gender, Captions.** When appropriate to the contexts, the use of the singular number shall be deemed to include the plural and vice versa. Each gender shall be deemed to include any other gender, and each shall include corporation, partnership, trust or other legal entity whenever the context so requires. The captions and headings of the various subdivisions of the Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of the Contract Documents or any subdivision thereof.

e. **Cross-References.** Any cross-references indicated between various paragraphs or other portions of the Specifications, Drawings or other Contract Documents are provided for the convenience of the CONTRACTOR and shall not be deemed to be all-inclusive.

f. **Demolition.** Existing Improvements at the Site, for which no specific description is made in the Project Criteria or Approved Deviations, but which could be reasonably assumed to interfere with the satisfactory completion of the Work, shall be removed and disposed of by the CONTRACTOR without Contract Adjustment.

g. **Omissions.** Items missing from the Contract Documents shall nevertheless be provided by the CONTRACTOR, without Contract Adjustment, to the extent reasonably inferable from the Contract Documents as being necessary to satisfy the Project.

h. **Conditions Precedent.** Wording used in the Contract Documents indicating that a right of the CONTRACTOR or an obligation of DISTRICT (either directly or through the District Project Manager) is subject to or conditioned upon the occurrence of a condition or event, whether or not such condition or event is within the control of CONTRACTOR, DISTRICT or others and whether or not such condition or event is designated to be a condition precedent, shall be understood and interpreted to mean that the stated condition or event is a condition precedent to the existence, arising, performance and exercise of such right or obligation.

i. **Design Deficiencies.** Statements in the Contract Documents to the effect that CONTRACTOR shall comply with or conform to the requirements of the Contract Documents shall not be interpreted as relieving the CONTRACTOR from any responsibility to correct any design deficiency in the Construction Documents.

j. **Conflicts.** All conflicts in the Contract Documents shall be reported to the District Project Manager in writing before proceeding with the Work affected thereby. Notwithstanding the order of precedence provisions set forth in this document, in the event of conflict between any of the Contract Documents, the provision placing a more stringent requirement or greater burden on the CONTRACTOR or requiring the greater quantity or higher quality material or the workmanship shall prevail, unless otherwise directed by the DISTRICT in writing. Conflicts that cannot be so resolved shall be interpreted in accordance with the following order of precedence (the first being the highest order of precedence):

1. **Applicable Laws** (provided, however, that where the Contract Documents or manufacturer’s recommendations or specification required standards higher than
those of Applicable Laws, the Contract Documents or manufacturer recommendations or specifications shall control);

2. Addenda;
3. Change Orders, Unilateral Change Orders and Field Orders;
4. General Conditions;
5. Supplementary and Special Conditions;
6. Final Construction Documents approved by DISTRICT; and
7. Reference Documents.

k. **Rehabilitation Work.** If any existing conditions in Existing Improvements, such as deterioration or construction not complying with Applicable Laws, be discovered by CONTRACTOR, with respect to which the Work covered by the Contract Documents does not provide for rectification of such conditions in a manner that complies with Title 24, California Code of Regulations, then a separate set of Drawings and Specifications, detailing and specifying the Work required to so rectify such conditions shall be developed and approved by the Office of Regulations Services of the Division of the State Architect in the State Department of the General Services for the State of California before proceeding with the Work.

### ARTICLE 2   STATUS OF CONTRACTOR

2.1. **Independent Contractor.** CONTRACTOR is and shall at all times be deemed to be an independent contractor and shall be wholly responsible for the manner in which it performs the services required of it by the terms of the Project Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the DISTRICT and CONTRACTOR or any of CONTRACTOR’S agents or employees. CONTRACTOR assumes exclusively the responsibility for the acts of its employees as they relate to the services to be provided during the course and scope of their employment. CONTRACTOR, its agents and employees shall not be entitled to any rights or privileges of DISTRICT employees and shall not be considered in any manner to be DISTRICT employees. DISTRICT shall be permitted to monitor the activities of the CONTRACTOR to determine compliance with the terms of the Project Documents.

2.2. **Licensed Contractor.** CONTRACTORS are required by law to be licensed and regulated by the Contractors’ State License Board. Any CONTRACTOR not so licensed is subject to penalties under the law, and the contract will be considered void pursuant to Section 7028.7 of the Business and Professions Code. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, 9821 Business Park Drive, P. O. Box 26000, Sacramento, CA 95826.

### ARTICLE 3   CHANGE IN NAME AND NATURE OF CONTRACTOR’S LEGAL ENTITY

3.1. **Legal Change.** Before CONTRACTOR makes any change in the name or legal nature of the CONTRACTOR’S entity, CONTRACTOR shall first notify the DISTRICT in writing and cooperate with DISTRICT in making such changes as the DISTRICT may request in the Project Documents.
ARTICLE 4  CONTRACTOR'S SUPERVISION, PROSECUTION AND PROGRESS

4.1.  Personnel. During progress of the work, CONTRACTOR shall keep on the work Site at all times that Work is underway competent management personnel ("Personnel" equals project manager, superintendent and engineer) satisfactory to DISTRICT.

a. Before commencing the work herein, CONTRACTOR shall give written notice to DISTRICT and ARCHITECT of the name, qualifications and experience of Personnel.

b. If any one or more of the Personnel is found unsatisfactory by DISTRICT, CONTRACTOR shall replace the unsatisfactory Personnel with one or more that are acceptable to the DISTRICT.

c. Personnel shall not be changed except with written consent of DISTRICT, unless Personnel proves to be unsatisfactory to CONTRACTOR and/or ceases to be in its employ, in which case, CONTRACTOR shall notify DISTRICT and ARCHITECT in writing and replace said personnel with one or more replacement acceptable to the DISTRICT.

d. Of the assigned Site Personnel, one or more persons shall be identified to represent CONTRACTOR and all directions given to identified personnel shall be as binding as if given to CONTRACTOR. If no single person is identified to represent CONTRACTOR, all Site Personnel shall be determined to act as CONTRACTOR representatives.

e. CONTRACTOR shall provide prior to the start of the Work, telephone numbers where Personnel can be reached 24 hours a day, 7 days a week.

4.2.  Project Knowledge. CONTRACTOR shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills as may be necessary to perform the work in accordance with the Project Documents.

a. Document Inconsistency. CONTRACTOR shall carefully study and compare all Plans, Drawings, Specifications, and other instructions and shall at once report to ARCHITECT any error, inconsistency or omission which CONTRACTOR or its employees may discover. The CONTRACTOR represents itself to DISTRICT as a skilled, knowledgeable, and experienced CONTRACTOR. The CONTRACTOR shall carefully study and compare the Project Documents with each other, and shall at once report to the ARCHITECT any errors, inconsistencies, or omissions discovered. The CONTRACTOR shall be liable to the DISTRICT for damage resulting from errors, inconsistencies, or omissions in the Project Documents that the CONTRACTOR recognized and which CONTRACTOR knowingly failed to report and which a similarly skilled, knowledgeable, and experienced contractor would have discovered.

b. Verify Dimensions. The CONTRACTOR shall verify all indicated dimensions before ordering materials or equipment, or before performing work. The CONTRACTOR shall take field measurements, verify field conditions, and shall carefully compare such field measurements and conditions and other information known to the CONTRACTOR with the Project Documents before commencing work. Errors, inconsistencies or omissions discovered shall be reported to the DISTRICT at once. Upon commencement of any item of work, the CONTRACTOR shall be responsible for dimensions related to such item of work and shall make any corrections necessary to make work properly fit at no additional cost to DISTRICT.
This responsibility for verification of dimensions is a non-delegable duty and may not be delegated to subcontractors or agents.

c. Intent. Omissions from the Plans, Drawings or Specifications, or the mis-description of details of work which are manifestly necessary to carry out the intent of the Plans, Drawings and Specifications, or which are customarily performed, shall not relieve the CONTRACTOR from performing such omitted or mis-described work, but they shall be performed as if fully and correctly set forth and described in the Plans, Drawings and Specifications.

d. Unknown Conditions. Save and except as hereinafter provided, CONTRACTOR agrees at CONTRACTOR’S Own Expense to assume the risk and costs of Extra Work and Delay due to concealed or unknown conditions, surface or subsurface, at the Site or in Existing Improvements.

1. Differing Site Conditions. Differing Site Conditions are those conditions located at the Site or in Existing Improvements and not otherwise ascertainable by CONTRACTOR in the performance of its obligations that constitute: (1) hazardous materials that constitute hazardous waste, as defined in California Health and Safety Code §25117, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of Applicable Laws; (2) subsurface or concealed conditions at the Site or concealed conditions in Existing Improvements which differ materially from those indicated by the Contract Documents or other information available to CONTRACTOR prior to the Notice of Award; or (3) unknown physical conditions at the Site or concealed conditions in Existing Improvements of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

2. Notice of Change and Investigation. If CONTRACTOR encounters conditions it believes constitute Differing Site Conditions, then CONTRACTOR shall, before such conditions are disturbed, give notice stating, without limitation, a detailed description and precise location of the conditions encountered. Upon receipt of notice from CONTRACTOR, DISTRICT shall promptly investigate CONTRACTOR’S report of Differing Site Conditions.

3. Change Order Request. If CONTRACTOR intends to seek a contract adjustment based upon Differing Site Conditions, it shall submit a complete and timely Change Order Request setting forth its request. If DISTRICT finds that Differing Site Conditions exist, then a contract adjustment shall be made in such amounts and durations as DISTRICT determines according to a good faith determination by DISTRICT are reasonable and permitted by these general conditions.

4. Waiver by Contractor. Failure by CONTRACTOR to strictly comply with these requirements concerning the timing and content of any notice or request for contract adjustment based on Differing Site Conditions shall constitute a waiver by CONTRACTOR of the right to further recourse or recovery upon such claim.
5. Final Completion. No claim by CONTRACTOR for additional compensation for Differing Site Conditions shall be allowed if asserted after final payment.

4.3. **Daily Reports by Contractor.** At the close of each working day, the CONTRACTOR shall submit a daily report to the DISTRICT, ARCHITECT and the Inspector, on forms approved by the DISTRICT, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and for other services and expenditures when authorized concerning Extra Work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the DISTRICT and the CONTRACTOR. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by Subcontractors or others shall be submitted through the CONTRACTOR.

   a. Labor. The report shall show names of workers, classifications, and hours worked and hourly rate. Project Superintendent expenses are not allowed.

   b. Materials. The report shall describe and list quantities of materials used and unit cost.

   c. Equipment. The report shall show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable, and hourly/daily cost.

   d. Inspection and Testing Activities. A list of inspections performed by name of inspector and testing company and the type of inspection, items of the Work involved and a description of the outcome of such inspection or test

   e. Visitors, Guests, Dignitaries. A list of visitors and guests by name, title, company and purpose of visit.

   f. Areas of the Work. As statement of the areas of the Site on which the Work was performed and a detailed description of the stage, status and progress of the Work in each such area at the beginning and end of the Day.

   g. Accidents, Delays, Defective Work. A description in detail of any injuries to the workers, accidents or delays that occurred or defective work that was encountered.

   h. Payment. Timely and complete submission of daily reports by CONTRACTOR shall be a condition to CONTRACTOR’s right to payment under the contract.

4.4. **Progress Meetings.** CONTRACTOR shall coordinate and attend all progress meetings at the Site, at which meetings progress of the Work shall be reported in detail with reference to the then-current updated Schedule accepted by the DISTRICT. Progress meetings shall be held weekly, or at such other time or frequency as DISTRICT, in its sole and absolute discretion, deems necessary. The ARCHITECT, Inspector of Record and each Subcontractor then actively performing Work, scheduled to become active within one week (greater if determined to be in the best interest of the project) or currently a critical path activity whether or not performing, shall have a competent and knowledgeable representative present at such progress meeting to report on the condition of the Work of such Subcontractor and to receive relevant information. Meeting notes shall be taken by the CONTRACTOR and draft form distributed to the DISTRICT, all meeting attendees and all other
affected parties. Meeting Minutes will become final with incorporated comments by team members upon completion of the next regularly scheduled weekly meeting.

4.5. **Notice Requirements.** Under no circumstances shall information contained in CONTRACTOR’S daily job reports, monthly reports or progress meeting minutes relieve CONTRACTOR of its obligations to comply with, serve as a substitute for, nor constitute a waiver by DISTRICT of its right to insist upon, CONTRACTOR’S compliance with the provisions of the Contract Documents relative to timely and complete notice to DISTRICT of changes, delays, claims, or other matters for which written notice is required by the Contract Documents.

4.6. **Use of Site.** CONTRACTOR shall coordinate operations with, and secure the approval of, DISTRICT before using any portion of the Site.

a. **Staging Area.** CONTRACTOR will be assigned staging space on or adjacent to the Site, and all field offices, materials and equipment shall be kept within this area. Unless otherwise required by the Contract Documents, CONTRACTOR shall be responsible for restoring such areas and surrounding areas to the condition they were in prior to CONTRACTOR’S commencement of the Work.

b. **Existing Improvements.** During the installation of the Work, CONTRACTOR shall ensure that Existing Improvements are adequately protected. Upon Final Completion of the Work, all Existing Improvements that may have been damaged shall be restored to the condition they were in prior to CONTRACTOR’S commencement of the Work.

c. **Unauthorized Use.** Personnel of CONTRACTOR and the Subcontractors shall not occupy, live upon or otherwise make use of the Site during any time that the Work is not being performed at the Site, except as otherwise approved by DISTRICT.

d. **College Operations.** CONTRACTOR shall anticipate and take all necessary and reasonable measures to minimize and control dust and noise that might interfere with the use or enjoyment of the Site by the DISTRICT and the College’s students, staff and visitors. The CONTRACTOR shall familiarize itself with the activities of the College, including, without limitation, campus functions and ceremonies and plan the Work so as to avoid interferences or disturbances therewith. The CONTRACTOR shall enclose the working area with a substantial barricade and arrange the Work to cause minimum amount of inconvenience and danger to students, faculty, staff and visitors.

e. **Site Security.** CONTRACTOR is responsible for the security of the Site and all of the Work. Fences, barricades and other perimeter security shall be maintained in good condition and secured with locking devices. Damage shall be repaired immediately. Graffiti and unauthorized postings shall be removed or painted over so as to maintain a clean and neat appearance. Mobile equipment and operable machinery shall be kept locked or otherwise made inoperable whenever left unattended.

f. **Persons on Site.** CONTRACTOR shall not allow any person, other than the workers on the Project, or other individuals authorized by DISTRICT, to come upon any portion of the Site where the Work is being performed. Only authorized personnel will be permitted on the Site. CONTRACTOR shall at all times maintain good discipline and order among its
employees and the employees of Subcontractors. Any person in the employ of CONTRACTOR or any of Subcontractor whom DISTRICT may deem, in its sole and absolute discretion, incompetent, unfit, intertemperate, troublesome or otherwise undesirable shall be excluded from the Site and shall not again be employed on the Site except with written approval of DISTRICT and all losses to CONTRACTOR or DISTRICT associated therewith shall be paid at CONTRACTOR’S own expense.

g. Confinement of Operations. CONTRACTOR shall confine apparatus, the storage of materials and the operations of the workers to limits indicated by Contract Documents or as otherwise directed by DISTRICT in writing. CONTRACTOR shall confine access and parking at the Site to areas permitted by Applicable Laws and/or DISTRICT direction. CONTRACTOR acknowledges that it is experienced in performing construction within limited and confined areas and spaces such as those that are anticipated to exist on this Project and agrees to assume responsibility, without a contract adjustment, to take all special measures (including, without limitation, those related to protection, storage, staging and deliveries) as may be necessary to adapt its performance to the constraints of the Site.

h. Prohibited Substances. CONTRACTOR shall not permit (1) the possession or use of alcohol, smoking or controlled substances on the Site.

4.7 Dust, Fumes, Noise. CONTRACTOR shall take preventive measures to minimize, and eliminate wherever reasonably possible, generation of dust, fumes and noise.

a. CONTRACTOR shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas shall occur at least three times a day, preferably in the mid-morning afternoon and after work is done for the day.

b. The CONTRACTOR shall ensure that traffic speed on unpaved roads and Project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions by approximately 44%.

c. The California Air Resources Board, in Title 13, Chapter 10, Section 2485, Division 3 of the California Code of Regulations, imposes a requirement that heavy duty trucks accessing the site shall not idle for greater than five minutes at any location. This measure applies to construction traffic. Prior to grading, a sign shall be posted on-site stating that workers need to shut off engines after five minutes of idling.

d. All Rubber Tired Dozers and Scrapers shall be CARB Tier 2 Certified or better.

e. Equipment and materials shall be staged in areas that will create the greatest distance between construction related noise sources and the noise sensitive receptors nearest the construction site. Construction Equipment staging areas shall be located at least 300 feet away from Sensitive Receptors.

f. All equipment shall be equipped with properly operating and maintained mufflers. To the extent feasible, haul routes shall not pass directly by sensitive land uses.
4.8. **Drainage, Erosion.** CONTRACTOR shall be responsible for changes in patterns of surface water drainage resulting from, and related erosion control made necessary by, the performance of the Work. DISTRICT Projects are part of a larger common plan of development and CONTRACTOR’S are required to develop and implement a Storm Water Pollution Prevention Plan (SWPPP) regardless of size of Project impacted area.

a. **CONTRACTOR’S Responsibility.** The CONTRACTOR shall (1) file and obtain the Storm Water Permit; (2) furnish all notices required under the Storm Water Permit; (3) prior to starting any Work at the Site prepare the Storm Water Management Plans and Storm Water Pollution Prevention Plans; and (4) take all necessary steps to monitor, report, enforce and otherwise implement and comply with the requirements of the Storm Water Permit, Storm Water Management Plans and Storm Water Pollution Prevention Plans and all Applicable Laws pertaining to the elimination or mitigation of storm water pollutant discharge to separate storm sewer systems or other watercourses, including without limitation, applicable requirements of the State Water Resources Control Board, Orange County Region Water Quality Control Board and municipal storm water management programs.

b. **Copies of Reports.** The CONTRACTOR shall provide copies of all reports and monitoring information to the DISTRICT.

c. **Violations.** The CONTRACTOR recognizes and understands that failure to comply with the requirements of the Storm Water Permit is a violation of federal and state law.

d. **Condition of Payment.** Compliance by the CONTRACTOR with these requirements shall be a condition to the CONTRACTOR’S right to payment under its Applications for Payment.

e. **Costs of Compliance.** The CONTRACTOR represents and warrants that it has included in the contract sum all costs of compliance with these requirements.

4.9. **Land Clearing and Excavation Activities.**

a. Prior to land-clearing activities from February 1 through August 31, at the expense of the CONTRACTOR and in relationship to addressing CEQA mitigation measures, a qualified biologist shall first evaluate the type and extent of vegetation removal and the impact, if any, on nesting birds. If determined necessary, the biologist shall conduct a survey and specify the appropriate mitigation measures for impacts which may include avoidance of occupied nests, working outside an established buffer area, modified scheduling of grading and clearing, and monitoring of active nests during construction.

b. Prior to any excavation, the CONTRACTOR shall compare the limits of proposed excavations with the depth and lateral extent of existing sub-surface disturbances, including foundations, utility and fill materials using information including but not limited to: as built construction plans, underground utility surveys and geotechnical information including boring and trenching logs. Should excavations exceed five feet in depth, a qualified paleontologist shall be retained to conduct additional paleontological assessment using pre-construction geotechnical surveys to better define the subsurface geological feature of the campus. Should data indicate paleontological sensitivity, District shall retain a qualified paleontologist to facilitate a preconstruction meeting and monitor all earth-moving activity.
with the potential to disturb previously undisturbed paleontologically sensitive sediment. Should resources be uncovered as a result of grading or excavation shallower than five feet, work shall cease until a paleontological monitor arrives.

c. All clearing, grading, earth-moving or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.

4.10. **Solid Waste Management.** CONTRACTOR shall comply with all provisions of Applicable Laws (including, without limitation, the requirements of the California Public Resources Code, rules and regulations of the California Integrated Waste Management Board and provisions of any Site-specific plans adopted by District) that are applicable to the activities of contractors performing construction or related activities on the Site.

a. Recycling. Without limitation to the foregoing, the Design-Build Entity shall take action to ensure that no less than ninety percent (90%) of marketable materials generated from the activities of the Design-Build Entity and Subcontractors on the Site that are not fully consumed in the performance of the Work are recycled.

b. Records. Design-Build Entity shall maintain, and make available to the District Project Manager upon request, complete and accurate records verifying its compliance with its obligations under this Section 3.23.

c. Condition of Payment. Compliance by the Design-Build Entity with these requirements shall be a condition to the Design-Build Entity’s right to payment under its Applications for Payment.

d. Costs of Compliance. The Design-Build Entity represents and warrants that it has included in the Contract Sum all costs of compliance with these requirements.

4.11. **Remediation by CONTRACTOR.** The provisions of this paragraph shall apply only if the Work to be performed by CONTRACTOR includes within its scope the removal, abatement, moving, handling, containment, disposal or transport of Hazardous Substances or Mold.

a. Advance Submissions. Before CONTRACTOR or any of its Subcontractors or Subconsultants moves, removes, or transports Hazardous Substances to a facility for the receipt, treatment, storage or disposal of the Hazardous Substances (“Hazardous Substances Facility”), CONTRACTOR shall cause the person or entity who will be moving, removing or transporting the Hazardous Substances to provide to DISTRICT the following: (1) verification of the Hazardous Substance Facility’s or other transporter’s licensed status to haul such materials; (2) verification of the Hazardous Substance Facility’s licensed status, including a current permit to receive the specific materials to be transported there; (3) certification that the Hazardous Substance Facility is not under enforcement action by the U.S. Environmental Protection Agency (“EPA”) or applicable State Government Authority or listed on any applicable EPA or applicable State Government Authority list of violating facilities; (4) verification of the Hazardous Substances Facility’s EPA Identification Number (if applicable); and (5) original executed letter(s) of indemnity from the Hazardous Substances Facility bearing the Hazardous Substance Facility’s letterhead. CONTRACTOR further warrants that the selected Hazardous Substance Facility is appropriately licensed and permitted to store, treat and dispose of Hazardous Substances waste in connection with the Work.
b. CONTRACTOR Responsibility. CONTRACTOR warrants that it is aware of and understands the hazards which are presented to persons, property and the environment in performance of the transportation, storage and disposal of Hazardous Substances. CONTRACTOR and its Subcontractors, and agents shall be responsible for the following: (1) processing the application for, and receiving on behalf of the DISTRICT or appropriate entity, an EPA or state-equivalent generator identification number (if required); (2) preparing manifests and other shipping documents; (3) making all necessary arrangements (after consultation with DISTRICT or DISTRICT Consultant) for any off-Site transportation, treatment, storage and disposal of Hazardous Substances in accordance with Applicable Laws; (4) ensuring the proper and lawful transportation and disposal of Hazardous Substances, even if such services are performed by other entities under contract with CONTRACTOR or its Subcontractors; and (5) taking any necessary actions to ensure such proper transport and disposal of Hazardous Substances in the event of any contingency, such as the rejection of the Hazardous Substances as nonconforming by any waste disposal facility. CONTRACTOR shall promptly provide to DISTRICT copies of all manifests and other shipping documents confirming the receipt and proper disposal of all waste at the Hazardous Substances Facility, even if such services are performed by other entities under contract with CONTRACTOR or its Subcontractors.

c. Reporting Requirements. CONTRACTOR shall comply with any Hazardous Substances release reporting requirements to Governmental Authorities directly applicable to CONTRACTOR. Notice of such reporting must be provided in advance to DISTRICT or concurrently in the event of an emergency.

d. Samples. CONTRACTOR and its Subcontractors shall retain all media samples for the longer of (1) the longest holding period specified in any federal, state or local laboratory analytical procedures or guidance for the analyses performed; or (2) three months for soil samples and thirty (30) Days for water samples. Further storage or transfer of samples will be made at DISTRICT’S expense upon DISTRICT’S written request of CONTRACTOR. CONTRACTOR shall require by contract that each and every Subcontractor and agent of CONTRACTOR who performs testing of samples in connection with the Work properly disposes of such samples in accordance with Applicable Laws after completion of testing and notice to DISTRICT. Regarding any such samples which may remain on-Site, provided DISTRICT or DISTRICT Consultant has approved of such on-Site storage in advance, DISTRICT agrees to pay all costs associated with the storage, transport, and disposal of such samples.

e. Verification. Upon Final Completion of the Work, CONTRACTOR shall confirm by a writing delivered to DISTRICT or DISTRICT Consultant that: (1) all Hazardous Substances specified for removal in the Contract Documents have been removed; and (2) all Hazardous Substances wastes removed from the Site as part of the Work have been disposed of in accordance with this Subparagraph 10.3.1.2 and Applicable Laws in a Hazardous Substances Facility.

f. Mold. CONTRACTOR is responsible to immediately notify DISTRICT in writing if any conditions in the construction materials incorporated or to be incorporated into the Work or present in existing improvements are encountered at the Site that CONTRACTOR or any Subcontractor knows or, in the exercise of due care, should know indicate the presence of
Mold or if untreated are likely to result in the growth of Mold. CONTRACTOR shall thereafter take such precautions as are reasonably required to prevent the exposure of persons to such conditions until they have been evaluated. Except as otherwise authorized by the Contract Documents or as are usual and customary according to prevailing standards of the construction industry in the vicinity of the Project, CONTRACTOR shall not allow water or moisture to come into contact with materials in existing improvements or with materials located at the Site that are incorporated or to be incorporated into the Work and if such contact occurs, the areas affected shall be inspected by CONTRACTOR, using appropriate consultants experienced in testing and evaluating Mold, for the presence of Mold and evaluated for the potential of future growth of Mold. All portions thereof that are found to indicate the presence of Mold, or that are found to be in a condition that has the potential for becoming a source of Mold, shall be removed and replaced. Costs incurred by CONTRACTOR due to its failure to perform its obligation under this paragraph shall be borne by CONTRACTOR at CONTRACTOR’S own expense.

g. Release of DISTRICT Liability. CONTRACTOR assumes the risk that its employees or the employees of its Subcontractors, and other persons that they cause or permit to be present on the Site, may be exposed to known or unknown Hazardous Substances or Mold. Under no circumstances shall DISTRICT be liable for, and CONTRACTOR hereby fully and unconditionally releases DISTRICT and the other Indemnitees from, and agrees to defend and indemnify DISTRICT and the other Indemnitees on the terms set forth in section, against, any and all known and unknown loss resulting from or relating to the exposure of any employee of CONTRACTOR or its Subcontractors, or other person that they cause or permit to be present on the Site, to: (1) Hazardous Substances or Mold encountered in connection with or as a result of the performance of the Work, or (2) Hazardous Substances or Mold not necessarily encountered in connection with the performance of the Work, but to which any of them may nevertheless be exposed as a result of their being present on the Site.

h. Governmental Authorities. CONTRACTOR shall provide to DISTRICT copies of all written communications with Governmental Authorities or others relating to Hazardous Substances or Mold (other than privileged communications); provided, however, that non-disclosure of privileged communications shall not limit Design-Build Entity’s obligation to otherwise comply with the terms of the Contract Documents, including, without limitation, this section.

i. Subcontractors, Subconsultants. CONTRACTOR shall include provisions in all contracts it enters into with Subcontractors for the Work requiring them to assume toward CONTRACTOR and DISTRICT the same obligations that CONTRACTOR assumes toward DISTRICT under this section. CONTRACTOR shall require the Subcontractors to ensure that such provisions are included in all contracts they enter into with all lower-tier subcontractors.

4.12. **Other Services and Expenditures.** Other services and expenditures shall be described in such detail as the DISTRICT may require. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Project Documents.
ARTICLE 5  SUBCONTRACTORS

5.1. **Bind Terms.** CONTRACTOR agrees to bind every subcontractor by terms of the Project Documents as far as such terms are applicable to subcontractor's work. If CONTRACTOR shall subcontract any part of the work, CONTRACTOR shall be as fully responsible to DISTRICT for acts and omissions of any subcontractor and of persons either directly or indirectly employed by any subcontractor, as it is for acts and omissions of persons directly employed by CONTRACTOR. Nothing contained in Project Documents shall create any contractual relation between any subcontractor and DISTRICT, nor shall the Contract Documents be construed to be for the benefit of any subcontractor.

5.2. **No Relief upon Consent.** DISTRICT’s consent to any subcontractor shall not in any way relieve CONTRACTOR of any obligations under the Project Documents and no such consent shall be deemed to waive any provision of any Project Document.

5.3. **Designation of Subcontractors.** CONTRACTOR must submit with its bid, a Designation of Subcontractors pursuant to the Subletting and Subcontracting Fair Practices Act. If CONTRACTOR specifies more than one subcontractor for the same portion of work or fails to specify a subcontractor, and such portion of the work exceeds one-half of one percent of the total bid, CONTRACTOR agrees that it is fully qualified to perform and shall perform such work itself, unless CONTRACTOR provides for substitution or addition of subcontractors. Substitution or addition of subcontractors shall be permitted only as authorized under the Subletting and Subcontracting Fair Practices Act, Public Contract Code Section 4100, et. seq.

5.4. **Licensed Subcontractor.** In accordance with Business and Professions Code Section 7059, if CONTRACTOR is designated as a "specialty contractor" (as defined in Section 7058 of the Public Contract Code), all of the work to be performed outside of the CONTRACTOR’S license specialty shall be performed by a licensed subcontractor in compliance with the Subletting and Subcontracting Fair Practices Act, Public Contract Code Section 4100, et seq.

5.5. **File Subcontractor Agreements.** A copy of each subcontract, if in writing, or, if not in writing, then a written statement signed by the CONTRACTOR giving the name of the subcontractor and the terms and conditions of such subcontract, shall be filed with the DISTRICT before the subcontractor begins work. Each subcontract shall contain a reference to the Agreement between the DISTRICT and the CONTRACTOR and the terms of that Agreement and all parts of the Project Documents shall be made a part of such subcontract insofar as applicable to the work covered thereby. Each subcontract will provide for termination in accordance with Article 13 of these General Conditions. Each subcontract shall provide for its annulment by the CONTRACTOR at the order of the ARCHITECT if in the ARCHITECT’S opinion the subcontractor fails to comply with the requirements of the Project Documents insofar as the same may be applicable to this work. Nothing herein contained shall relieve the CONTRACTOR of any liability or obligation hereunder.

5.6. **No Ineligible Subcontractors.** A CONTRACTOR may not permit a subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code to bid on, be awarded, or perform work as a subcontractor on a public works project.
6.1. No official of DISTRICT who is authorized in such capacity and on behalf of DISTRICT to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Project, shall become directly or indirectly interested financially in this Project or in any part thereof. No officer, employee, ARCHITECT, attorney, engineer or inspector of or for DISTRICT who is authorized in such capacity and on behalf of DISTRICT to exercise any executive, supervisory or other similar functions in connection with construction of Project shall become directly or indirectly interested financially in this Project or in any part thereof. CONTRACTOR shall receive no compensation and shall repay DISTRICT for any compensation received by CONTRACTOR hereunder, should CONTRACTOR aid, abet or knowingly participate in violation of this Article 6.

ARTICLE 7 DISTRICT'S INSPECTOR

7.1. **General.** One or more Inspector(s), including special inspectors, as required, will be employed by DISTRICT and will be assigned to the Project.

7.2. **No Direction to Work.** No work shall be performed by the CONTRACTOR solely upon the instructions or comments by the Inspector. The Inspector has no authority to interpret the Project Documents or order Extra Work and any Extra Work performed without the written instruction of the DISTRICT shall be at CONTRACTOR’s sole cost and expense and there will be no delay damages incurred by DISTRICT for such work.

7.3. **Fully Informed.** No work shall be carried on except with the knowledge and under the inspection of said Inspector(s). He/she shall have free access to any or all parts of work at any time. CONTRACTOR shall furnish Inspector reasonable opportunities for obtaining such information as may be necessary to keep Inspector fully informed respecting progress and manner of work and character of materials. Inspection of work shall not relieve CONTRACTOR from any obligation to fulfill the Project Documents. Inspector or ARCHITECT shall have authority to stop work whenever provisions of Project Documents are not being complied with and such noncompliance is discovered. CONTRACTOR shall instruct its employees accordingly.

7.4. **Notification.** CONTRACTOR understands and agrees that the Inspector for the Project may also serve concurrently as inspector for other DISTRICT projects and may not therefore be available on Site during the entire work day. It shall be the responsibility of CONTRACTOR to notify the Inspector not less than twenty-four (24) hours in advance of materials and equipment deliveries and required inspections.

7.5. **Inspection Trailer.** If required by DISTRICT, CONTRACTOR shall provide inspection trailer in accordance with provisions of Special or Supplemental Conditions.

ARTICLE 8 ARCHITECT’S STATUS

8.1. **General.** The ARCHITECT shall be the DISTRICT’s representative during construction and shall observe the progress and quality of the work on behalf of the DISTRICT. ARCHITECT shall have the authority to act on behalf of DISTRICT only to the extent expressly provided in the Project Documents. ARCHITECT shall have authority to stop work whenever such stoppage may be
necessary in ARCHITECT’S reasonable opinion to ensure the proper execution of the Project Documents.

8.2. **Evaluate Performance.** The ARCHITECT shall be, in the first instance, the judge of the performance of the work. ARCHITECT shall exercise authority under the Project Documents to enforce CONTRACTOR’S faithful performance.

8.3. **Authority.** The ARCHITECT shall have all authority and responsibility established by law. The ARCHITECT has the authority to enforce compliance with the Project Documents and the CONTRACTOR shall promptly comply with instructions from the ARCHITECT or an authorized representative of the ARCHITECT.

8.4. **Governing Decision.** On all questions related to the quantities, the acceptability of material, equipment or workmanship, the execution, progress or sequence of work, the interpretation of Plans, Specifications or Drawings, and the acceptable performance of the CONTRACTOR pursuant to the decision of the ARCHITECT shall govern and shall be precedent to any payment unless otherwise ordered by the Governing Board. The progress and completion of the work shall not be impaired or delayed by virtue of any question or dispute arising out of or related to the foregoing matters and the instructions of the ARCHITECT relating thereto.

8.5. **CONTRACTOR’S Responsibility.** General supervision and direction of the work by the ARCHITECT shall in no way imply that the ARCHITECT or his or her representatives are in any way responsible for the safety of the CONTRACTOR or its employees or that the ARCHITECT or his or her representatives will maintain supervision over the CONTRACTOR’S construction methods or personnel other than to ensure that the quality of the finished work is in accordance with the Project Documents.

**ARTICLE 9  NOTICE OF TAXABLE POSSESSORY INTEREST**

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

**ARTICLE 10  ASSIGNMENT OF ANTITRUST ACTIONS**

10.1. **General.** Public Contract Code Section 7103.5 provides:

   a. 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 (DISTRICT) all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, 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.

10.2. **Assignment of Rights.** CONTRACTOR, for itself and all subcontractors, agrees to assign to DISTRICT all rights, title, and interest in and to all such causes of action CONTRACTOR and all subcontractors
may have under the Agreement. This assignment shall become effective at the time DISTRICT tenders final payment to the CONTRACTOR and CONTRACTOR shall require assignments from all subcontractors to comply herewith.

**ARTICLE 11 OTHER CONTRACTS**

11.1. **General.** DISTRICT reserves the right to let other contracts in connection with this work. CONTRACTOR shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly connect and coordinate its work with such other contractors.

11.2. **Inspect and Report.** If any part of CONTRACTOR'S work depends for proper execution or results upon work of any other contractor, the CONTRACTOR shall inspect and promptly report to ARCHITECT in writing any defects in such work that render it unsuitable for such proper execution and results. CONTRACTOR will be held accountable for damages to DISTRICT for that work which it failed to inspect or should have inspected. CONTRACTOR'S failure to inspect and report shall constitute its acceptance of other contractor's work as fit and proper for reception of its work, except as to defects which may develop in other contractors' work after execution of CONTRACTOR'S work.

11.3. **Define Changes in Work.** To ensure proper execution of its subsequent work, CONTRACTOR shall measure and inspect work already in place and shall at once report to the ARCHITECT in writing any discrepancy between executed work and Project Documents.

11.4. **Review Work Compatibility.** CONTRACTOR shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by DISTRICT in prosecution of the Project to the end that CONTRACTOR may perform this Agreement in the light of such other contracts, if any.

11.5. **Non Exclusive Occupancy.** Nothing herein contained shall be interpreted as granting to CONTRACTOR exclusive occupancy at Site of Project. CONTRACTOR shall not cause any unnecessary hindrance or delay to any other contractor working on Project. If simultaneous execution of any contract for Project is likely to cause interference with performance of some other contract or contracts, DISTRICT shall decide which contractor shall cease work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously.

11.6. **No Damages.** DISTRICT shall not be responsible for any damages suffered or extra costs incurred by CONTRACTOR resulting directly or indirectly from award or performance or attempted performance of any other contract or contracts on Project, or caused by any decision or omission of DISTRICT respecting the order of precedence in performance of contracts.

**ARTICLE 12 OCCUPANCY**

12.1. DISTRICT reserves the right to occupy buildings and/or portions of the Site at any time before completion, and such occupancy shall not constitute final Acceptance of any part of work covered by this Agreement, nor shall such occupancy extend the date specified for completion of the work. Beneficial occupancy of building(s) does not commence any warranty period nor shall it entitle CONTRACTOR to any additional compensation due to such occupancy.
ARTICLE 13  DISTRICT’S RIGHT TO TERMINATE AGREEMENT

13.1. **Termination for Cause.** If the CONTRACTOR refuses or fails to complete the work or any separable part thereof with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or if the CONTRACTOR should file a petition for relief as a debtor, or should relief be ordered against CONTRACTOR as a debtor under Title 11 of the United States Code, or if CONTRACTOR should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, or if it should refuse or should fail to supply enough properly skilled workers or proper equipment, tools, and materials in the necessary quantity and quality to complete the work in the time specified, or if CONTRACTOR should fail to make prompt payment to subcontractors for materials or labor, or disregard laws or ordinances or instructions of DISTRICT, or if CONTRACTOR or its subcontractors should otherwise be guilty of a violation of any provision of this Agreement, then CONTRACTOR shall be deemed to be in default of the Agreement and DISTRICT may, without prejudice to any other right or remedy, serve written notice upon CONTRACTOR and its Surety of DISTRICT’s intention to terminate this Agreement, such notice to contain the reasons for such intention to terminate, and unless within ten (10) calendar days after the service of such notice such condition shall cease or such violation shall cease, or arrangements satisfactory to DISTRICT for the correction thereof be made and corrective action commenced in a diligent and workmanlike manner and pursued to satisfactory completion, this Agreement shall upon the expiration of said ten (10) calendar days, cease and terminate. In such case, CONTRACTOR shall be excluded from the worksite and not be entitled to receive any further payment until work is finished to DISTRICT’s satisfaction.

13.2. **Surety Take Over.** In the event of any such termination, Surety shall have the right to take over and perform this Agreement, provided, however, that if Surety within five (5) calendar days after service upon it of said notice of termination does not give DISTRICT written notice of its intention to take over and perform this Agreement or does not commence performance thereof within ten (10) calendar days after date of serving such notice of termination by DISTRICT on Surety, DISTRICT may take over the work and prosecute same to completion by any means determined by DISTRICT including hiring another contractor for the account and at the expense of CONTRACTOR, and CONTRACTOR and its Surety shall be liable to DISTRICT for any excess cost or other damages occasioned by the DISTRICT thereby. Time is of the essence in this Agreement. If the DISTRICT takes over the work as hereinabove provided, the DISTRICT may, without liability for so doing, take possession of and utilize in completing the work such materials, supplies, equipment and other property belonging to the CONTRACTOR as may be on the Site of the work and necessary therefore.

13.3. **Back charge Additional Compensation.** The expense of finishing the work, including compensation for additional architectural, managerial, and administrative services, shall be a charge against CONTRACTOR and CONTRACTOR agrees that the charge may be deducted from any money due or becoming due to CONTRACTOR from DISTRICT or CONTRACTOR shall pay the charge to the DISTRICT. Expense incurred by DISTRICT as herein provided, and damage incurred through CONTRACTOR’S default, shall be certified to DISTRICT by ARCHITECT. The Surety shall become liable for payment should CONTRACTOR fail to pay in full any cost incurred by the DISTRICT.
13.4. **Non-appropriation of Funds/Insufficient Funds.** In the event that sufficient funds are not appropriated to complete the Project or the DISTRICT determines that sufficient funds are not available to complete the Project, DISTRICT may terminate or suspend the completion of the Project at any time by giving written notice to the CONTRACTOR. In the event that the DISTRICT exercises this option, the DISTRICT shall pay for any and all work and materials completed or delivered onto the Site, and the value of any and all work then in progress and orders actually placed which cannot be canceled up to the date of notice of termination. The value of work and materials paid for shall include a factor of fifteen percent (15%) for the CONTRACTOR’S overhead and profit and there shall be no other costs or expenses paid to CONTRACTOR. All work, materials and orders paid for pursuant to this provision shall become the property of the DISTRICT. DISTRICT may, without cause, order CONTRACTOR in writing to suspend, delay or interrupt the Project in whole or in part for such period of time as DISTRICT may determine. Adjustment shall be made for increases in the cost of performance of the Agreement caused by suspend, delay or interruption.

13.5. **Other Remedies.** The foregoing provisions are in addition to and not a limitation of any other rights or remedies available to the DISTRICT.

**ARTICLE 14   BONDS**

14.1. **Performance and Payment Bonds.** Within fourteen (14) Days of Notice of Intent to Award or Board approval of contract, CONTRACTOR shall deliver to DISTRICT a good and sufficient labor and material payment bond (“Payment Bond”) and a good and sufficient performance bond (“Performance Bond”), each in the amount of one hundred percent (100%) of the Contract Sum.

a. Changes. The penal amounts of the Performance Bond and Payment Bond shall be increased on account of Change Orders and Unilateral Change Orders increasing the Contract Sum. If requested by DISTRICT, CONTRACTOR shall deliver to DISTRICT evidence of the increases of such penal amounts.

b. Replacement. Should any bond required hereunder or any Surety on such bond become or be determined by DISTRICT to be insufficient, it shall be replaced within ten (10) Days by a bond that fully complies with the requirements of this section.

c. Duration. The Payment Bond shall remain in effect until acceptance of the Work and all Claims of CONTRACTOR and the Subcontractors of any Tier, have been fully and finally resolved. The Performance Bond shall remain in effect and assure faithful performance of all CONTRACTOR’S obligations under the Contract Documents, including, without limitation, warranty obligations.

b. Duration. The Payment Bond shall remain in effect until acceptance of the Work and all Claims of CONTRACTOR and the Subcontractors of any Tier, have been fully and finally resolved. The Performance Bond shall remain in effect and assure faithful performance of all CONTRACTOR’S obligations under the Contract Documents, including, without limitation, warranty obligations.

d. Premiums. The premiums for the Performance Bond and Payment Bonds are included in the Contract Sum and shall be paid by CONTRACTOR at CONTRACTOR’S Own Expense.

e. Obligee. A Performance Bond shall name DISTRICT as obligee. All performance bonds, if any, purchased by Subcontractors shall name DISTRICT as a dual obligee with CONTRACTOR.

f. No Exoneration. The Performance Bond and Payment Bond shall contain provisions to the effect that Change Orders, Unilateral Change Orders, Field Orders, Modifications, Changes
and Contract Adjustments shall in no way release or exonerate CONTRACTOR or its Surety from their obligations and that notice thereof is waived by the Surety.

g. No Limitation. The requirements of this section pertaining to the Performance Bond and the Payment Bond shall be without limitation to any other obligations CONTRACTOR may have under Applicable Laws to provide bonding for the benefit of, and to assure payment to the Subcontractors performing the Work for the Project.

h. Subcontractor Bonds. Each performance bond, if any, furnished by a first-Tier Subcontractor shall include a provision whereby the Surety consents to the contingent assignment of CONTRACTOR’S rights under such bond to DISTRICT as provided in section 14.2. **Condition of Payment.** No payments to CONTRACTOR for Work performed shall be made or due until there has been full compliance with the requirements of this section.

14.3. **Surety Rating.** Any Surety company issuing the Payment Bond or Performance Bond shall be, at all times while such bonds are in effect, listed in the latest published United States Treasury Department list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” and have a current A.M. Best rating of A VIII or better.

14.4. **Communications.** DISTRICT shall have the right to communicate with Surety with respect to matters that are related to performance of the Work. CONTRACTOR shall be provided with a copy of all such communications that are in writing. Such communications shall not create or be interpreted as creating any contractual obligation of DISTRICT to Surety.

**ARTICLE 15  SUBSTITUTION OF SECURITIES**

15.1. **Securities for Investment.** Pursuant to the requirements of Public Contract Code Section 22300, upon CONTRACTOR’S request, DISTRICT will make payment to CONTRACTOR of any earned retention funds withheld from payments under this Agreement if CONTRACTOR deposits with the DISTRICT or in escrow with a California or federally chartered bank acceptable to DISTRICT, securities eligible for the investment pursuant to Government Code Section 16430 or bank or savings and loan certificates of deposit, upon the following conditions:

a. CONTRACTOR shall be the beneficial owner of any securities substituted for retention funds withheld and shall receive any interest thereon.

b. All expenses relating to the substitution of securities under said Section 22300 and under this Article 15, including, but not limited to DISTRICT’s overhead and administrative expenses, and expenses of Escrow Agent shall be the responsibility of the CONTRACTOR.

c. If CONTRACTOR shall choose to enter into an escrow agreement, such agreement shall be in the form as set forth in Public Contract Code section 22300(f) attached hereto as part of the Project Documents and which shall allow for the conversion to cash to provide funds to meet defaults by the CONTRACTOR including, but not limited to, termination of the CONTRACTOR’S control over the work, stop notices filed pursuant to law, assessment of liquidated damages or amount to be kept or retained under the provisions of the Project Documents.
d. Securities, if any, shall be returned to CONTRACTOR only upon satisfactory completion of the Agreement.

15.2. **Deposit Security.** To minimize the expense caused by such substitution of securities, CONTRACTOR shall, prior to or at the time CONTRACTOR requests to substitute security, deposit sufficient security to cover the entire amount to be then withheld and to be withheld under the General Conditions of this Agreement. Should the value of such substituted security at any time fall below the amount for which it was substituted, or any other amount which the DISTRICT determines to withhold, CONTRACTOR shall immediately, and at CONTRACTOR’S expense, deposit additional security qualifying under said Section 22300 until the total security deposited is no less than equivalent to the amount subject to withholding under the Agreement.

15.3. **Payment to Escrow.** In the alternative, under Section 22300, CONTRACTOR, at its own expense, may request DISTRICT to make payment of earned retention funds directly to the Escrow Agent. Also at the expense of CONTRACTOR, CONTRACTOR may direct investment of the payments into securities, and CONTRACTOR shall receive the interest earned on the investment upon the same conditions as shown in paragraph (a) for securities deposited by CONTRACTOR. Upon satisfactory completion of the Agreement, CONTRACTOR shall receive from the Escrow Agent all securities, interest and payments received by the Escrow Agent from DISTRICT, pursuant to the terms of Section 22300.

15.4. **Full Force and Effect.** If any provision of this Article 15 shall be found to be illegal or unenforceable, then, notwithstanding, this Article 15 shall remain in full force and effect, and such provision shall be deemed stricken.

**ARTICLE 16   FIRE INSURANCE**

16.1. CONTRACTOR will procure at CONTRACTOR’S own expense, and before commencement of any work under this Agreement, fire insurance on the Project. Amount of fire insurance shall be sufficient to protect against loss or damage in full until work is accepted by DISTRICT. CONTRACTOR shall submit proof of insurance and shall provide endorsements on forms provided by the DISTRICT or on forms approved by the DISTRICT.

**ARTICLE 17   PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE**

17.1. **General.** CONTRACTOR shall take out and maintain during the life of this Agreement such public liability and property damage insurance as shall protect CONTRACTOR and DISTRICT from all claims for personal injury, including accidental death, to any person (including, as to DISTRICT, injury or death to CONTRACTOR’s or subcontractor’s employees), as well as from all claims for property damage arising from operations under this Agreement, in amounts as set forth in the Agreement.

17.2. **Subcontractor Insurance.** CONTRACTOR shall require its subcontractors, if any, to take out and maintain similar public liability and property damage insurance in like amounts or insure the activities of its subcontractors in CONTRACTOR’s own policy.

17.3. **Builder’s Risk.** CONTRACTOR, during the progress of the work and until final Acceptance of the work by DISTRICT upon completion of the entire Agreement, shall maintain Builder’s Risk/ “All Risk,” course-of-construction insurance in an amount not less than as set forth in the Agreement. Coverage is to provide extended coverage and insurance against vandalism, malicious mischief,
perils of fire, sprinkler leakage, civil authority, sonic boom, earthquake, collapse, flood, wind, lightning, smoke, riot, debris removal (including demolition), and reasonable compensation for ARCHITECT’S services and expenses required as a result of such insured loss upon the entire work which is the subject of the Project Documents, including completed work, work in progress to the full insurable amount thereof, and temporary field offices placed at the project Site by the Contractor or District Consultants in conjunction with the Project. The risk of damage to the work due to the perils covered by the Builder’s Risk/“All Risk” Insurance, as well as any other hazards which might result in damage to the work, is that of CONTRACTOR and the surety, and no claims for such loss or damage shall be recognized by DISTRICT nor will such loss or damage excuse the complete and satisfactory performance of the Agreement by CONTRACTOR.

17.4. **Proof of Insurance.** CONTRACTOR shall submit proof of insurance and shall provide endorsements on the forms provided by the DISTRICT or on forms approved by the DISTRICT. Such insurance shall be issued by admitted surety insurers under the same conditions as required for bonds on the Project.

### ARTICLE 18 WORKERS’ COMPENSATION INSURANCE

18.1. **General.** In accordance with the provisions of Section 3700 of the Labor Code, the CONTRACTOR and every subcontractor shall be required to secure the payment of compensation to its employees.

18.2. **Full Employee Coverage.** The CONTRACTOR shall provide, during the life of the Agreement, workers' compensation insurance for all of its employees engaged in work under this Agreement, on or at the Site of the Project, and, in case any of its work is sublet, the CONTRACTOR shall require the subcontractor similarly to provide workers' compensation insurance for all the latter’s employees. Any class of employee or employees not covered by a subcontractor’s insurance shall be covered by the CONTRACTOR’S insurance. In case any class of employees engaged in work under this Agreement, on or at the Site of the Project, is not protected under the workers' compensation statute, the CONTRACTOR shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected before subcontractor commences work. The CONTRACTOR shall file with the DISTRICT certificates of its insurance protecting workers and a thirty (30) day notice shall be provided to DISTRICT before the cancellation or reduction of any policy of CONTRACTOR or subcontractor. CONTRACTOR shall submit proof of insurance and shall provide endorsements on the forms provided by the DISTRICT or on forms approved by the DISTRICT. Such endorsements shall be submitted concurrently with the Project Documents.

### ARTICLE 19 PROOF OF CARRIAGE OF INSURANCE

19.1. **General.** CONTRACTOR shall not commence work nor shall it allow any subcontractor to commence work under this Agreement until all required insurance certificates and endorsements from admitted surety insurers have been obtained and delivered in duplicate to and approved by DISTRICT. Such insurance shall be issued by admitted surety insurers under the same conditions as required for bonds on the Project. CONTRACTOR shall provide proof of insurance on DISTRICT approved forms without revisions.
19.2. **Certificate Contents.** Certificates and insurance policies shall include the following:

   a. A clause stating: "This policy shall not be canceled or reduced in required limits of liability or amount of insurance until notice has been mailed to DISTRICT stating date of cancellation or reduction. Date of cancellation or reduction may not be less than thirty (30) days after date of mailing notice."

   b. Language stating in particular those insured, extent of insurance, location and operation to which insurance applies, expiration date, to whom cancellation and reduction notice will be sent, and length of notice period.

   c. Statement that the DISTRICT is an additional insured under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by the DISTRICT.

19.3. **Failure to Provide.** In case of CONTRACTOR's failure to provide insurance as required by the Agreement, the DISTRICT may, at DISTRICT's option, take out and maintain at the expense of the CONTRACTOR, such insurance in the name of CONTRACTOR, or subcontractor, as the DISTRICT may deem proper and may deduct the cost of taking out and maintaining such insurance from any sums which are due or to become due to the CONTRACTOR under this Agreement.

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**ARTICLE 20 DRAWINGS AND SPECIFICATIONS**

20.1. **General.** Drawings and Specifications are intended to delineate and describe the Project and its component parts to such a degree as will enable skilled and competent contractors to intelligently bid upon the work, and to carry said work to a successful conclusion.

20.2. **Compliance.** Drawings and Specifications are intended to comply with all laws, ordinances, rules and regulations of constituted authorities having jurisdiction, and where referred to in the Project Documents, said laws, ordinances, rules and regulations shall be considered as a part of the Agreement within the limits specified. The CONTRACTOR shall bear all expenses of correcting work done contrary to said laws, ordinances, rules and regulations and if the CONTRACTOR performed same (1) without first consulting the ARCHITECT for further instructions regarding said work, or (2) disregarded the ARCHITECT'S instructions regarding said work.

20.3. **Clarification.** Questions regarding interpretation of Drawings and Specifications shall be clarified by the ARCHITECT. Before commencing any portion of the work, CONTRACTOR shall carefully examine all Drawings and Specifications and other information given to CONTRACTOR. CONTRACTOR shall immediately notify ARCHITECT and DISTRICT in writing of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications. If CONTRACTOR or its subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any work under the Project Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, CONTRACTOR shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof. In the event ARCHITECT determines that CONTRACTOR'S requests for clarification or interpretation are not justified or do not reflect adequate competent supervision or knowledge by the CONTRACTOR or his/her subcontractors,
CONTRACTOR shall be required to pay ARCHITECT’S reasonable and customary fees in processing and responding to such requests. Should the CONTRACTOR commence work or any part thereof without seeking clarification, CONTRACTOR waives any claim for Extra Work or damages as a result of any ambiguity, conflict or lack of information.

20.4. Order of Precedent. Figured dimensions on Drawings shall govern, but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified. Large-scale Drawings shall take precedence over smaller scale Drawings as to shape and details of construction. Specifications shall govern as to materials, workmanship, and installation procedures. Drawings and Specifications are intended to be fully cooperative and to agree. If CONTRACTOR observes that Drawings and Specifications are in conflict, CONTRACTOR shall promptly notify the ARCHITECT in writing, and any necessary changes shall be adjusted as provided in the Article entitled "Changes and Extra Work;" provided, however, that the specification calling for the higher quality material or workmanship shall prevail without additional cost to DISTRICT.

20.5. Standard Meaning. Materials or work described in words which so applied has a well-known technical or trade meaning shall be deemed to refer to such recognized standards.

20.6. Trade Term. It is not the intention of the Agreement to go into detailed descriptions of any materials and/or methods commonly known to the trade under "trade name" or "trade term." The mere mention or notation of such "trade name" or "trade term" shall be considered a sufficient notice to CONTRACTOR that it will be required to complete the work so named with all its incidental and accessory items according to the best practices of the trade.

20.7. Associated Items. The naming of any material and/or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and/or labor necessary to achieve full and complete functioning of the material and/or equipment as per best practices of the trade(s) involved, unless specifically noted otherwise.

20.8. Record Documents.

a. Posting. CONTRACTOR shall maintain Record Drawings and Specifications in a satisfactory record condition by posting, on a weekly basis (or, in the case of building or site mechanical, electrical, plumbing or fire sprinkler systems, as soon thereafter as is reasonable and practical and prior to payment request for associated Work), thoroughly and neatly, all Changes to the Work and the location of the Work, including, without limitation, the location of portions of the Work shown diagrammatically, as occurs in the actual construction of the Work, as well as any as-built conditions noted by other DISTRICT Consultants, including, without limitation, DISTRICT Consultants involved in the commissioning process. Each revision, change and notation shall be coordinated with other revisions, changes and notations and accurately annotated and cross-referenced by the CONTRACTOR.

b. Property of District. All Record Drawings and Specifications and other Record Documents shall be deemed the sole property of the DISTRICT and at the earlier of Final Completion or termination of the CONTRACTOR, shall be turned over to DISTRICT.
c. Final Completion. CONTRACTOR shall, as a condition to Final Completion and Final Payment, furnish the DISTRICT with one (1) **Building Information Model (BIM)** of the Record Drawings provided according to the requirements identified in the BIM standards and one (1) annotated hard copy and one (1) computer disk (using software format acceptable to the DISTRICT) of the Record Specifications. All electronic versions shall conform to the requirements of the BIM Standards. Each page of such Record Drawings and the cover page of such Record Specifications shall prominently bear the words "Record Documents" and the CONTRACTOR’s approval by manual signature certifying that, to the best of his/her knowledge, they are true and accurate and that the indications thereon represent the actual condition of the Work.

d. Condition of Payment. Compliance by CONTRACTOR with the requirements of this Record Documents paragraph shall be deemed a condition to CONTRACTOR’s right to payment upon its Applications for Payment.

e. **Drawings Furnished for Posting.** DISTRICT will furnish to CONTRACTOR one (1) complete set of drawings for posting of changes. Additional copies shall be provided upon payment by CONTRACTOR. During the construction period, CONTRACTOR shall maintain the set of drawings in a satisfactory record condition, and shall thoroughly and neatly post, as they occur, all additions, deletions, corrections and/or revisions in the actual construction of the Project. The Record Drawings must be posted monthly and be current prior to each submission of each certificate of payment.

### ARTICLE 21 OWNERSHIP OF DRAWINGS

21.1. All Plans, Drawings, designs, Specifications, and other incidental architectural and engineering work or materials and other Project Documents and copies thereof furnished by DISTRICT are DISTRICT’s property. They are not to be used in other work and are to be returned to DISTRICT on request at completion of work, and may be used by DISTRICT as it may require, without any additional costs to DISTRICT.

### ARTICLE 22 DETAIL DRAWINGS AND INSTRUCTIONS

22.1. **Additional Information.** In case of ambiguity, conflict, or lack of information, ARCHITECT shall furnish additional instructions by means of Drawings or otherwise, necessary for proper execution of work. All such drawings and instructions shall be consistent with Project Documents, true developments thereof, and reasonably inferable therefrom. Such additional instructions shall be furnished with reasonable promptness, provided that CONTRACTOR informs the ARCHITECT of the relationship of the request to the critical path of construction.

a. Work shall be executed in conformity therewith and CONTRACTOR shall do no work without proper Drawings and instructions.

b. The ARCHITECT will furnish necessary additional details to more fully explain the work, which details shall be considered as part of the Project Documents.

22.2. **Increased Detail.** Should any details be more elaborate, in the opinion of the CONTRACTOR, than scale drawings and Specifications warrant, CONTRACTOR shall give written notice thereof to the
ARCHITECT within five (5) days of the receipt of same. In case no notice is given to the ARCHITECT within five (5) days, it will be assumed the details are reasonable development of the scale drawings. In case notice is given, then it will be considered, and if found justified, the ARCHITECT will either modify the Drawings or shall recommend to DISTRICT a change order for the Extra Work involved.

22.3. **Proper Performance.** All parts of the described and shown construction shall be of the best quality of their respective kinds and the CONTRACTOR is hereby advised to use all diligence to become fully involved as to the required construction and finish, and in no case to proceed with the different parts of the work without obtaining first from the ARCHITECT such directions and/or drawings as may be necessary for the proper performance of the work.

22.4. **Improper Work.** If it is found at any time, before or after completion of the work, that the CONTRACTOR has varied from the Drawings and/or Specifications, in materials, quality, form or finish, or in the amount or value of the materials and labor used, the ARCHITECT shall make a recommendation: (1) that all such improper work should be removed, remade and replaced, and all work disturbed by these changes be made good at the CONTRACTOR's expense; or (2) that the DISTRICT deduct from any amount due CONTRACTOR, the sum of money equivalent to the difference in value between the work performed and that called for by the Drawings and Specifications. ARCHITECT shall determine such difference in value. The DISTRICT, at its option, may pursue either recommendation made by the ARCHITECT.

**ARTICLE 23  SUBMITTALS AND SHOP DRAWINGS**

23.1. **Not Contract Documents.** Shop Drawings, Product Data, Samples and other Submittals are not Contract Documents. Their purpose is to demonstrate for those portions of the Work for which Submittals are required the way the CONTRACTOR proposes to conform to the Work to the designs and other information in the Contract Documents.

23.2. **Submittal Review.** All Shop Drawings, Product Data, Samples and other Submittals required by the Contract Documents shall be submitted to DISTRICT for its review, with a copy to College Director of Facilities and to such of DISTRICT’S Consultants or Separate Contractors as DISTRICT may direct in writing.

a. Transmittal Form. All Submittals shall be accompanied by an accurately completed transmittal in the form required by District. With respect to Submittals of documents, the transmittal shall give a list of the numbers of the sheets submitted. All sheets shall be marked with the name of the Project and the name of CONTRACTOR, shall be numbered consecutively and referenced to the sheets or paragraphs of the Drawings and Specifications affected. A separate transmittal form shall be used for each specific item or class of material or equipment for which a Submittal is required. Transmission of Submittals of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer’s "package" or are so functionally related that expediency dictates review of the group or package as a whole. Any Submittal not accompanied by such transmittal form, or where all applicable items on the form are not completed, may be returned for re-submittal without review.
b. Similar Work Together. Except where the preparation of a Submittal is dependent upon the approval of a prior Submittal, all Submittals pertaining to the same class or portion of the Work shall be submitted simultaneously.

c. Appropriate Back up. Submittals shall consist of the appropriate combination of catalog sheets, material lists, manufacturer’s brochures, technical bulletins, specifications, diagrams and product samples, necessary to describe a system, product or item. Submittals shall show in detail the size, sections and dimensions of all members, the arrangement and construction of all connections, joints and other pertinent details, and all holes, straps and other fittings for attaching the Work. When required by the Contract Documents, engineering computations shall be submitted.

d. Timely Submittal. CONTRACTOR shall in all cases submit its Submittals within a time frame sufficiently early to allow review of the same by the ARCHITECT, DISTRICT and DISTRICT Consultants without causing Delay to construction progress. CONTRACTOR will be responsible to pay, at CONTRACTOR’S own Expense, additional services fees and costs incurred by DISTRICT in order to expedite review of Submittals which are not submitted in a timely fashion.

e. Checked and Coordinated. The CONTRACTOR’S submission of Submittals to DISTRICT constitutes a representation that the CONTRACTOR has determined or verified materials and field measurements and conditions related thereto, and that it has checked and coordinated the information contained within such Submittals with the requirements of the Contract Documents and with the Submittals for related Work. CONTRACTOR’S review and approval of shop drawings shall include the following stamp: "The CONTRACTOR has reviewed and approved not only the field dimensions but the construction criteria and has also made written notation regarding any information in the shop drawings that does not conform to the Project Documents. This shop drawing has been coordinated with all other shop drawings received to date by CONTRACTOR and this duty of coordination has not been delegated to subcontractors, material suppliers, the ARCHITECT, or the engineers on this project. Signature of CONTRACTOR"

f. Evidence of Approval. Submittals without evidence thereon of the CONTRACTOR’S approval shall be returned, without further consideration, for resubmission in accordance with these requirements.

g. Informational Submittal. Informational Submittals (i.e., Submittals upon which no responsive action is expected) may be required and if so shall be limited to those Submittals so identified in the Contract Documents. Submittals made by CONTRACTOR which are not required by the Contract Documents may be returned without action.

h. ARCHITECT Review. The ARCHITECT shall review and submit CONTRACTOR’S Shop Drawings, Product Data, Samples and other Submittals to the DISTRICT, in accordance with the latest Submittal Schedule accepted by the DISTRICT. If prints of the Shop Drawings, Product Data, Samples and other Submittals are returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision of said drawing will not be required. If prints of the drawing are returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED," formal resubmittal of
said drawings will not be required. If prints of the drawing are returned to the CONTRACTOR marked "REVISE AND RESUBMIT," the CONTRACTOR shall revise said drawing and shall resubmit six (6) copies of the revised drawing to the ARCHITECT. If prints of the drawing are returned to the CONTRACTOR marked "REJECTED RESUBMIT," the CONTRACTOR shall resubmit six (6) new copies of the drawing to the ARCHITECT.

i. Attention to Revisions. CONTRACTOR shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or other Submittals, to revisions other than those requested by ARCHITECT or DISTRICT on previous Submittals.

23.3. **Deviations.** CONTRACTOR shall, notwithstanding any review or approval thereof by ARCHITECT and DISTRICT be solely responsible for the content of all Submittals. Without limitation to the foregoing, deviations in Submittals from requirements of the Contract Documents shall remain the sole responsibility of CONTRACTOR unless CONTRACTOR has specifically informed ARCHITECT and DISTRICT in writing, using Substitution Form, of such deviation at the time of submission of the Submittal and DISTRICT has given specific written approval thereof.

23.4. **No Basis for Adjustment.** Revisions indicated on Shop Drawings, Product Data, Samples or other Submittals shall not be considered as a basis for a Contract Adjustment.

23.5. **Submittal Approval before Work.** CONTRACTOR shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or other Submittals until the respective Submittal has been returned by the ARCHITECT and DISTRICT with an indication that it has been reviewed and that the Work addressed by the Submittal may proceed. Such Work shall be in accordance with such Submittals, unless such Submittal indicates that there are corrections to be made. If corrections are indicated to be made then the Work shall be in accordance with the resubmitted and corrected Submittal that is reviewed and returned to the CONTRACTOR by the ARCHITECT and DISTRICT. Fabricating dimensions, quantities of material, applicable code requirements, and other contract requirements shall be the CONTRACTOR'S responsibility particularly where piping, machinery, and equipment and the required arrangements and clearances are involved.

23.6. **Deferred Approval.** CONTRACTOR shall submit its related DSA Deferred Approval Submittals to DSA through the ARCHITECT with an original, manual signature of the professional engineer registered in the State of California responsible for preparing such Submittal. Calculations of a structural nature must be approved by the Division of State ARCHITECT. Shop drawings shall be submitted at a time sufficiently early to allow review of same by the Division of State Architect (DSA) if required, and the ARCHITECT, and to accommodate the rate of construction progress required under the Project Documents. CONTRACTOR will be required to pay ARCHITECT’S reasonable and customary fees in order to expedite review of shop drawings which are not submitted in a timely fashion.

23.7. **No Delay Claim.** The CONTRACTOR shall have no claim for damages or extension of time due to any delay resulting from the CONTRACTOR having to make the required revisions to shop drawings unless review by the ARCHITECT of said drawings is delayed beyond the time provided hereinbefore and the CONTRACTOR can establish that the ARCHITECT’S delay in review actually resulted in a delay in the CONTRACTOR construction schedule. CONTRACTOR shall not be entitled to any claim for
damages resulting from DSA review extending beyond fifteen (15) calendar days after submittal. However, DISTRICT may consider an extension of time due to any delay caused by DSA review.

23.8. **Submittal Process.** CONTRACTOR shall check and verify all field measurements and shall submit to ARCHITECT, with sufficient advance time, six (6) copies, checked and approved by CONTRACTOR, of all shop or setting list drawings, schedules, and materials list required for the work of various trades. ARCHITECT shall review such drawings, schedules and materials list only for conformance with design concept of Project and compliance with information given in Project Documents, and return as approved or disapproved with guidance as to required corrections within fourteen (14) calendar days (and more than 14 calendar days for complex reviews). CONTRACTOR shall make any corrections required by ARCHITECT, file three (3) corrected copies with ARCHITECT, and furnish such other copies as may be needed for construction within fourteen (14) calendar days. ARCHITECT’S approval of such drawings, schedules, or materials list shall not relieve CONTRACTOR from responsibility for deviations unless CONTRACTOR has in writing called ARCHITECT’S attention to such deviations at time of submission and secured ARCHITECT’S written approval, nor shall it relieve CONTRACTOR from responsibility for errors in shop drawings or schedules.

23.9. **Complete and Conforming.** All submittals of shop drawings, catalog cuts, data sheets, schedules and material lists shall be complete and shall conform to contract Drawings and Specifications.

23.10. **Direct Communication.** The CONTRACTOR may authorize a material or equipment supplier to deal directly with the ARCHITECT with regard to shop drawings, however, ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the CONTRACTOR.

23.11. **Complete by Second Submittal.** The CONTRACTOR shall make a complete and acceptable submittal to the ARCHITECT by the second submission of drawings. The DISTRICT shall withhold funds due the CONTRACTOR to cover additional costs of the ARCHITECT’S review beyond the second submission and any other costs incurred by DISTRICT.

**ARTICLE 24 LAYOUT AND FIELD ENGINEERING**

24.1. All field engineering if required for laying out of work and establishing grades for earthwork operations shall be furnished by CONTRACTOR at its expense. Such work shall be done by a qualified civil engineer approved by the DISTRICT.

**ARTICLE 25 SOILS INVESTIGATION REPORT**

25.1. **General.** When a soils investigation report has been obtained from test holes at the Site, such report is available for the CONTRACTOR’S use for work under this Agreement. Such report shall not be part of the Agreement. Any information obtained from such report or any information given on the project documents as to surface and subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed and does not form a part of the Agreement. CONTRACTOR is required to make a visual examination of Site and must make whatever test CONTRACTOR deems appropriate to determine surface and subsurface soil conditions. If, during the course of work under this Agreement, CONTRACTOR encounters subsurface or latent conditions
which differ materially from those indicated in the soils investigation report, then CONTRACTOR shall notify the DISTRICT within five (5) working days of discovery of the condition.

25.2. **No Warranty. WARNING:** DISTRICT does not warrant the soils at the project Site nor any information contained in any soils report. Soils investigation report is provided for CONTRACTOR’S information only. CONTRACTOR must conduct an independent investigation of the project Site and the soils conditions of the Site. DISTRICT does not warrant the soils conditions of the Site and CONTRACTOR is fully responsible to ascertain Site conditions for the purposes of determining construction means and methods prior to commencing construction.

a. CONTRACTOR agrees that no claim against DISTRICT will be made by CONTRACTOR for damages and hereby waives any rights to damages in the event that during progress of work CONTRACTOR encounters subsurface or latent conditions at the worksite materially different from those shown on project documents.

### ARTICLE 26  TESTS AND INSPECTIONS

26.1. **Code Compliance.** Tests and inspections will comply with California Code of Regulations and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction over the Project.

26.2. **General.** One or more Inspectors of Record, including special inspectors as required, will be employed by DISTRICT and will be assigned to the Work. The fees of Inspectors of Record shall be directly paid for by DISTRICT. No work shall be carried on except under the inspection, and with the knowledge, of the appropriate inspector(s) of record and CONTRACTOR shall be responsible, at CONTRACTOR’S Own Expense, to remove and replace any Work performed without such inspection by the appropriate Inspector of Record.

26.3. **Coordination.** CONTRACTOR shall schedule, arrange, and coordinate its activities with the activities of the DISTRICT, Inspectors of Record, Design Consultant, DISTRICT Consultants and others designated by DISTRICT to inspect or observe the Work. CONTRACTOR understands and agrees that the Inspector of Record for the Project may also serve concurrently as inspector for other DISTRICT projects and may not therefore be available on site during the entire work day. It shall be the responsibility of CONTRACTOR to notify the Inspector not less than forty-eight (48) hours in advance of materials and equipment deliveries and required inspections. When, in order to comply with the intent of the Contract Documents, inspection or observation must be made at the plant or mill of the manufacturer or fabricator of material or equipment, CONTRACTOR shall notify the DISTRICT, as well as any other persons identified by DISTRICT as assigned by it to inspect or observe the Work, a sufficient length of time and no less than seventy two (72) hours in advance to allow for arrangements to be made for such inspection or observation.

26.4. **Uncovering of Work.** DISTRICT or an Inspector or Record shall have the right to request that any portion of the Work be uncovered by CONTRACTOR for inspection. Except as otherwise provided, if such Work is found to be in accordance with the Contract Documents, then all of the additional costs incurred in uncovering, replacing and re-covering the Work shall constitute grounds for CONTRACTOR, upon proper notice, to receive a contract adjustment for compensable change and if such uncovering, replacing and re-covering of the Work causes a delay, such delay shall constitute
grounds for CONTRACTOR, upon proper notice, to receive a contract adjustment for compensable delay. If such Work is not in accordance with the Contract Documents, then such costs of uncovering, replacing and re-covering shall be paid for by CONTRACTOR at CONTRACTOR’S Own Expense and any resulting delay shall be considered an unexcused delay.

26.5  **Off-Hours Inspections.** CONTRACTOR shall request approval by DISTRICT before arranging any inspections either: (1) before 6:00 am or after 6:00 pm on Monday through Friday, or (2) on any Saturday, Sunday, holiday or any other time when Work is not usually in progress. Such request shall be delivered to DISTRICT at least two (2) working days in advance of the inspection being performed. Approval or disapproval of such request is in the sole and absolute discretion of DISTRICT, which approval will be communicated to CONTRACTOR by the DISTRICT. Except where such off-hours inspections are due to a breach by DISTRICT of an obligation under the Contract Documents, the additional cost (over and above that which would be required for inspections during regular business hours) to DISTRICT of the inspection shall be paid for by CONTRACTOR at CONTRACTOR’S Own Expense.

26.6  **Off Site Inspections.** CONTRACTOR shall be responsible for any additional inspection cost due to fabrication of materials being performed outside of Orange County.

26.7  **Access to the Work.** CONTRACTOR shall make available for use by DISTRICT, Inspectors of Record, Design Consultant, DISTRICT Consultants and others assigned to inspect or observe the Work, any equipment (wheelbarrow, shovel, ladder, man-lift, etc.) that is available or in use on Site, and is required to assist in such inspections or observations.

26.8  **Right to Stop Work.** Inspectors of Record shall, only if and to the extent permitted by applicable laws, have the authority, but not the obligation, to stop the Work whenever provisions of Contract Documents are not being complied with, or the conduct of the Work poses a probable risk of harm to persons or property.

26.9  **No DISTRICT Duty.** No authority of the DISTRICT, Inspectors of Record, Design Consultant, DISTRICT Consultants or others designated by DISTRICT to inspect the Work that is conferred by the Contract Documents nor any decision made by any of them in good faith either to exercise or not exercise such authority, nor any recommendation by any of them, shall give rise to a duty or responsibility on the part of any of them to CONTRACTOR or to the Subcontractors of any Tier.

26.10  **CONTRACTOR Responsibility.** Inspections or observations by the DISTRICT, Inspectors of Record, DISTRICT Consultants or others shall not in any way relieve CONTRACTOR from its sole responsibility for full compliance with all of the terms and conditions of the Contract Documents, nor be construed to lessen, to any degree, CONTRACTOR’S responsibility for providing efficient and capable superintendence as required herein or for incorporating into the Work only those items of the Work that conform to the Contract Documents. Welding procedures shall be purchased solely through American Welding Society (AWS).

26.11  **Reimbursement to DISTRICT.** Without limitation to any other provisions of the Contract Documents, CONTRACTOR shall reimburse the DISTRICT at CONTRACTOR’S Own Expense, or DISTRICT shall have the right, at its option, to withhold from payments due to CONTRACTOR, costs of inspections, observations or testing and other losses that are incurred for any of the following
reasons: (1) CONTRACTOR has failed to execute the Work in accordance with the Contract Documents; (2) materials or equipment have been substituted by CONTRACTOR without prior approval by the DISTRICT; (3) defective work; or (4) to conduct load testing of certain portions of the structure that have not fully met the requirements of the Contract Documents.

ARTICLE 27 TRENCHES

27.1. Protection. CONTRACTOR shall provide adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life and limb in trenches and open excavation, which conform to applicable safety standards.

27.2. Greater than Five Feet. If this Agreement involves the excavation of any trench or trenches five (5) feet or more in depth, and the Project cost is in excess of $25,000, the CONTRACTOR shall, in advance of excavation, submit to the DISTRICT for acceptance or to whomever DISTRICT designates which may include a registered civil or structural engineer employed by the DISTRICT to whom authority to accept has been delegated, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the Shoring System Standards established by the Construction Safety Orders of the Division of Industrial Safety, the plan shall be prepared by a registered civil or structural engineer employed by the CONTRACTOR, and all costs therefore shall be included in the price named in the Agreement for completion of the work as set forth in the Project Documents. In no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by CAL-OSHA and a CAL-OSHA permit for such plan delivered to the DISTRICT. Labor Code Section 6500 and 6705; Health and Safety Code Section 17922.5)

27.3. Greater than Four Feet. If this Agreement involves the digging of trenches or excavations that extend deeper than four feet below the surface, the following shall apply pursuant to Public Contract Code section 7104:

a. The CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the DISTRICT, in writing, of any:

   1. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

   2. Subsurface or latent physical conditions at the Site different from those indicated.

   3. Unknown physical conditions at the Site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

b. Material Difference. The DISTRICT shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR’S cost of, or the time required for, performance of any part of the work shall issue a change order under the procedures described in the
Project Documents. In the event a dispute arises between the DISTRICT and the CONTRACTOR, the CONTRACTOR shall not be excused from any scheduled completion date provided for by the Project Documents, but shall proceed with all the work to be performed under the Project Documents. The CONTRACTOR shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

**ARTICLE 28 DOCUMENTS ON WORK**

28.1. CONTRACTOR shall keep on the job Site at all times one legible copy of all Project Documents, including addenda and change orders, and all approved Drawings, Plans, schedules and Specifications. Said Documents shall be kept in good order and available to ARCHITECT, ARCHITECT’S representatives, and all authorities having jurisdiction. CONTRACTOR shall be acquainted with and comply with all California Code of Regulations provisions relating to conditions on this Project.

**ARTICLE 29 STATE AUDIT**

29.1. Pursuant to and in accordance with the provisions of Government Code Section 8546.7, or any amendments thereto, all books, records and files of the DISTRICT, the CONTRACTOR, or any subcontractor connected with the performance of this Agreement involving the expenditure of public funds in excess of Ten Thousand Dollars ($10,000.00), including, but not limited to, the costs of administration of the Agreement, shall be subject to the examination and audit of the State Auditor at the request of the DISTRICT or as part of any audit of the DISTRICT for a period of three (3) years after final payment is made under this Agreement.

**ARTICLE 30 SUBSTITUTIONS**

30.1. **Prior to Bid Opening.** Should the bidder wish to request prior to bid opening, any substitution for the materials, process, service or equipment specified, the bidder shall submit a written request at least ten (10) working days before the bid opening date and hour. If the substituted item is acceptable, the DISTRICT will approve it in an Addendum issued to all bidders of record. Requests received less than ten (10) working days prior to bid opening will **not** be considered. DISTRICT shall only consider substitution requests from the bidder submitting the bid for the project.

30.2. **After Bid Opening and Prior to Award of Contract.** If the bidder clearly indicates in its bid that it is proposing to use an “equal” product, the brand name or trade name, if any, of a proposed substitute item shall be inserted in the spaces provided on the SUBSTITUTION REQUEST FORM. Any submittal provided after the aforementioned deadline will not be considered. If the bidder fails to indicate an “equal” product, its bid shall be considered as offering the material, process, service or equipment referred to by the brand name or trade name specified. It is expressly understood and agreed to by the bidder that the DISTRICT reserves the right to reject any such proposed substituted item. It is further expressly understood and agreed by bidder that in the event the DISTRICT rejects a proposed “equal” item, the bidder will then supply the material; process, service or equipment designated by brand name or trade name or a substitute therefore which meets with the approval of the DISTRICT.
30.3. **The Substitution Request Form.** Requests for substitutions of products, materials, or processes in place of a specified item must be writing on the DISTRICT’S Substitution Request Form (“Request Form”) at the time of submitting bids to the District.

a. The SUBSTITUTION REQUEST FORM must be accompanied by evidence as to whether the proposed substitution:

1. Is equal in quality/service/ability to the Specified Item;
2. Will entail no changes in detail, construction, and scheduling of related work;
3. Will be acceptable in consideration of the required design and artistic effect;
4. Will provide no cost disadvantage to the District;
5. Will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts; and
6. Will required no change of the construction schedule.

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

30.4. **“Equal Substitution.”** With respect to all proposed substitutions of “equal” items, the bidder shall submit all pertinent and appropriate data substantiating its request for substitutions within fifteen (15) days prior to the Award of Contract. DISTRICT shall only consider substitution requests from the bidder submitting the bid for the Project. The DISTRICT is not responsible for locating or securing any information which is not included in such substantiating data. The burden of proof as to the quality or suitability of proposed substituted items shall be borne by the bidder. The DISTRICT shall be the sole judge as to the quality and suitability of proposed substituted items, and decisions of the DISTRICT shall be final and conclusive. Unless extended by the mutual agreement of the parties, the DISTRICT shall notify the successful bidder of the decision concerning the proposed substitution of “equal” items prior to the Award of Contract. Also such decisions by the DISTRICT shall be in writing, and no proposed substituted item shall be deemed approved unless the DISTRICT has so indicated in writing. These time limitations shall be complied with strictly, and in no case will an extension of time for completion be granted because of the bidder’s failure to request the substitution of an item at the times and in the manner set forth herein.

30.5. **“Or Equal.”** Whenever in Specifications any materials, process, service or equipment is indicated or specified by brand name, trade name, proprietary name or by name of manufacturer, such specification shall be deemed to be used for the purpose of facilitating description of material, process, service or equipment desired and shall be deemed to be followed by the words “or equal,” and CONTRACTOR may, unless otherwise stated, offer any material, process, service, or equipment which shall be substantially equal or better in every respect to that so indicated or specified subject to DISTRICT or ARCHITECT approval.
30.6. **Burden of Proof.** If material, process, service, or equipment offered by CONTRACTOR is not, in opinion of ARCHITECT, or DISTRICT, substantially equal or better in every respect to that specified, then CONTRACTOR shall furnish the material, process, service, or equipment specified. Burden of proof as to equality of any material, process, service, or equipment shall rest with CONTRACTOR. Provision authorizing submission of "or equal" substantiating data shall not in any way authorize an extension of time for performance of this Agreement.

30.7. **Defective “Equal”.** In the event CONTRACTOR furnishes material, process, service or equipment other than what was specified by the DISTRICT and which has been accepted by the DISTRICT and which later is defective, then CONTRACTOR at its sole cost and expense shall furnish the DISTRICT specified material, process, service or equipment or fully replace with new the defective material process, service or equipment at DISTRICT’s discretion.

30.8. **Cost of Approved Alternate.** In the event CONTRACTOR furnishes material, process service, or equipment more expensive than that specified, difference in cost of such material, process, service, or equipment so furnished shall be borne by CONTRACTOR. Any engineering, design fees, or approval agencies’ fees required to make adjustments in material or work of all trades directly or indirectly affected by the approved substituted items shall be borne entirely by CONTRACTOR. Any difference in cost between an approved substitution which is lower in cost than the originally specified item shall be refunded or credited by CONTRACTOR to DISTRICT.

30.9. **Preferred material.** Price, fitness and quality being equal with regard to supplies, the District may prefer supplies grown, manufactured, or produced in California and next prefer supplies partially manufactured grown, or produced in California provided the bids of said suppliers or the prices quoted by them do not exceed by more than 5% of the lowest bids/prices quoted by out of state suppliers, the major portion of the manufacture of the supplies is not done outside of California and the public good will be served thereby. (Government Code section 4330-4334).

**ARTICLE 31  SAMPLES**

31.1. **General.** CONTRACTOR shall furnish for approval, within thirty-five (35) calendar days following Award of Contract, all samples as required in Specifications together with catalogs and supporting data required by ARCHITECT. This provision shall not authorize any extension of time for performance of the work. ARCHITECT shall review such samples, as to conformance with design concept of work and for compliance with information given in Project Documents and approve or disapprove same within ten (10) working days from receipt of same.

31.2. **ASTM Testing.** Unless specified otherwise, sampling, preparation of samples and tests shall be in accordance with the latest standards of the American Society for Testing and Materials.

31.3. **Test Approval before Installation.** Samples shall, upon demand of ARCHITECT or DISTRICT, be submitted for tests or examinations and considered before incorporation of same into the work. CONTRACTOR shall be solely responsible for delays due to samples not being submitted in time to allow for tests. Acceptance or rejection will be expressed in writing. Work shall be equal to approved samples in every respect. Samples which are of value after testing will remain the property of the CONTRACTOR.
ARTICLE 32 PROGRESS SCHEDULE

32.1. General. Within five (5) calendar days after Board approval of contract, CONTRACTOR shall submit a preliminary schedule that describes the work sequence planned in the first 30 days of construction. Within 21 calendar days following Board approval of contract, CONTRACTOR shall prepare and submit for DISTRICT’s acceptance the Initial Construction Schedule for the value reporting, planning and scheduling, of all work required under the Project Documents. The schedule will separately identify those milestones or events that must be completed before other portions of the work can be accomplished.

32.2. Format. The schedule shall be in the form of a critical path progress schedule that shows, in graphic form, a plan for performance of the Work within the Contract Time. It shall indicate the beginning and completion dates of all phases of construction, using Primavera P3 or later version, as a time-scaled bar chart showing:

a. continuous flow from left to right and activities and milestones that are critical to Completion of the Work;

b. identification of “float”, techniques or methods designed to suppress depiction of available float are strictly prohibited;

c. a clearly highlighted critical path, no more than ten percent (10%) of the activities shall be shown as critical;

d. Durations and specific calendar days shall be clearly and legibly shown for the early and late start and finish of each activity; and

e. With the exception of DISTRICT review periods and governmental authority review periods, any activity having a duration of more than fifteen (15) Days will be segmented into fifteen (15) Day increments;

f. The weighted cost value expressed as a percentage of the total cost of the Work for each activity;

 g. The final labor force curves by trade;

h. Anticipated duration for shop fabrication requiring special inspections;

i. The anticipated purchase and delivery of major materials and equipment (procurement schedule); and

j. The District’s occupancy requirements with an item with duration for DISTRICT furnished Furniture, Fixture and Equipment procurement and installation.

32.3. Software Use. Alternate software may be not be used unless DISTRICT provides written approval in advance of use.

32.4. Submittal Review. The scheduling is necessary for the DISTRICT’s adequate monitoring of the progress of the Work and shall be prepared in accordance with the time frame described in the Agreement. The DISTRICT may reject schedule and require modification to it if, in the opinion of the ARCHITECT or DISTRICT, adherence to the progress schedule will cause the Work not to be
32.5. **Lean Scheduling.** CONTRACTOR will participate in no less than six Lean Scheduling exercises prior to each new grouping of major trades coming on Site. CONTRACTOR will exchange scheduling information with subcontractors and suppliers. CONTRACTOR will order work, equipment and materials with sufficient lead time to avoid interruption of the work.

32.6. **Monthly Schedule.** The CONTRACTOR shall submit to DISTRICT a monthly schedule to reflect the actual sequence of the work which shall be totally separate and apart from the original progress schedule.

32.7. **Revised Schedule due to Completion Jeopardy.** The CONTRACTOR shall also, if requested by the ARCHITECT or DISTRICT, provide revised schedules within ten (10) calendar days if, at any time, the ARCHITECT or DISTRICT, consider the completion date to be in jeopardy. The revised schedule shall be designed to show how the CONTRACTOR intends to accomplish the work to meet the original completion date. The form and method employed by the CONTRACTOR shall be the same as for the original progress schedule. The CONTRACTOR shall modify any portions of the schedule that become infeasible because of "activities behind schedule" or for any other valid reason. CONTRACTOR will provide documents and justification for any schedule changes. An activity that cannot be completed by its original completion date shall be deemed to be behind schedule.

32.8. **Revised Schedule due to Extension Request.** CONTRACTOR shall submit a revised schedule within ten (10) consecutive calendar days of CONTRACTOR’S request for any extension of time. Failure to submit such schedule will result in CONTRACTOR waiving his/her right to obtain any extension of time.

32.9. **Float Ownership.** It is agreed that the DISTRICT owns the “float” on this Project. If CONTRACTOR submits a revised schedule showing an earlier completion date for the Project, DISTRICT’s acceptance of this revised schedule shall not entitle CONTRACTOR to any delay claim or disruption damages or any other damages due to any such revised schedule. Nothing provided here in shall be construed as a direct, indirect or implicit acceleration order to the CONTRACTOR.

32.10. **Condition of Payment.** Compliance by CONTRACTOR with the requirements of this Article and the other provisions of the Contract Documents pertaining to preparing, submitting, revising and updating the schedule is a condition to DISTRICT’S obligation to make payment to CONTRACTOR. Recognizing that scheduling is a continuing, cumulative and recurring obligation, failure by DISTRICT to assert a right to withhold payment under this Article due to a noncompliance by CONTRACTOR with its schedule obligations shall not waive or diminish the DISTRICT’S right to withhold, or the DISTRICT’S right to disapprove of, future payments on account of such noncompliance or any other past or future noncompliance of the same or similar nature.

32.11. **Look Ahead.** In addition to the requirement to update the baseline schedule, CONTRACTOR is responsible to provide a four week rolling schedule at each progress meeting. This Schedule will include activities that are 1 week behind the Data Date and 3 weeks ahead of the Data Date. The Data Date shall be the date of the progress meeting. Schedule shall include information for all trades on-Site. Schedule will identify any work that is proposed outside the regular working hours.
32.12. **Digger Report.** CONTRACTOR will provide a digger report (version 3.0 or later) with each schedule submittal.

### ARTICLE 33  TIME ALLOWANCES

33.1. **Notice to Proceed.** DISTRICT will serve a Notice to Proceed upon Contractor by hand delivery, email or delivery to Contractor at legal address.

33.2. **Start Date.** Start date for Contract Times shall be on the date indicated in the Notice to Proceed. If no date is indicated, then the start date for contract time shall be the 5th calendar day from date that Contractor receives DISTRICT’s written Notice to Proceed, unless the Notice to Proceed is served by mail only, then the Start Date under the Contract shall be the tenth (10th) calendar day following the date of mailing. The Contractor shall commence work on such day, and shall prosecute the Work diligently to completion thereafter. No work shall commence before contract bonds and insurance certificates have been filed with the DISTRICT and the contract has been signed by the DISTRICT.

33.3. **Notice of Delay.** Notice shall constitute application for extension of time only if notice requests extension and sets forth the impact of the delay on the critical path and CONTRACTOR’S estimate of additional time required together with full recital of causes of unavoidable delays relied upon.

   a. With respect to any matter that may involve or require an adjustment extending the Contract Time, CONTRACTOR shall, within fourteen (14) Days after receipt by DISTRICT of a notice of delay, submit to DISTRICT a written Request for Extension.

   b. No time extensions shall be granted for delays for which CONTRACTOR fails to give timely notice and CONTRACTOR hereby waives any and all damages for delay for which timely notice is not given.

   c. CONTRACTOR recognizes and acknowledges that timely submission of a formal notice of delay and a formal request for extension, whether or not the circumstances of a delay may be known to DISTRICT or available to DISTRICT through other means, are not mere formalities but are of crucial importance to the ability of DISTRICT to promptly identify, prioritize, evaluate and mitigate the potential effects of delay. Any forms of informal notice, whether verbal or written (including, without limitation, statements at regular job meetings or entries in monthly reports, daily logs, job meeting minutes, updated Design-Build Schedules or look-ahead schedules), that do not strictly comply with the formal requirements herein, shall accordingly be deemed insufficient to satisfy the notice requirements.

   d. Any request for extension of time shall be accompanied by the claimant’s written statement that the adjustment claimed is the entire adjustment to which the claimant is entitled as a result of the occurrence of said event. No claim for an adjustment in the contract times will be valid and such claim will be waived if not submitted in accordance with the requirements of this paragraph.
e. The CONTRACTOR’S failure to perform in accordance with the construction schedule shall not be excused because the CONTRACTOR has submitted time extension requests, unless and until such requests are approved by DISTRICT.

33.4. **Change of Contract Times.** The contract times may only be changed by change order or written amendment and time is of this essence in this Agreement.

a. Adjustments. The Contract Times will be adjusted due to

1. changes in the Work ordered by DISTRICT;
2. acts or neglect by DISTRICT’s consultants, acts or neglect of utility districts, acts or neglect of other contractors performing other Work, provided CONTRACTOR has fully and completely performed its responsibilities under the Contract Documents, including but not limited to, its cooperation and coordination responsibilities required by the Contract Documents;
3. Fires, floods, abnormal weather conditions, earthquakes, civil disturbances, or Acts of God, provided damage resulting from same is not the result of CONTRACTOR’S failure to properly protect the Work as required by the Contract Documents. Notwithstanding the foregoing, the contract times shall not be extended unless CONTRACTOR has actually been prevented from completing any part of the Work within the contract time due to delay which is (i) beyond the control of CONTRACTOR and (ii) due to reasons for which CONTRACTOR is not responsible and (iii) a claim for delay is made as provided for herein. Delays attributable to and within the control of a subcontractor, or its subcontractors, or supplier shall be deemed to be delays within the control of CONTRACTOR.

b. Weather. The Contract Times will be adjusted due to Weather. CONTRACTOR shall have no right to an adjustment in the time of completion due to weather conditions which are normal for the locality of the Site.

1. The time period for completion of the project has been determined with consideration given to the average climatic range prevailing in the locality of the Site.
2. Delays due to adverse weather conditions will not be allowed for weather conditions which do not directly impact the performance of the critical path. Whenever the CONTRACTOR has undertaken an exterior critical path activity which is directly impacted by adverse weather conditions, the CONTRACTOR shall immediately notify the DISTRICT of the potential delay to such activity. The DISTRICT shall inspect the Site, meet with the CONTRACTOR and confirm that the exterior critical path activity is impacted and grant an extension of the Contract Times sufficient to allow the CONTRACTOR to perform the impacted activity.

c. Non-compensable Delay. Where CONTRACTOR is prevented from completing any part of the Work within the contract due to delay beyond the control of both DISTRICT and CONTRACTOR, an extension of contract times in an amount equal to the time loss due to
such delay shall be the CONTRACTOR’S sole and exclusive remedy for such delay. DISTRICT shall not be liable to CONTRACTOR, any subcontractor, any supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, Acts of God or acts or neglect by utility districts.

d. Concurrent Delay. The Contract Times will be adjusted due to Concurrent Delay. If delays acceptable for evaluation occur concurrently, the maximum extension of the Contract time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last. If an inexcusable delay occurs concurrently with acceptable delays for evaluation, the maximum extension of the Contract Time shall be the number of days, if any, by which the duration of a delay exceeds the inexcusable delay. The duration of concurrence is non-compensable.

e. Expiration of Contract. Delay in completion of the Work beyond the expiration of the contract time resulting from causes other than those listed as acceptable for evaluation are considered inexcusable delays and shall not entitle the CONTRACTOR to an extension of the contract time or an adjustment of the Contract amount.

f. Calculating Changes Involving Time. Contract Adjustments to the contract sum or contract time that are based on an extension of the contract time for compensable delay or a shortening of the contract time due to deleted Work shall be calculated as stated below, with no allowable markup thereon for CONTRACTOR. Contract Adjustments that are based on an acceleration in performance of the Work that is ordered by DISTRICT in writing to overcome a compensable delay for which the CONTRACTOR is entitled to an extension of the contract time that has been properly requested and is not granted by DISTRICT due to a DISTRICT decision to accelerate rather than extend the contract time shall be calculated as stated below:

1. Extensions. Provided that CONTRACTOR has complied with the contract provisions (including, without limitation, the requirements pertaining to timely delivery of a Notice of Delay and Request for Extension), if, as a result of excusable delay or compensable delay to the actual, as-built critical path of activities leading to achievement Completion, CONTRACTOR is unable to achieve Completion of the Work within the contract time Completion, then the contract time for completion of Final Construction Documents shall be extended, either by Change Order or Unilateral Change Order, for the length of the proven, resulting delay to CONTRACTOR’S ability to complete the construction Work within the contract time. The contract time shall not be adjusted for unexcused delays.

2. Shortening. CONTRACTOR shall within ten (10) Days after receiving notice of deleted Work prepare and deliver to DISTRICT a time impact analysis of the impact of the deleted work upon the critical path to determine if the contract time should be shortened thereby and if so the duration of the shortening. If the DISTRICT and CONTRACTOR are unable to agree upon the duration of the shortening, then
DISTRICT shall make a good faith determination of the reasonable amount of time that the contract time shall be shortened on account of such deleted Work.

3. Prescribed Calculations.

i. Work Day Lost Calculations. CONTRACTOR may claim an excusable delay or a compensable delay for a full Day only if all Work on a critical path activity is stopped for more than six (6) hours of a normal eight (8) hour work Day and for a half-Day only if all Work on a critical path activity is stopped for three (3) to six (6) hours of such a normal Work Day. No excusable delay or compensable delay may be claimed if all Work on a critical path activity is stopped for less than three (3) hours of such a normal work Day. Similarly, where deleted Work results in the projected avoidance of the need to perform more than six (6), or between three (3) and six (6) hours of all Work on a critical path activity on such a normal work Day, the contract time shall be contracted by a full Day or half Day, respectively.

ii. Dry Out Time Calculations. Contract Adjustments to the contract time that are based upon unusual precipitation that is an Act of God as defined herein, shall include, in addition to the number of Days of excusable delay to which CONTRACTOR is entitled due to a cessation of Work that occurs at the Site while the unusual precipitation is occurring, an additional extension for the delay to the critical path of activities affecting Completion that is the result of CONTRACTOR being unable, after cessation of the unusual precipitation at the Site, to proceed with performance of Work due to wet or muddy conditions at the Site (hereinafter referred to as “dry out” time); provided, however, that the amount of dry out time for which CONTRACTOR is entitled to an extension of time in any given calendar month shall not exceed the number of Days that is the product derived by multiplying (a) the number of Days of excusable delay to which CONTRACTOR is entitled due to a cessation of Work that occurs at the Site while such unusual precipitation is occurring, by (b) a fraction, the (i) numerator of which is the number of Days of excusable delay due to measurable unusual precipitation occurring at the Site during such calendar month that constitutes an Act of God as defined herein, and (ii) the denominator of which is the total number of Days of measurable precipitation occurring at the Site during said calendar month (including both the number of Days comprising the normal, 10-year monthly average of measurable precipitation recorded by NOAA and the excess, or unusual precipitation that constitutes an Act of God as defined herein.

33.5. DISTRICT Response to Time Change Request. All claims and adjustments in the contract times shall be determined by DISTRICT and shall be in accordance with the requirements set forth in the section on Changes and Extra Work.

a. After receipt of a timely and complete request for extension, DISTRICT shall investigate the facts concerning the cause and extent of such delay and, depending on whether the request
for extension is justified, will notify CONTRACTOR of its approval or disapproval in writing of all or a portion of CONTRACTOR’S request.

b. Extensions of time approved by DISTRICT shall apply only to that portion of the Work affected by the delay, and shall not apply to other portions of Work not so affected.

c. DISTRICT shall have the right, exercised in its sole and absolute discretion, in lieu of granting a contract adjustment to the contract time for compensable delay, to direct in writing the acceleration of the Work by CONTRACTOR in order to recapture time lost due to such compensable delay. The DISTRICT and CONTRACTOR shall endeavor prior to commencement of such acceleration to mutually agree upon the amount of compensation to be paid therefor. DISTRICT shall have the right, in the absence of such an agreement, to direct in writing that CONTRACTOR accelerate. CONTRACTOR shall comply with such directive. CONTRACTOR’S right to a contract adjustment to the contract sum on account of such acceleration shall be limited to (1) the premium time portion of any overtime paid for labor provided by CONTRACTOR or any subcontractor, plus (2) additional supervision costs for additional shifts of supervision provided at the Site by CONTRACTOR only (not by Subcontractors or Subconsultants), plus (3) allowable markup thereon. Except as directed by DISTRICT in writing, no statements, conduct or actions by DISTRICT will be construed as creating an obligation on the part of DISTRICT to agree to a contract adjustment to the contract sum on account of any cost of overtime or other costs associated with an acceleration of the Work to recapture time lost due to compensable delay.

33.6. **No Damage for Contractor Caused Delay.** CONTRACTOR shall not be entitled to any compensation, including but not limited to extended field or home office overhead, field supervision, costs of capital, interest, escalation charges, acceleration costs or other impacts for any delays caused in whole or in part by CONTRACTOR’S failure to perform its obligations under this Contract, or during periods of delay concurrently caused by CONTRACTOR and either DISTRICT or others. CONTRACTOR may be compensated for delays caused directly and solely by DISTRICT except that CONTRACTOR shall not be entitled to damages for delay to the Work caused by the following reasons:

a. DISTRICT’s right to sequence Work in a manner which would avoid disruption to the DISTRICT’s tenants and their contractors or other prime contractors and their respective subcontractors, exercised as a result of CONTRACTOR’S failure to perform its cooperation and coordination responsibilities required by this Contract;

b. DISTRICT’s enforcement of government act or regulation, or the provisions of the Contract Documents; and

c. Extensive requests for clarifications to Construction Documents or modifications to contract, provided such clarifications or modifications are processed by DISTRICT or its consultants in a reasonable time commensurate with provisions of Contract requirements.

33.7. **Extension of time does not waive DISTRICT’S Rights.** Granting of time extension for any reason shall in no way operate as waiver on part of DISTRICT, of right to collect liquidated damages for other delays or of right to collect other damages or other rights to which DISTRICT is entitled.
ARTICLE 34  MATERIALS AND WORK

34.1. **General.** Except as otherwise specifically stated in this Agreement, CONTRACTOR shall provide and pay for all materials, supplies, tools, equipment, labor transportation, superintendence, temporary constructions of every nature, and all other services and facilities of every nature whatsoever necessary to execute and complete the Project within specified time.

34.2. **New Material.** Unless otherwise specified, all materials shall be new and the best of their respective kinds and grades as noted or specified, and workmanship shall be of good quality.

34.3. **Storage.** Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of work and shall be stored properly and protected as required. DISTRICT has no obligation to pay for any prefabricated material stored offsite until delivered and installed to the jobsite and inspected and approved by the Inspector of Record.

34.4. **Timely Procurement.** CONTRACTOR shall, after issuance of the Notice to Proceed by DISTRICT, place orders for materials and/or equipment as specified so that delivery of same may be made without delays to the work. CONTRACTOR shall, upon demand from the ARCHITECT, furnish to the ARCHITECT documentary evidence showing that orders have been placed.

34.5. **DISTRICT Material Orders.** DISTRICT reserves the right, for any neglect in not complying with the above instructions, to place orders for such materials and/or equipment as it may deem advisable in order that the work may be completed at the date specified in the Agreement, and all expenses incidental to the procuring of said materials and/or equipment shall be paid for by the CONTRACTOR.

34.6. **No Interest Retained.** No materials, supplies, or equipment for work under this Agreement shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. CONTRACTOR warrants good title to all material, supplies, and equipment installed or incorporated in work and agrees upon completion of all work to deliver premises, together with all improvements and appurtenances constructed or placed thereon by it, to DISTRICT free from any claims, liens, or charges. CONTRACTOR further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by this Agreement shall have any right to lien upon premises or any improvement or appurtenance thereon, except that CONTRACTOR may install metering devices or other equipment of utility companies or of political subdivisions, title to which is commonly retained by utility company or political subdivision. In the event of installation of any such metering device or equipment, CONTRACTOR shall advise DISTRICT as to owner thereof.

34.7. **Protection of Supplier's Rights.** Nothing contained in this Article, however, shall defeat or impair the rights of persons furnishing material or labor under any bond given by CONTRACTOR for their protection or any rights under any law permitting such persons to look to funds due CONTRACTOR in hand of DISTRICT, and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials or labor when no formal contract is entered into for such materials or labor.
34.8. **CONTRACTOR Retains Title.** The title to new materials and/or equipment and attendant liability for its protection and safety, shall remain in the CONTRACTOR until incorporated in the work and accepted by the DISTRICT; no part of said materials and/or equipment shall be removed from its place of onsite/offsite storage except for immediate installation in the work; and CONTRACTOR shall keep an accurate inventory of all said materials and/or equipment in a manner satisfactory to the DISTRICT or its authorized representative.

**ARTICLE 35 INTEGRATION OF WORK**

35.1. **General.** CONTRACTOR shall do all cutting, fitting, patching, and preparation of work as required to make its several parts come together properly, and fit it to receive or be received by work of other contractors or existing conditions showing upon, or reasonably implied by, the Drawings and Specifications, and shall follow all directions given by the ARCHITECT.

35.2. **CONTRACTOR Costs.** All costs caused by defective or ill-timed work shall be borne by CONTRACTOR.

35.3. **Consent of ARCHITECT.** CONTRACTOR shall not endanger any work by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor without the written consent of the ARCHITECT. CONTRACTOR shall be solely responsible for protecting existing work on adjacent properties and shall obtain all required permits for shoring and excavations near property lines.

35.4. **DSA Review.** Cutting, boring, saw-cutting or drilling through structural elements of Existing Improvements is not to be started until the details (if the details are not already shown in, or as shown do not conform to, the DSA-approved Contract Documents) have been reviewed and approved the appropriate subconsultant responsible for structural engineering and the DSA field engineer.

35.5. **Match Existing.** When modifying existing work or installing new work adjacent to existing work, CONTRACTOR shall match, as closely as conditions of Site and materials will allow, the finishes, textures, and colors of the original work, refinishing existing work as required, at no additional cost to DISTRICT.

35.6. **Phased Construction.** CONTRACTOR is aware that this Project may be split into several phases. If the Project is split into phases then CONTRACTOR has made allowances for any delays or damages which may arise from coordination with contractors for other phases. If any delays should arise from a contractor working on a different phase, CONTRACTOR'S sole remedy for damages, including delay damages, shall be against the contractor who caused such damage and not the DISTRICT. CONTRACTOR shall provide access to contractors for other phases as necessary to prevent delays and damages to contractors working on other phases of construction.

**ARTICLE 36 OBTAINING OF PERMITS, LICENSES AND EASEMENTS**

36.1. **General.** Permits, licenses, and certificates necessary for prosecution of work, shall be secured and paid for by CONTRACTOR, unless otherwise specified. All such permits, licenses, and certificates shall be delivered to the ARCHITECT before demand is made for the certificate of final payment. CONTRACTOR shall, and shall require subcontractors to, maintain contractors’ licenses in effect as required by law.
36.2. **Payment for Easements.** Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by DISTRICT, unless otherwise specified.

36.3. **Utility Coordination.** Permits and charges for installation, and inspection thereof, of utility services by serving utilities shall be secured and paid for by DISTRICT.

### ARTICLE 37 SURVEYS

37.1. Surveys to determine location of property lines and corners will be supplied by DISTRICT. Surveys to determine locations of construction, grading, and site work, shall be provided by CONTRACTOR.

### ARTICLE 38 EXISTING UTILITY LINES; REMOVAL, RESTORATION

38.1. **Unidentified Utilities.** Pursuant to Government Code Section 4215, the DISTRICT assumes the responsibility for removal, relocation, and protection of utilities located on the construction Site at the time of commencement of construction under this Agreement with respect to any such utility facilities which are not identified in the Plans and Specifications. The CONTRACTOR shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of the DISTRICT to provide for removal or relocation of such utility facilities. If the CONTRACTOR, while performing work under this Agreement, discovers utility facilities not identified by the DISTRICT in the Plans or Specifications, CONTRACTOR shall immediately notify the DISTRICT and the utility in writing. CONTRACTOR shall be compensated according to the provisions governing changes in the work.

38.2. **Other Utilities.** This Article shall not be construed to preclude assessment against the CONTRACTOR for any other delays in completion of the work. Nothing in this Article shall be deemed to require the DISTRICT to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the construction Site can be inferred from the presence of other visible facilities, such as buildings, meter junction boxes, on or adjacent to the Site of the construction.

38.3. **Code Requirements.** As part of the work to be performed, CONTRACTOR shall provide the notices and proceed in accordance with Government Code Sections 4216.2, 4216.3 and 4216.4, and pay all fees charged pursuant to Government Code Section 4216, et seq.

### ARTICLE 39 WORK TO COMPLY WITH APPLICABLE LAWS AND REGULATIONS

39.1. **Compliance.** CONTRACTOR shall give all notices and comply with all laws, ordinances, rules, and regulations applicable to the work as indicated and specified.

39.2. **Notify of Variance.** If CONTRACTOR observes that Drawings or Specifications are at variance therewith, CONTRACTOR shall promptly notify ARCHITECT in writing and any changes deemed necessary by the ARCHITECT shall be adjusted as provided for changes in work. If CONTRACTOR performs any work which it knew, or through exercise of reasonable care should have known, to be contrary to such laws, ordinances, rules or regulations, and without such notice to ARCHITECT, CONTRACTOR shall bear all costs arising therefrom. Where Plans, Drawings or Specifications state that materials, processes, or procedures must be approved by the Division of State ARCHITECT, State Fire Marshall, or other body or agency, CONTRACTOR shall be responsible for satisfying requirements of such bodies or agencies.
**ARTICLE 40   ACCESS TO WORK AND PHOTOGRAPHY**

40.1. **Access.** DISTRICT and its representatives shall at all times have access to work wherever it is in preparation or progress. CONTRACTOR shall provide safe and proper facilities for such access so that DISTRICT’s representatives may perform their functions.

40.2. **Consent to Photographing.** CONTRACTOR is advised that DISTRICT intends, from time to time, to take photographs, videotapes and/or motion pictures of the Work, and workers located on the Site and proximate settings. CONTRACTOR consents to the use of CONTRACTOR’S name and likeness in instructional or training uses, news releases, advertising and/or publicity throughout the world in perpetuity, in all media now known or hereafter invented. CONTRACTOR shall include in its contracts with its Subcontractors a consent by the Subcontractor to the use of Subcontractor’s name and the likenesses of its employees on the same terms as provided for herein applicable to such consent by CONTRACTOR.

**ARTICLE 41   PAYMENTS BY CONTRACTOR**

41.1. **General.** CONTRACTOR shall pay:

   a. For all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered;

   b. For all materials, tools, and other expendable equipment to the extent of ninety percent (90%) of cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at Site of Project and balance of cost thereof not later than the 30th day following completion of that part of work in or on which such materials, tools, and equipment are incorporated or used; and

   c. To each of its subcontractors, not later than the 5th day following each payment to CONTRACTOR the respective amounts allowed CONTRACTOR on account of work performed by respective subcontractor to the extent of such subcontractor’s interest therein.

   d. Within seven (7) days from the time that all or any portion of the retentions are received by CONTRACTOR from DISTRICT, to each of its subcontractors from whom retention has been withheld, each subcontractor’s share of the retention received. However, if a retention payment received by CONTRACTOR is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor, if the payment is consistent with the terms of the subcontract. CONTRACTOR may withhold from a subcontractor its portion of the retentions if a bona fide dispute exists between the subcontractor and the CONTRACTOR. The amount withheld from the retention shall not exceed one hundred fifty percent (150%) of the estimated value of the disputed amount.

**ARTICLE 42   INSPECTOR’S FIELD OFFICE**

42.1. CONTRACTOR shall provide for the exclusive use of Inspector a temporary field office to be located as directed by Inspector and to be maintained until removal is authorized by DISTRICT. Office shall be of substantial waterproof construction with adequate natural light and ventilation by means of
stock design windows. Door shall have a key-type lock or padlock hasp. A table satisfactory for study of Plans and two chairs shall be provided by CONTRACTOR. CONTRACTOR shall provide and pay for adequate electric lights, telephone service (not a pay phone), and adequate heat for the field office until authorized removal.

**ARTICLE 43 UTILITIES**

43.1. General. All utilities, including but not limited to electricity, water, gas, and telephone used on work shall be furnished and paid for by CONTRACTOR. CONTRACTOR shall furnish and install necessary temporary distribution systems, including meters, if necessary, from distribution points to points on Site where utility is necessary to carry on the work. When it is necessary to interrupt any existing utility service to make connections, a minimum of **forty-eight (48) hours** advance notice shall be given to the DISTRICT, the College Director of Facilities and ARCHITECT. Interruptions in utility services shall be of the shortest possible duration for the work at hand and shall be approved by the DISTRICT and the ARCHITECT. In the event any utility service is interrupted without the required **forty-eight (48) hour notice**, then CONTRACTOR shall be liable for all damage suffered by DISTRICT due to the interruption. Upon completion of work, CONTRACTOR shall remove all temporary distribution systems.

43.2. **Use of Existing Utilities.** CONTRACTOR may, with written permission of DISTRICT, use DISTRICT’s existing utilities by making prearranged payments to DISTRICT for utilities used by CONTRACTOR for the Project.

**ARTICLE 44 SANITARY FACILITIES**

44.1. The CONTRACTOR shall provide sanitary temporary toilet and wash facilities in no fewer numbers than required by law and such additional facilities as may be directed by the Inspector for the use of all workers. The toilet facilities shall be maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by the Inspector. Use of toilet and wash facilities in the Work under construction shall not be permitted. Use of existing or permanent toilet facilities shall not be permitted except by written consent of DISTRICT.

**ARTICLE 45 CLEANING UP**

45.1. CONTRACTOR at all times shall keep work Site free from debris such as waste, rubbish, and excess materials and equipment caused by this work. CONTRACTOR shall not leave debris under, in, or about the work Site and shall remove same promptly and with not greater than one week between removals. Upon completion of Work, CONTRACTOR shall clean interior and exterior of building, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected. CONTRACTOR shall clean and polish all glass, plumbing fixtures, and finish hardware and similar finish surfaces and equipment and remove temporary fencing, barricades, planking, sanitary facilities and similar temporary facilities from Site. If CONTRACTOR fails to clean up, the DISTRICT shall do so and the cost thereof shall be charged to the CONTRACTOR and deducted from any progress payment due.

**ARTICLE 46 PATENTS, ROYALTIES, AND INDEMNITIES**
46.1. The CONTRACTOR shall hold and save the DISTRICT and its governing board, officers, agents, and employees harmless from liability of any nature or kind, including cost and expense, for or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of this Agreement, including its use by the DISTRICT, unless otherwise specifically provided in the Project Documents, and unless such liability arises from the sole negligence, or active negligence, or willful misconduct of the DISTRICT.

**ARTICLE 47 GUARANTEE**

47.1. **Warranty.** CONTRACTOR warrants that the work (which includes any equipment furnished by CONTRACTOR as part of the materials) shall: (a) be free from defects in workmanship and material; (b) be free from defects in any design performed by CONTRACTOR; (c) be new, and conform and perform to the requirements stated in the Specifications and where detail requirements are not so stated, shall conform to applicable industry standards; and (d) be suitable for the use stated in the Specifications.

47.2. **Assignment.** CONTRACTOR does hereby unconditionally and irrevocably assign to DISTRICT all warranties and guarantees issued or made by any Subcontractor of any Tier (including, without limitation, any manufacturer, supplier and distributor). Such assignment shall not relieve CONTRACTOR of, or otherwise limit, any of its obligations contained in the Contract Documents, including, without limitation, the general responsibility and liability of CONTRACTOR for a breach by a Subcontractor (including, without limitation, any manufacturer, supplier and distributor) of a warranty or guarantee given by such Subcontractor in connection with the Work.

47.3. **Warranty Period.** The warranty period for discovery of defective work shall commence on the date stamped on the Notice of Completion verifying County recordation and continue for the period set forth in the Specifications or for one year if not so specified. If, during the warranty period, the work is not available for use due to Defective Work, such time of unavailability shall not be counted as part of the warranty period. The warranty period for corrected Defective Work shall continue for a duration equivalent to the original warranty period.

47.4. **Repairs.** District shall give CONTRACTOR prompt written notice after discovery of any Defective Work. CONTRACTOR shall correct any such Defective Work, as well as any damage to any other part of the work resulting from such Defective Work, and provide repair, replacement, or reimbursement, at its sole expense, in a manner approved by the DISTRICT and with due diligence and dispatch as required to make the work ready for use by DISTRICT, ordinary wear and tear, unusual abuse or neglect excepted. Such corrections shall include, but not be limited to, any necessary adjustments, modifications, changes of design (unless of DISTRICT’s design), removal, repair, replacement or reinstallation, and shall include all necessary parts, materials, tools, equipment, transportation charges and labor as may be necessary, and cost of removal and replacement of work shall be performed at a time and in such a manner so as to minimize the disruption to DISTRICT’s use of the work.

47.5. **DISTRICT Right to Repair.** In the event of failure of CONTRACTOR or Surety to commence and pursue with diligence said repairs or replacements within ten (10) calendar days after being notified in writing, DISTRICT is hereby authorized to proceed to have defects repaired or replaced and made
good at expense of CONTRACTOR and Surety who hereby agree to pay costs and charges therefore immediately on demand.

47.6. **Dangerous Condition.** If, in the opinion of the DISTRICT, Defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the DISTRICT or to prevent interruption of operations of the DISTRICT, the DISTRICT will attempt to give the written notice required by this Article. If the CONTRACTOR or Surety cannot be contacted or neither complies with the DISTRICT’s requirements for correction within a reasonable time as determined by the DISTRICT, the DISTRICT may, notwithstanding the provisions of this Article, proceed to make such correction or provide such attention and the costs of such correction or attention shall be charged against the CONTRACTOR and Surety. Such action by the DISTRICT will not relieve the CONTRACTOR and Surety of the guarantees provided in this Article or elsewhere in the Project Documents.

47.7. **Not a Limitation.** This Article does not in any way limit the guarantees on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. CONTRACTOR shall furnish to DISTRICT all appropriate guarantee or warranty certificates upon completion of the Project or upon request by DISTRICT.

47.8. **Delivery of Bound Volume.** All guarantees required under this Article shall be in writing on the Guarantee form included in the Project Documents. All such guarantees and warranties shall be: (1) in writing; (2) indexed and bound; (3) accompanied by such certifications and instruction materials as may be required by the Contract Documents; and (4) issued or assignable by their terms to DISTRICT and will in the latter case be assigned to DISTRICT. Nothing herein shall limit any other rights or remedies available to DISTRICT.

47.9. **Manuals.** CONTRACTOR shall provide to DISTRICT instruction manuals for all items which require same.

   a. Two (2) hard copies and one (1) electronic version of operations and maintenance manuals will be prepared and transmitted to DISTRICT within the Contract Time for Final Completion.

   b. Final Payment will not be due until District Project Manager has received manuals covering the Work that are either required to be provided by the terms of the Contract Documents or if not required are customarily provided according to usual commercial practices applicable to the portion of Work involved. Operating instructions will be included within the equipment manuals and will state all information necessary for DISTRICT to operate, use, maintain and service the equipment fully and efficiently.

47.10. **Fees.** The DISTRICT may collect its reasonable costs and attorneys’ fees in any action to enforce this Article.

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**ARTICLE 48  DUTY TO PROVIDE FIT WORKERS**

48.1. **General.** CONTRACTOR and subcontractors shall at all times enforce strict discipline and good order among their employees and shall not employ on work any unfit person or anyone not skilled in work assigned to such person. It shall be the responsibility of CONTRACTOR to ensure compliance with this Article.
48.2. **Excluded from Work.** Any person in the employ of the CONTRACTOR or subcontractors whom DISTRICT or ARCHITECT may deem incompetent, unfit, troublesome or otherwise undesirable shall be excluded from the work Site and shall not again be employed on it except with written consent of DISTRICT.

**ARTICLE 49  WAGE RATES, TRAVEL AND SUBSISTENCE**

49.1. **General.** Pursuant to the provisions of Article 2 (commencing at Section 1770), Chapter 1, Part 7, Division 2 of the Labor Code, the governing board of DISTRICT has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification or type of worker needed for this file with the Clerk of the DISTRICT’s governing board and copies will be made available to any interested party on request. CONTRACTOR shall post a copy of such wage rates at the work Site. Labor Code Section 1773.2. The rates are available on the Internet at [www.dir.ca.gov](http://www.dir.ca.gov) “Statistics & Research.”

49.2. **Holiday and Overtime.** Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Agreement applicable to each particular craft, classification or type of worker employed.

49.3. **Not Less than Prevailing Rate.** CONTRACTOR shall pay and shall cause to be paid each worker engaged in work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the CONTRACTOR or any subcontractor and such workers.

49.4. **Travel and Subsistence.** CONTRACTOR shall pay and shall cause to be paid to each worker needed to execute the work on the Project travel and subsistence payments, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed with the Department of Industrial Relations in accordance with Labor Code Section 1773.8.

49.5. **Changes in Rates during Bid.** If during the period this bid is required to remain open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which this public work is to be performed, such change shall not alter the wage rates in the Notice Calling for Bids or the contract subsequently awarded.

49.6. **Penalty.** Pursuant to Labor Code Section 1775, CONTRACTOR shall as a penalty to the DISTRICT, forfeit fifty dollars ($50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of per diem wages, determined by the Director, for each craft or classification in which such worker is employed for any public work done under the Agreement by CONTRACTOR or by any subcontractor under it. The amount of the penalty shall be determined by the Labor Commission and shall be based on consideration of the CONTRACTOR’S mistake, inadvertence or neglect in failing to pay the correct prevailing rate of per diem wage, or the previous record of the CONTRACTOR in meeting his or her prevailing rate of per diem wage obligations, or the CONTRACTOR’S willful failure to pay the correct prevailing rate of per diem wages. A mistake, inadvertence or neglect in failing to pay the correct prevailing rate of per diem wage is not excusable if the CONTRACTOR had knowledge of his or her obligations under this part. The difference
between such prevailing rate of per diem wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of per diem wage shall be paid to each worker by the CONTRACTOR.

49.7. **Closest Correspondence of Trade.** Any worker employed to perform work on the Project, which work is not covered by any craft or classification listed in the general prevailing rate of per diem wages determined by the Director shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to work to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such person in such craft or classification.

49.8. **Per Diem.** Pursuant to Labor Code Section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Labor Code Section 1773.8.

49.9. **Wage Rates and Deductions.** CONTRACTOR shall post at appropriate conspicuous points on the Site of the Project, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned.

### ARTICLE 50  HOURS OF WORK

50.1. **General.** As provided in Article 3, (commencing at Section 1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the CONTRACTOR or by any subcontractor on any subcontract under this Agreement upon the work or upon any part of the work contemplated by this Agreement shall be limited and restricted by the Agreement to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, work performed by employees of CONTRACTOR in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

50.2. **Records.** The CONTRACTOR shall keep and shall cause each subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by CONTRACTOR in connection with the work or any part of the work contemplated by this Agreement. The record shall be kept open at all reasonable hours to the inspection of the DISTRICT and to the Division of Labor Standards Enforcement, Department of Industrial Relations.

50.3. **Penalty.** Pursuant to Labor Code Section 1813, the CONTRACTOR shall pay to the DISTRICT a penalty of Twenty-Five Dollars ($25) for each worker employed in the execution of this Contract by the CONTRACTOR or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of Article 3 (commencing at Section 1810), Chapter 1, Part 7, Division 2 of the Labor Code.
50.4. **No Additional Cost to DISTRICT.** Any work necessary to be performed after regular working hours, or on Saturdays or other holidays shall be performed without additional expense to DISTRICT.

**ARTICLE 51  PAYROLL RECORDS**

51.1. **General.** Pursuant to the provisions of Labor Code Section 1776, the CONTRACTOR shall keep and shall cause each subcontractor performing any portion of the work under this Agreement to keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by CONTRACTOR in connection with the work.

51.2. **Certified Payroll.** The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the CONTRACTOR on the following basis:

a. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative as required by law or at DISTRICT direction.

b. A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished as required by law or upon DISTRICT request, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

c. A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection upon request by the public or copies thereof made; provided, however, that a request by the public shall be made through either the DISTRICT, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the CONTRACTOR, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the CONTRACTOR.

d. The form of certification shall be as follows: I, ______________, (Name-print), the undersigned, am ___________ (position in business) with the authority to act for and on behalf of ________________ (Name of business and/or CONTRACTOR), certify under penalty of perjury that the records or copies thereof submitted and consisting of __________________________ (description, number of pages) are the originals or true, full and correct copies of the originals which depict the payroll record(s) of the actual disbursements by way of cash, check, or whatever form to the individual or individuals named. Dated: _______________.

51.3. **File Certified Copy.** Contractor shall file a certified copy of the payroll records enumerated in subdivision (a) with the entity that requested the records within ten (10) days after receipt of a written request. In the event that the CONTRACTOR fails to comply within the 10-day period, the
CONTRACTOR shall, as a penalty to the DISTRICT, forfeit Twenty-Five Dollars ($25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

51.4. **Redacted Copy.** Any copy of payroll records made available for inspection as copies and furnished upon request to the public by the DISTRICT, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the CONTRACTOR shall not be marked or obliterated.

51.5. **Location of Payroll Records.** The CONTRACTOR shall inform the DISTRICT of the location of the payroll records enumerated under subdivision (a), including the street address, city and county, and shall, within five (5) working days, provide a written notice of a change of location and address.

51.6. **Pre-Construction Meetings, Interviews.** The CONTRACTOR shall attend any pre-construction meetings held by the DISTRICT to discuss labor requirements. The CONTRACTOR and the subcontractors shall allow the DISTRICT, DISTRICT Third Party Labor Compliance Officer, DISTRICT Consultants and the Department of Industrial Relations, and designated representatives of each, to conduct, at their discretion, interviews of workers at the Site during working hours.

51.7. **Compliance.** It shall be the responsibility of the CONTRACTOR to ensure compliance with the provisions of this Article and the provisions of Labor Code Section 1776.

51.8. **Condition of Payment.** Compliance by the CONTRACTOR with the requirements of the provisions of this Article and the provisions of Labor Code Section 1776 shall be a condition to the CONTRACTOR’S right to payment under its Applications for Payment. Without limitation to the foregoing, payments to the CONTRACTOR shall not be made when payroll records are delinquent or inadequate.

### ARTICLE 52  APPRENTICES

52.1. **General.** The CONTRACTOR acknowledges and agrees that, if this Agreement involves a dollar amount greater than or a number of working days greater than that specified in Labor Code Section 1777.5, this Agreement is governed by the provisions of Labor Code Section 1777.5. It shall be the responsibility of the CONTRACTOR to ensure compliance with this Article 51 and with Labor Code Section 1777.5 for all apprenticing occupations.

52.2. **Registered Apprentices.** Apprentices of any crafts or trades may be employed and, when required by Labor Code Section 1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the Labor Code.

52.3. **Apprentice Wage.** Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered.

52.4. **Standards and Agreements.** Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3 of the Labor Code, are eligible to be employed on public works. The
employment and training of each apprenticeship shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he or she is training.

52.5. **Apprentice Ratios.** Pursuant to Labor Code Section 1777.5, the CONTRACTOR and any subcontractors employing workers in any apprenticeship craft or trade in performing any work under this Agreement shall employ apprentices in at least the ratio set forth in Section 1777.5 and apply to the applicable joint apprenticeship committee for a certificate approving the CONTRACTOR or subcontractor under the applicable apprenticeship standards for the employment and training of apprentices.

52.6. **Contract Award to Apprenticeship Committee.** Every contractor and subcontractor shall submit contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Agreement, the number of apprentices to be employed and the approximate dates the apprentices will be employed.

52.7. **Noncompliance.** If the CONTRACTOR or subcontractor willfully fails to comply with Labor Code Section 1777.5, then, upon a determination of noncompliance by the Chief of the Division of Apprenticeship Standards, the CONTRACTOR or subcontractor shall be subject to the penalties imposed under Labor Code Section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council.

52.8. **Discrimination Forbidden.** The CONTRACTOR and all subcontractors shall comply with Labor Code Section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

52.9. **Fully Acquainted.** CONTRACTOR shall become fully acquainted with the law regarding apprentices prior to commencement of the work. Special attention is directed to Sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and Title 8, California Code of Regulations, Section 200, et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 8th Floor, San Francisco, California 94102, (415) 703-4920.

**ARTICLE 53 LABOR - FIRST AID**

53.1. The CONTRACTOR shall maintain emergency first aid treatment for CONTRACTOR's workers on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C.A., Sec. 651, et seq.).

**ARTICLE 54 PROTECTION OF PERSONS AND PROPERTY**

54.1. **General.** The CONTRACTOR shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Agreement and shall take all necessary measures and be responsible for the proper care and protection of all materials delivered and work performed until completion and final Acceptance by the DISTRICT. CONTRACTOR shall provide such heat, covering, and enclosures as are necessary to protect all persons, work, materials, equipment, appliances, and tools against damage by weather conditions. All work shall be solely at the CONTRACTOR'S risk with the exception of damage to the work caused by Acts of God.
54.2. **Safety.** CONTRACTOR shall take, and require subcontractors to take, all necessary precautions for safety of workers and shall comply with all applicable federal, state, local and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to the work Site, on a twenty-four (24) hours a Day, seven (7) Days a week basis, and to provide a safe and healthful place of employment.

a. Protection. CONTRACTOR shall furnish, erect and properly maintain at all times, as directed by DISTRICT or ARCHITECT or required by conditions and progress of work, all necessary safety devices, safeguards, construction canopies, signs audible devices for protection of the blind, safety rails, belts and nets, barriers, lights, and security personnel for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction.

b. Illness and Injury Prevention Plan. Prior to the start of the Work, CONTRACTOR shall prepare and submit to DISTRICT an Illness and Injury Prevention Plan, which shall comply with the requirements of the Contract Documents and shall include, at a minimum, guidelines, requirements and procedures for the following: safety management policy; emergency response plan; illness and injury prevention procedures; safety meetings; accident investigation; basic accident causes; safety inspection checklist; fire prevention and control; report forms; and employee safety manual and procedures for achieving compliance with safety requirements of insurers. A copy of the Illness and Injury Prevention Plan shall be maintained on Site at all times and provided to the DISTRICT upon request. CONTRACTOR, and any member of the CONTRACTOR Team, where applicable, is solely responsible for monitoring activities at the Site for compliance with the Illness and Injury Prevention Plan and for the enforcement thereof.

c. Safety Representative. CONTRACTOR shall designate a responsible employee, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety and health of workers. Name and position of person so designated shall be reported in writing to DISTRICT by CONTRACTOR.

d. First Aid. CONTRACTOR shall maintain emergency first aid treatment for all workers and other persons on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C.A., §§651 et seq.) and all other Applicable Laws.

e. Loading, Storage. CONTRACTOR shall be responsible for coordinating the storage and staging of materials and equipment on-Site and off-Site and shall not load or store or permit any part of the Work or the Site to be loaded or stored so as to endanger the safety of persons or property.

f. Unsafe Conditions. CONTRACTOR shall immediately correct any condition that exists on the Site, or that DISTRICT, in its reasonable judgment, determines to exist on the Site, that is unsafe or potentially unsafe to persons or property. If, in the sole and absolute discretion of DISTRICT, the condition is potentially life-threatening, the DISTRICT may, with or without notice to CONTRACTOR, take whatever immediate action is necessary to correct the life-
threatening condition, and the costs thereof, including, without limitation, any additional service fees or costs of the DISTRICT, Design Consultant, Inspectors of Record, DISTRICT Consultants or others to whom DISTRICT may be liable, shall be reimbursed to DISTRICT by CONTRACTOR at CONTRACTOR’S Own Expense. Nothing set forth in this paragraph shall be interpreted as an assumption of any obligation on the part of the DISTRICT, Inspectors of Record, Design Consultant, DISTRICT Consultants or other persons or entities other than CONTRACTOR and the Subcontractors, to report such conditions to CONTRACTOR nor as relieving CONTRACTOR of any of its responsibilities under the Contract Documents.

g. Corrections. CONTRACTOR shall correct any violations of safety laws, standards, orders, rules, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, such violation shall be corrected immediately by the CONTRACTOR at CONTRACTOR’S expense.

h. Separate Contractors. With respect to work of separate contractor being performed within an area of the Site that is under the responsibility or control of the CONTRACTOR, CONTRACTOR shall: (1) provide copies of the IIPP to the separate contractors; (2) protect the separate contractors’ work and workers from loss due to the actions or inactions of CONTRACTOR and the subcontractors; and (3) notify the separate contractor and DISTRICT of any observed violation by the separate contractor of the IIPP or of any violations by the separate contractor of Applicable Laws governing safety on the Site. Nothing herein shall be interpreted as relieving the separate contractors from their obligations to comply with the CONTRACTOR’S IIPP, as excusing any failure by a separate contractor from performing its obligations under its contracts with DISTRICT or Applicable Laws or as obligating CONTRACTOR to directly supervise or enforce the obligations of the separate contractors to comply with the requirements of the IIPP or applicable law relating to safety.

54.3. **Safety Emergency.** In an emergency affecting safety of person or of work or of adjoining property, CONTRACTOR, without special instruction or authorization from ARCHITECT or DISTRICT, is hereby permitted to act, at its discretion, to prevent such threatened loss or injury; and CONTRACTOR shall so act if so authorized or instructed by ARCHITECT or DISTRICT. Any compensation claimed by CONTRACTOR on account of emergency work shall be determined by written agreement with the DISTRICT.

54.4. **Safeguards.** CONTRACTOR shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations. CONTRACTOR shall (unless waived by the DISTRICT in writing):

a. Provide substantial barricades around any shrubs or trees indicated to be preserved.

b. Deliver materials to building area over route designated by ARCHITECT.

c. When directed by DISTRICT, take preventive measures to eliminate objectionable dust.

d. Enforce all instructions of DISTRICT and ARCHITECT regarding signs, advertising, fires, and smoking and require that all workers comply with all regulations while on construction Site.
e. Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved civil engineer at no cost to the DISTRICT.

54.5. **Hazardous Material Release.** CONTRACTOR and its Subcontractors shall not cause the introduction, discharge, release, emission, spill, storage, treatment or disposal of any Hazardous Substance on or adjacent to the Site. Should CONTRACTOR or its Subcontractors introduce, discharge, release, emit, spill, treat, store or dispose of any Hazardous Substance on the Site in violation of the foregoing obligation or otherwise in violation of Applicable Laws, CONTRACTOR shall at CONTRACTOR’S own expense and without limitation to DISTRICT’S other rights or remedies for default immediately (1) inform DISTRICT in writing of such event, (2) advise DISTRICT with respect to any release reporting or notification requirement that may apply as a result of such event, (3) assist DISTRICT in complying with any such reporting or notification requirement as determined by DISTRICT, and (4) perform any investigation, remediation, removal or other response that is necessary or desirable in order to abate or clean up the condition resulting from such event to the full satisfaction of DISTRICT and any applicable Governmental Authority. Such Hazardous Substances shall be removed and properly disposed of as soon as they can be accepted at an appropriate disposal facility, and in no event later than sixty (60) Days after such waste is generated, unless a longer time is approved by DISTRICT.

54.6. **Indemnification of Adjacent Property Owners.** In the event CONTRACTOR enters into any agreement with the owners of any adjacent property to enter upon such property for the purpose of performing the Work or other activities incidental to the Work, CONTRACTOR shall fully indemnify, defend and hold harmless any person or entity which owns or has any interest in such adjacent property against any loss resulting from the acts or omissions of the CONTRACTOR.

54.7. **Responsibility for Loss.** CONTRACTOR shall promptly remedy loss to any property or person caused in whole or in part by the failure of CONTRACTOR, the subcontractors of any Tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable to fully comply with the requirements of this section, except loss attributable solely to the negligent acts or omissions of the DISTRICT, Inspectors of Record, Design Consultant, DISTRICT Consultants or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable, in whole or in part, to the negligence, willful misconduct or violation of Applicable Laws by CONTRACTOR or a subcontractor of any Tier, or the failure by CONTRACTOR to comply with the Contract Documents. The foregoing obligations of CONTRACTOR are in addition to and not a limitation upon CONTRACTOR’S indemnity obligations.

### ARTICLE 55 NON-DISCRIMINATION

55.1. In the performance of the terms of this Agreement, CONTRACTOR agrees that it will not engage in nor permit such subcontractor as it may employ to engage in unlawful discrimination in employment of persons because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, age or sex of such persons.

### ARTICLE 56 SCHEDULE OF VALUES AND PERIODICAL ESTIMATES

56.1. **General.** CONTRACTOR shall furnish on form(s) approved by DISTRICT:
a. Within ten (10) calendar days of Award of Contract a detailed schedule of values prepared in a form and incorporating a level of detail satisfactory to DISTRICT, that allocates the Contract Sum to various portions of the Work, giving complete breakdown of contract price for each component of the Project or Site which shall include all subcontractor/supplier agreements showing dollar amounts of these agreements to justify the schedule of values; and

b. Balanced Allocation. The Schedule of Value shall be balanced, reflecting in each line item CONTRACTOR’S estimated or actual cost commitments for the category of Work included in the line item and a proportionate share of CONTRACTOR’S overhead and profit. Techniques, such as “front-end loading”, designed to create an imbalanced cash flow are strictly prohibited.

c. Updating. The Schedule of Values shall be updated by CONTRACTOR each month as necessary to reflect the CONTRACTOR’S actual progress in the Work. An updated Schedule of Values shall be attached to each Application for Payment.

d. Substantiation. CONTRACTOR shall provide such data as DISTRICT may reasonably require to substantiate that the Schedule of Values has been prepared in conformance with the requirements of the Contract Documents. Failure to provide such substantiation shall result in the Schedule of Values being deemed incomplete and unapproved by DISTRICT.

e. Corrections. If corrections are required in order to make the Schedule of Values comply with the requirements of the Contract Documents, such corrections shall be made as a condition of the CONTRACTOR’S Application for Payment being considered properly prepared, submitted and complete.

f. Changes to Work. Costs involved in the performance of Work covered by change orders, unilateral change orders or field orders shall be separately scheduled.

g. Applications for Payment. The Schedule of Values prepared by CONTRACTOR in accordance with the requirements of the Contract Documents shall be used as a basis for DISTRICT’S review and approval or disapproval of Applications for Payment.

56.2. **ARCHITECT’S Review.** Values employed in making up any of these schedules are subject to the ARCHITECT’S written approval and will be used only for determining basis of partial payments and will not be considered as fixing a basis for additions to or deductions from contract price.

**ARTICLE 57  CONTRACTOR CLAIMS**

57.1. If the CONTRACTOR shall claim compensation for any damage sustained by reason of the acts of the DISTRICT or its agents, CONTRACTOR shall, within five (5) calendar days after sustaining of such damage, make to the ARCHITECT a written statement of the damage sustained. On or before the 15th day of the month succeeding that in which such damage shall have been sustained the CONTRACTOR shall file with the DISTRICT an itemized statement of the details and amount of such damage, and unless such statement shall be made as thus required, CONTRACTOR’S claims for compensation shall be forfeited and invalidated and it shall not be entitled to consideration for payment on account of any such damage.
ARTICLE 58  DISPUTES DECISIONS AND RESOLUTION

58.1.  Initial Analysis. The ARCHITECT shall, within a reasonable time, make decisions on all matters relating to the CONTRACTOR’S execution and progress of the work. The decisions of the ARCHITECT shall not be binding, but shall be advisory only on the CONTRACTOR for the purpose of CONTRACTOR’S obligation to proceed with the work.

58.2.  Continuous Work. In the event of a dispute between the parties as to performance of the work, the interpretation of this Agreement or payment or nonpayment for work performed or not performed, the parties shall attempt to resolve the dispute. Pending resolution of the dispute, CONTRACTOR agrees to continue the work diligently to completion. If the dispute is not resolved, CONTRACTOR agrees it will neither rescind the Agreement nor stop the progress of the work, but CONTRACTOR’S sole remedy shall be to submit such controversy to determination by a court of the State of California, in Orange County, having competent jurisdiction of the dispute, after the Project has been completed, and not before.

58.3.  Settlement Procedures. Except for tort claims, all claims by the CONTRACTOR for a time extension, payment of money or damages arising from work done by, or on behalf of, the CONTRACTOR pursuant to the Agreement and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or as to the amount of payment which is disputed by the DISTRICT of Three Hundred Seventy Five Thousand Dollars ($375,000) or less shall be subject to the settlement procedures set forth in Public Contract Code Section 20104, et seq. which provisions are incorporated herein by reference.

   a. Mediation Requirements. All claims, disputes or controversies arising out of or relating to the PROJECT or to this agreement or the breach thereof shall be first attempted to be resolved through mediation.

   b. Arbitration. If mediation is unsuccessful, claims, disputes or controversies arising out of or relating to this AGREEMENT will be decided by arbitration in accordance with the American Arbitration Association then prevailing unless the parties mutually agree otherwise.

      1. No arbitration arising out of or relating to this Agreement shall include, by consolidation, joinder or in any other manner, any additional person not a party to this Agreement except by written consent containing a specific reference to this Agreement and signed by the CONTRACTOR, DISTRICT and any other person sought to be joined. Consent to arbitration involving an additional person or persons shall not constitute consent to arbitration of any dispute not described therein or with any person not named therein.

      2. This agreement to arbitrate shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

      3. Notice of demand for arbitration shall be filed in writing with the other party to this AGREEMENT in accordance with the rules of the American Arbitration Association. The demand shall be made within a reasonable time after the claim, dispute or other matter in question has arisen. In no event shall the demand for arbitration be
made after the date when institution of legal or equitable proceedings based upon such claim, dispute or other matter in questions would be barred by the applicable statutes of limitation.

4. In any judicial proceeding to enforce this agreement to arbitrate, the only issues to be determined shall be those set forth in 9 U.S.C. Section 4 Federal Arbitration act and such issues shall be determined by the court without a jury. All other issues, such as, but not limited to, arbitrability, prerequisites to arbitration, compliance with contractual time limitations, applicability of indemnity clauses, clauses limiting damages and statutes of limitation shall be for the arbitrators whose decision thereon shall be final and binding. There shall be no interlocutory appeal of an order compelling arbitration.

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

58.4. **Jurisdiction.** Unless otherwise provided, this Agreement shall be governed by the law of the state and county where the Project is located.

## ARTICLE 59 PAYMENTS

59.1. **General.** Unless otherwise specified in writing, each month within thirty (30) days after receipt by the DISTRICT of the monthly progress schedule and an undisputed, properly submitted payment request from CONTRACTOR which has been certified for payment by the ARCHITECT, there shall be paid to CONTRACTOR a sum equal to **ninety five percent (95%)** of value of work performed and of materials delivered to the jobsite and inspected and approved by the Inspector of Record and subject to or under the control of the DISTRICT and unused up to the last day of the previous month, less aggregate previous payments. Public Contract Code Section 20104.50. Monthly payments shall be made only on the basis of monthly estimates which shall be prepared by CONTRACTOR on a form approved by DISTRICT and filed before the fifth day of the month during which payment is to be made. Work completed as estimated shall be an estimate only and no inaccuracy or error in said estimate shall operate to release CONTRACTOR or Surety from any damages arising from such work or from enforcing each and every provision of this Agreement, and DISTRICT shall have the right subsequently to correct any error made in any estimate for payment. CONTRACTOR shall not be entitled to have any payment estimates processed or be entitled to have any payment for work performed so long as any lawful or proper direction concerning work, or any portion thereof, given by the DISTRICT or ARCHITECT shall remain not complied with by the CONTRACTOR. CONTRACTOR agrees to the **five percent** retention on all progress payments for construction projects which exceed in cost a total of five thousand dollars. Public Contract Code Section 9203.

59.2. **Support Documents.** DISTRICT has discretion to require from the CONTRACTOR any of the following information with the Application for Payment: (i) certified payroll covering the period of the prior Application for Payment; (ii) unconditional waivers and releases from all subcontractors/suppliers for which payment was requested under the prior Application for Payment; (iii) receipts or bills of sale for any items; and/or any other items noted within these general conditions as a condition for
payment. CONTRACTOR agrees that payment may be contingent upon District receiving any one or more of these documents.

59.3. **ARCHITECT Review.** Before payment is made hereunder, a certificate in writing shall be obtained from the ARCHITECT stating that the work for which the payment is demanded has been performed in accordance with the terms of the Project Documents and that the amount stated in the certificate is due under the terms of the Project Documents, which certificate shall be attached to and made a part of the claim made and filed with the DISTRICT, provided that if the ARCHITECT shall, within three (3) days after written demand therefore, fail to deliver such certificate to the DISTRICT, the CONTRACTOR may file its claim with the DISTRICT without said certificate, but together with such claim shall be filed a statement that demand was made for such certificate and that the same was refused. Thereupon, the DISTRICT will either allow said claim as presented or shall, by an order entered on the minutes of said DISTRICT state the reasons for refusing to allow said claim. It is understood, moreover, that the certificate of the ARCHITECT shall not be conclusive upon the DISTRICT, but advisory only.

59.4. **DISTRICT Review.** Upon receipt of CONTRACTOR’S payment request, DISTRICT shall review the payment request as soon as practicable after receipt for the purpose of determining that the payment request is proper. Any payment request determined not to be proper shall be returned to the CONTRACTOR as soon as practicable but not later than seven (7) days after receipt and shall be accompanied by a document setting forth in writing the reasons(s) why the payment request was not proper. Public Contract Code Section 20104.50

59.5. **No Acceptance.** No payment by DISTRICT hereunder shall be interpreted so as to imply that DISTRICT has inspected, approved, or accepted any part of the work.

59.6. **District Nullification.** DISTRICT reserves the right to nullify any prior approval of an Application for Payment that is later found to have not complied with the requirements of the Contract Documents, whether or not such noncompliance was observed or apparent on the face of the Application for Payment, and based on such nullification DISTRICT may take either of the following actions, as applicable: (1) if the Application for Payment has not yet been paid by DISTRICT, disapprove of that portion of the Application for Payment that is not in compliance and withhold payment of that sum until the noncompliance is fully rectified, or (2) if the Application for Payment has been paid by DISTRICT, nullify the prior approval and withhold payment of such disputed amounts in response to future Applications for Payment; provided, however, that in either case the amount of the DISTRICT’S nullification shall be limited to that portion of the amount requested in the Application for Payment that is in dispute and the amount of its withholding from the current or any future Application for Payment shall be limited to the amount nullified plus any additional withholding permitted to protect DISTRICT from loss or threatened loss.

59.7. **No Waiver by District.** Neither approval by DISTRICT, failure by DISTRICT to exercise its right of nullification with respect to, nor payment by DISTRICT upon, an Application for Payment or any portion thereof shall be interpreted as or constitute a waiver or release of any of DISTRICT’S rights to require CONTRACTOR’S full compliance with the Contract Documents.
59.8. **Changes in Work.** Applications for Payment may include requests for payment on account of Compensable Changes in the Work which have been properly authorized by Change Order or Unilateral Change Order.

59.9. **Percentage Completion.** Progress Payments shall indicate the CONTRACTOR’S estimated percentage of completion of each line item listed in the Schedule of Values as of the end of the period covered by the Application for Payment.

59.10. **Disagreements.** In the event of a disagreement between DISTRICT and CONTRACTOR over the accuracy or reasonableness of the CONTRACTOR’S percentage estimates, the DISTRICT shall make a good faith determination, which percentage shall then be inserted by CONTRACTOR and the Application for Payment submitted, or resubmitted, incorporating such revision.

59.11. **Certification by CONTRACTOR.** Each submitted Application for Payment shall be signed by CONTRACTOR with a certification that: (1) the data comprising the Application for Payment is accurate and the Work has progressed to the point indicated; (2) to the best of CONTRACTOR’S knowledge, information and belief, the Work is in accordance with the Contract Documents; (3) CONTRACTOR is entitled to payment in the amount certified; and (4) all sums previously applied for by CONTRACTOR on account of the Work performed by the Subcontractors that have been paid by DISTRICT have been paid to the Subcontractors performing such Work, without any retention, withholding or back charge by DISTRICT.

59.12. **Stored Materials.** DISTRICT may, in the exercise of its sole and absolute discretion, approve or disapprove for inclusion in CONTRACTOR’S Application for Payment the cost of materials to be incorporated but not yet incorporated in the Work and delivered and suitably stored either at the Site or at a bonded warehouse location acceptable and within proximity for verification by the DISTRICT. As part of any request for such approval, CONTRACTOR shall furnish evidence satisfactory to DISTRICT: (1) of the cost of such materials; (2) that such materials are under the exclusive control of CONTRACTOR, or if not, that title to the materials is in the DISTRICT’S name, free of any lien or encumbrance; and (3) with respect to materials stored off-Site, that the materials are safely and suitably stored with appropriate insurance coverage satisfactory to DISTRICT. No payment or approval by DISTRICT shall (a) be construed as an inspection or acceptance of the materials; (b) relieve CONTRACTOR of its continuing and sole responsibility for the care and protection of, and sole responsibility for any loss to, such materials, from any cause whatsoever; or (c) operate as a waiver of rights by DISTRICT.

59.13. **Title.** CONTRACTOR warrants that title to all the Work covered by an Application for Payment will pass to DISTRICT no later than the time of payment. CONTRACTOR further warrants that upon submittal of an Application for Payment all Work for which approval for payment has been previously issued by DISTRICT shall, to the best of CONTRACTOR’S knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of CONTRACTOR, the Subcontractors, or other persons or entities making a claim by reason of having provided labor, materials, equipment and services for the Work.

59.14. **Summary of Claims.** Unless otherwise provided, on or before making request for final payment of the undisputed amount due under the Agreement, CONTRACTOR shall submit to DISTRICT, in writing a summary of all claims for compensation under or arising out of this Agreement which were timely
filed. The acceptance by CONTRACTOR of the payment of the final amount shall constitute a waiver of all claims against DISTRICT under or arising out of this Agreement, except those previously made, in a timely manner and in writing, and identified by CONTRACTOR as unsettled at the time of CONTRACTOR'S final request for payment.

59.15. **Subcontractor Retention Release.** CONTRACTOR shall pay each of its subcontractors from whom retention has been withheld each subcontractor’s share of the retention received within seven (7) days from the time that all or any portion of the retention are received by the CONTRACTOR subject to any limitations set forth in Public Contract Code Section 7107(e).

59.16. **Joint Payment.** DISTRICT shall have the right, if deemed necessary in its sole and absolute discretion, to issue joint checks made payable to CONTRACTOR and any of the Subcontractors of any Tier. The joint check payees shall be solely responsible for the allocation and disbursement of funds included as part of any such joint payment. Endorsement on such check by a payee shall be conclusively presumed to constitute receipt of payment by such payee. In no event shall any joint check payment be construed to create: (1) any contract between DISTRICT and any of the Subcontractors of any Tier; (2) any obligation from DISTRICT to any of the Subcontractors; or (3) any third-party rights against DISTRICT.

59.17. **Direct Negotiation of Stop Notices.** DISTRICT shall have the right to directly discuss, negotiate, settle or pay, without notice to or participation by CONTRACTOR, any stop notice claims asserted by the Subcontractors of any Tier, and to deduct such sums paid from sums due to CONTRACTOR.

59.18. **Release of Stop Notices.** With the exception of that portion, and only that portion, of a stop notice or other claim that arises as a result of a failure by the DISTRICT to make payment to CONTRACTOR under circumstances constituting a breach of the Contract by DISTRICT, if any stop notice or other claim, whether invalid or valid, is made, filed with, served upon or asserted against the DISTRICT or the Site by any Subcontractor of any Tier, or their agent or employee, for money claimed due, then CONTRACTOR shall within five (5) Days after written notice by the DISTRICT procure, furnish and record appropriate releases or other instruments which under Applicable Laws will fully release, extinguish and remove such stop notice or claim, as well as any notices of pending action or other notices recorded against the Site in connection with the enforcement thereof. All costs of such actions by CONTRACTOR shall paid for by CONTRACTOR. Unless and until fully released as aforesaid, the DISTRICT shall have the right to retain from any payment then due, or thereafter to become due, to CONTRACTOR an amount equal to one hundred and fifty percent (150%) of the amount necessary to satisfy, discharge and defend against any such stop notice or claim and any action or proceeding thereon. If the amount to be paid, or the amount retained, is insufficient to satisfy, discharge and defend against any such stop notice or claim and any action or proceeding thereon, then CONTRACTOR shall be liable for the difference and upon demand shall immediately deposit the same with the DISTRICT. These provisions are in addition to such other rights as the DISTRICT may have against CONTRACTOR under the Contract Documents or Applicable Laws.

59.19. **No District Obligation.** DISTRICT shall have no obligation to pay or to see to the payment of money to any of the Subcontractors except as may otherwise be required by Applicable Laws.

59.20. **Application for Final Payment.** Upon issuance by DISTRICT of the Notice of Final Completion, CONTRACTOR shall submit to DISTRICT its Application for Payment requesting Final Payment.
DISTRIBUTION will review and approve or disapprove of the Application for Payment requesting Final Payment.

59.21. **Conditions to Final Payment.** Without limitation to any other conditions to payment set forth elsewhere in the Contract Documents, the following shall be conditions to a proper submission, and to DISTRIBUTION’S approval, of CONTRACTOR’S Application for Payment requesting Final Payment:

a. submission of a certificate evidencing that the insurance required by the Contract Documents is in force;

b. submission of conditional releases and waivers of stop notice and bond rights upon final payment in the form required by California Civil Code §8132 executed by CONTRACTOR and by all the Subcontractors of every Tier;

c. submission of all Close-Out Documents including, without limitation, complete, accurate As-Built Drawings and Specifications certified by CONTRACTOR;

d. compliance with the Labor Compliance Program including, without limitation, proper payment of prevailing wages as defined in California Labor Code §1720, et seq., timely submission of adequate and complete certified payroll records as required by the Contract Documents for any time period that Work was performed, which have not been submitted by CONTRACTOR in connection with its previous Applications for Payment, submission of certifications by CONTRACTOR and each Subcontractor, as required by the Labor Compliance Program or Applicable Laws, certifying that all employee benefit contributions due and owing have been paid in full; and

e. submission of any other documents or information required by the Contract Documents as a condition of Final Payment or Final Completion.

59.22. **Disputed Amounts.** Pursuant to California Public Contract Code §7107, DISTRIBUTION may deduct and withhold from Final Payment an amount of up to one hundred fifty percent (150%) of any disputed amounts, including, without limitation, amounts to protect DISTRIBUTION against any loss caused or threatened as a result of CONTRACTOR’S failing to fully satisfy the conditions of Final Completion and Final Payment.

59.23. **Waiver by CONTRACTOR.** Acceptance of Final Payment by CONTRACTOR or a Subcontractor shall constitute a waiver of all rights by that payee against DISTRIBUTION for recovery of any loss, excepting only those Claims that have been submitted by CONTRACTOR prior to or at the time of CONTRACTOR’S submission of its Application for Payment requesting Final Payment.

59.24. **Completion.** Work shall be deemed one hundred percent complete upon Completion and the amount released to CONTRACTOR shall, subject to District’s right to withhold be a sum sufficient to increase the total of Progress Payments to CONTRACTOR to ninety five percent (95%) of the Contract Sum.

59.25. **Retention Release.** The final payment of the five percent (5%) retention of the value of the work done under this Agreement, if unencumbered, shall be made thirty-five (35) days after recording by the DISTRIBUTION of the Notice of Completion at the County Recorder’s Office. Approval of Completion
of the Project will be made only by action of the governing board of DISTRICT. Public Contract Code Section 7107.

**ARTICLE 60  CHANGES AND EXTRA WORK**

60.1. **General.** DISTRICT may, as provided by law and without affecting the validity of this Agreement, order changes, modifications, deletions and Extra Work by issuance of written change orders from time to time during the progress of the Project, contract sum being adjusted accordingly. All such work shall be executed under conditions of the original Agreement except that any extension of time caused thereby shall be adjusted at time of ordering such change. DISTRICT has discretion to order changes on a “time and material” basis with adjustments to time made after CONTRACTOR has justified through documentation the impact on the critical path of the Project.

60.2. **Entire Compensation.** Notwithstanding any other provision in the Project Documents, the adjustment in the contract sum, if any, and the adjustment in the contract time, if any, set out in a change order shall constitute the entire compensation and/or adjustment in the contract time due CONTRACTOR arising out of the change in the work covered by the change order unless otherwise provided in the change order. The amount of the compensation due CONTRACTOR shall be calculated pursuant to subparagraph (e) of this Article 59. The entire compensation shall not include any additional charges not set forth in subparagraph (e) and shall not include delay damages (due to processing of a change order, refusal to sign a change order) indirect, consequential, and incidental costs including any project management costs, extended home office and field office overhead, administrative costs and profit other than those amounts authorized under subparagraph (e) of this Article 59.

60.3. **Architect Authority.** In giving instructions, ARCHITECT shall have authority to make minor changes in work, not involving change in cost, and not inconsistent with purposes of the Project. Otherwise, except in an emergency endangering life or property, no Extra Work or change shall be made unless in pursuance of a written order from DISTRICT, authorized by action of the governing board, and no claim for addition to contract sum shall be valid unless so ordered.

60.4. **Request Proposal.** If the ARCHITECT determines that work required to be done constitutes Extra Work outside the scope of the Agreement, the ARCHITECT shall send a request for a detailed proposal to the CONTRACTOR. CONTRACTOR will respond with a detailed proposal within five (5) calendar days of receipt of the Request for Proposal which shall include a complete itemized cost breakdown of all labor and materials showing actual quantities, hours, unit prices, and the wage rates required for the change. If the change order involves a change in construction time, a request for the time change shall accompany the change order cost breakdown. All such requests for time shall be specified by CONTRACTOR as either “work days” or “calendar days.” Any request for time received with only the designation of “days” shall be considered calendar days. The term “work days” as used in this paragraph shall mean Monday through Friday, excluding Saturdays, Sundays and federal/State of California observed holidays. If the work is to be performed by a subcontractor, CONTRACTOR must include a bid from the subcontractor containing the same detailed information as required for CONTRACTOR. No extensions of time will be granted for change orders that, in the opinion of the ARCHITECT, do not affect the critical path of the Project.
60.5. **Value Determination.** Value of any such Extra Work, change, or deduction shall be determined at the discretion of DISTRICT in one or more of the following ways:

a. By mutual written acceptance of a lump sum proposal from CONTRACTOR properly itemized and supported by sufficient substantiating data to permit evaluation by DISTRICT and ARCHITECT.

b. By unit prices contained in CONTRACTOR's original bid and incorporated in the Project Documents or fixed by subsequent agreement between DISTRICT and CONTRACTOR.

c. By cost of material and labor and percentage for overhead and profit ("time and material"). If the value is determined by this method the following requirements shall apply:

1. Daily Reports by Contractor.
2. Basis for Establishing Costs
   i. Labor. The costs of labor will be the actual cost for wages prevailing locally for each craft classification or type of workers 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 assessments or benefits required by lawful collective bargaining agreements. The use of labor classification which would increase the Extra Work cost will not be permitted unless the CONTRACTOR establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

   ii. Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the work Site in the quantifies involved, plus sales tax, freight and delivery. The DISTRICT reserves the right to approve materials and sources of supply, or to supply materials to the CONTRACTOR if necessary for the progress of the work. No markup shall be applied to any material provided by the DISTRICT.

   iii. Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of $500 or less or where an invoice is not provided.

A. Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental source, or distributors, at the time the work is performed. The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Necessary loading and transportation costs for equipment used on the Extra Work shall be included.

B. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the DISTRICT than holding it at the
work Site, it shall be returned, unless the CONTRACTOR elects to keep it at the work Site at no expense to the DISTRICT.

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

iv. Other Items. The DISTRICT may authorize other items which may be required on the Extra Work. Such items include labor, services, material and equipment which are different in their nature from those required by the work and which are of a type not ordinarily available from the CONTRACTOR or any of the subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

v. Invoices. Vendors' invoices for material, equipment rental, and other expenditures, shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the DISTRICT may establish the cost of the item involved at the lowest price which was current at the time of the report.

3. The following form shall be used as applicable by the DISTRICT and CONTRACTOR to communicate proposed additions and deductions to the Agreement.

<table>
<thead>
<tr>
<th>EXTRA CREDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Material/Equipment (attach itemized quantity and unit cost plus sales tax) ________ ________</td>
</tr>
<tr>
<td>ii. Labor (attach itemized hours and rates) ________ ________</td>
</tr>
<tr>
<td>iii. Subtotal ________ ________</td>
</tr>
<tr>
<td>iv. If subcontractor performed work, add Subcontractor's overhead and profit to portions performed by it, not to exceed 15% of Item iii. above ________ ________</td>
</tr>
<tr>
<td>v. Subtotal ________ ________</td>
</tr>
<tr>
<td>vi. General Contractor's Overhead and Profit, not to exceed 15% of Item v if Contractor performed the work. If subcontractor performed the work, not to exceed 5% of Item v.</td>
</tr>
</tbody>
</table>

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Of portions performed by Contractor and subcontractors, portions performed by Contractor shall not exceed 15% of Item V, and portions performed by Subcontractor shall not exceed 5% of Item V.

vii. Subtotal

viii. Bond and Liability Insurance Premium, if in fact additional bonds or insurance were actually purchased, not to exceed 1% of Item vii.

ix. Total

It is expressly understood that the value of such Extra Work or changes, as determined by any of the aforementioned methods, expressly includes any and all of CONTRACTOR’S costs and expenses, both direct and indirect, resulting from additional time required on the project, or resulting from delays to the Project. Any costs or expenses not included are deemed waived. For purposes of determining the cost, if any, of any Extra Work, change, addition or omission hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to CONTRACTOR, and CONTRACTOR shall ensure that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of CONTRACTOR’S cost in determining the actual cost of construction for purposes of any Extra Work, change, addition or omissions in the work as provided herein.

60.6. **Procedures.**

a. Notice of Change. CONTRACTOR shall submit a written Notice of Change to DISTRICT if any instruction, request, drawing, specification, action, condition, omission, default or other circumstance occurs that constitutes a compensable change, deleted work, compensable delay or other matter that may involve or require a Contract Adjustment (additive or deductive). Such notice shall be provided prior to commencement of performance of the Work affected and no later than three (3) working days after the discovery date of such circumstance.

b. Form. Notices of Change shall be provided using forms furnished by the DISTRICT. Failure by DISTRICT to request or approve a particular form shall not relieve CONTRACTOR of its obligation to provide a Notice of Change in a written form that complies with the requirements specified below:

1. a general statement of the circumstances giving rise to the Notice of Change (including, without limitation, identification of any related field order);
2. an reasonable order of magnitude estimate by CONTRACTOR of any related
Contract Adjustments (additive and deductive) to the Contract Sum; and,

3. if such circumstances involve a right to adjustment of the contract time due to
compensable delay or excusable delay that has not been waived, CONTRACTOR
shall include, if not previously provided, a complete and timely Notice of Delay.

c. Waiver by CONTRACTOR. Failure by CONTRACTOR to provide a complete and timely notice
of change under circumstances where a notice of change involving a change is required shall
constitute a waiver by CONTRACTOR of the right to a Contract Adjustment on account of
such circumstances and a waiver of any right to further recourse or recovery by reason or
related to such change by means of the claims dispute resolution process or by any other
legal process otherwise provided for under Applicable Laws.

d. Deductive Adjustments. Failure by CONTRACTOR to submit a timely or proper Notice of
Change under circumstances in which a Notice of Change is required shall in no way affect
DISTRICT’S right to a deductive Contract Adjustment on account of such circumstances.

60.7. **No Written Authorization.** Without limitation to any other provisions of the Contract Documents
expressly or impliedly requiring performance of Work at CONTRACTOR’S own expense, any change
performed by CONTRACTOR pursuant to any direction other than a duly authorized and executed
change order or unilateral change order shall be paid for by CONTRACTOR at CONTRACTOR’S own
expense.

60.8. **Unilateral Change Order.** The purpose of a Unilateral Change Order is to establish the DISTRICT’S
estimate of the undisputed amount of an otherwise disputed Contract Adjustment.

a. Good Faith Determination. The DISTRICT’S estimate in a Unilateral Change Order of a
Contract Adjustment shall be based upon a good faith determination by DISTRICT of the
Contract Adjustment to the contract sum and/or contract time that is appropriate under the
circumstances and consistent with the terms of the Contract Documents.

b. Claim by CONTRACTOR. If CONTRACTOR disputes any portion of the DISTRICT’S good faith
determination of the Contract Adjustment that is set forth in a Unilateral Change Order,
CONTRACTOR shall file within thirty (30) Days after issuance of the Unilateral Change Order
by DISTRICT a claim. The amount of the Contract Adjustment requested in the claim shall
not exceed the difference between the amount (either in terms of dollar amount or amount
of time extension) of the Contract Adjustment requested by CONTRACTOR and the amount
(either in terms of dollar amount or amount of time extension) of the Contract Adjustment
granted in the Unilateral Change Order. CONTRACTOR shall have no reserved right, and
hereby waives any such right that may exist under Applicable Law, to seek in such claim a
Contract Adjustment or recovery that is based upon any amount (either in terms of dollar
amount or amount of time extension) that is in excess of such difference.

c. Waiver by CONTRACTOR. Failure by CONTRACTOR to submit a claim within thirty (30) days
after issuance of a Unilateral Change Order by DISTRICT shall constitute a waiver by
CONTRACTOR of the right to further recourse or recovery, either by means of the claims
dispute resolution process or by any other legal process otherwise provided for under
Applicable Laws, based on an assertion that the amount of the Contract Adjustment on account of the change or delay described in such Unilateral Change Order should be different than the amount of the Contract Adjustment set forth in such Unilateral Change Order.

60.9. **Time Allocated.** If the CONTRACTOR should claim that any instruction, request, drawing, specification, action, condition, omission, default, or other situation obligates the DISTRICT to pay additional compensation to CONTRACTOR or to grant an extension of time, or constitutes a waiver of any provision in the Agreement, CONTRACTOR shall notify the DISTRICT, in writing, of such claim within five (5) calendar days from the date CONTRACTOR has actual or constructive notice of the factual basis supporting the claim. The notice shall state the factual bases for the claim and cite in detail the Project Documents (including Plans and Specifications) upon which the claim is based. The CONTRACTOR’S failure to notify the DISTRICT within such five (5) day period shall be deemed a waiver and relinquishment of such a claim. If such notice be given within the specified time, the procedure for its consideration shall be as stated above in these General Conditions.

60.10. **Qualifying Language Prohibited.** CONTRACTOR use of qualifying language stamps on DISTRICT Drawings or contract forms is prohibited. Contractor shall not countersign or endorse any form, drawing, change order, contract or other documents with any conditions not mutually agreed to in advance by the DISTRICT and the CONTRACTOR. Endorsement of a contract, change order, specification, drawing or form with the following: “This change order is being executed without waiver of the right to seek additional compensation for such services,” shall be of no legal force or effect.”

**ARTICLE 61 COMPLETION**

61.1. **Contract Time.** CONTRACTOR shall achieve Completion of the Work, or such portion of the Work as may be designated at any time by DISTRICT for separate delivery, in accordance with the requirements of the contract time and other provisions of the Contract Documents. However, the DISTRICT, at its sole option, may accept completion of the Project and have the Notice of Completion recorded when the entire work including individual portions of the work shall have been completed to the satisfaction of the DISTRICT, except for minor corrective items, as distinguished from incomplete items.

61.2. **Request for Inspection.** A final walk through of the Project to determine completion and to record the Notice of Completion shall occur only upon a valid claim by CONTRACTOR that the Project is complete except for minor corrective items. Any erroneous claims of completion by CONTRACTOR resulting in a premature walk through shall be at CONTRACTOR’S sole cost and expense and DISTRICT shall make adjustments to the contract price by reducing the amount thereof to pay for any costs incurred by the DISTRICT due to the erroneous claims by the CONTRACTOR that the Project is complete. Minor corrective items shall be identified in the final walk through of the Project.

61.3. **Punch List.** At the conclusion of such inspection, DISTRICT shall prepare and give to CONTRACTOR a Punch List of items, if any, to be completed or corrected for Completion. If CONTRACTOR disputes any of the items included, it shall so note its objection on the Punch List. CONTRACTOR shall proceed
within forty-eight (48) hours after preparation of the Punch List to commence correction and completion of the items on the Punch List, including, without limitation, any disputed items, and all such items of Work shall be completed by CONTRACTOR before the Work will be considered as Complete. Failure by DISTRICT, Inspector of Record, Design Consultant or CONTRACTOR to include an item on the Punch List does not alter the responsibility of CONTRACTOR to perform the Work in accordance with the Contract Documents. Items of Work necessary for Completion that, for any reason, have been omitted from the Punch List shall be added to the Punch List and shall be promptly completed by CONTRACTOR upon request by DISTRICT, Design Consultant or Inspector of Record made at any time prior to Final Payment.

61.4. **Re-Inspection.** CONTRACTOR shall notify DISTRICT when the items of Work shown on the Punch List are completed. DISTRICT, Inspector of Record, Design Consultant and such others as DISTRICT deems necessary or appropriate will then make a further inspection to determine whether such Work is Complete. If such inspection, or any subsequent re-inspection required pursuant hereto, discloses any item, whether or not included on the Punch List, which must be completed or corrected before Completion, CONTRACTOR shall, as a condition of Completion, complete or correct such item, which shall then be re-inspected to confirm that such Work is Complete. CONTRACTOR shall reimburse DISTRICT, or DISTRICT may at its option withhold from CONTRACTOR payments, amounts incurred by DISTRICT, Inspector of Record, Design Consultant, DISTRICT Consultants or others whose services, for reasons within the control or responsibility of CONTRACTOR or the Subcontractors, are necessary for more than two (2) such re-inspections to determine Completion.

61.5. **Partial Occupancy or Use.** DISTRICT reserves the right to beneficially occupy all or any portion of the Work at any time before Completion of the entire Work. Beneficial occupancy means that DISTRICT has assumed physical occupancy and use of such portion of the Work. Commencement of improvements or other work by separate contractors in order to ready the Work for use or occupancy by DISTRICT shall be unconditionally permitted in all cases prior to Completion and shall not constitute a taking of beneficial occupancy by DISTRICT. Exercise by DISTRICT in accordance with the provisions of this section of its right to take beneficial occupancy shall not constitute grounds for a Contract Adjustment. The DISTRICT’S right of beneficial occupancy of all or a portion of the Work prior to Completion shall be subject to the following conditions:

a. DISTRICT and such others as DISTRICT deems necessary will make an inspection of the portion of the Work to be beneficially occupied and prepare a list of items to be completed or corrected in the same manner as required by and subject to the same conditions as set forth above.

b. Beneficial occupancy by DISTRICT shall not be construed as acceptance of that portion of the Work which is to be occupied.

c. Except as otherwise provided in this section, beneficial occupancy by DISTRICT shall not constitute a waiver of rights of the DISTRICT against CONTRACTOR. Notwithstanding anything stated in this section or elsewhere in the Contract Documents to the contrary, beneficial occupancy by DISTRICT shall not constitute a waiver of rights of DISTRICT relating to defective Work in the area beneficially occupied or in any other portion of the Work.
d. Prior to the DISTRICT’S taking beneficial occupancy, CONTRACTOR shall submit to DISTRICT an itemized list of each piece of equipment located in or serving the area to be occupied stating the date operation of such piece of equipment commenced, together with operating instructions, manuals and other information required by the Contract Documents. CONTRACTOR shall provide, in the areas beneficially occupied, on a continual basis, utility services, elevator service, and heating and cooling systems in operable condition commencing at the time of beneficial occupancy and until Completion of the entire Work. DISTRICT shall be responsible, from and after taking occupancy, for utility consumption, regular operation and regular maintenance of such systems or equipment.

e. Provided that all of the equipment and systems located in or serving the occupied area are complete and operational, the Guarantee to Repair Period, as well as other express warranties on materials, equipment or other Work installed and contained entirely within that portion of the Work which is beneficially occupied, will commence upon the first date of actual beneficial occupancy or use of such occupied portions of the Work by DISTRICT.

f. DISTRICT shall pay all normal operating and maintenance costs resulting from its use of equipment in areas beneficially occupied.

g. DISTRICT shall pay all utility costs that arise out of its beneficial occupancy.

h. CONTRACTOR shall not be responsible for providing security in areas beneficially occupied.

i. DISTRICT shall use its best efforts to prevent its beneficial occupancy from interfering with the conduct of CONTRACTOR’S remaining Work.

j. CONTRACTOR shall not be required to repair damage caused solely by DISTRICT’S beneficial occupancy.

k. CONTRACTOR shall continue to maintain all insurance required by the Contract Documents in full force and effect.

61.6. Notice of Completion. The DISTRICT shall accept completion of the Project and have the Notice of Completion recorded within ten (10) days of acceptance of completion of the Project when the entire work including punch list items shall have been completed to the satisfaction of the DISTRICT. Civil Code Section 3093. The work may only be accepted as complete by action of the DISTRICT’S Governing Board.

ARTICLE 62 ADJUSTMENTS TO CONTRACT PRICE

62.1. Adjustment due to Deficiency. If CONTRACTOR defaults or neglects to carry out the work in accordance with the Project Documents or fails to perform any provision thereof, DISTRICT may, after ten (10) days written notice to the CONTRACTOR and Surety without prejudice to any other remedy it may have, make good such deficiencies.

62.2. Withhold Payment. If the CONTRACTOR fails to complete the minor corrective items prior to the expiration of the thirty-five (35) day period immediately following recording of the Notice of Completion, the DISTRICT shall withold from the final payment an amount equal to one hundred
fifty percent (150%), as determined by the DISTRICT, of the amount of each item until such time as the item is completed. Public Contract Code Section 7107.

ARTICLE 63  CORRECTION OF WORK

63.1. **General.** CONTRACTOR shall promptly remove all work identified by DISTRICT as failing to conform to the Project Documents, whether incorporated or not. CONTRACTOR shall promptly replace and re-execute its own work to comply with Project Documents without additional expense to DISTRICT and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

63.2. **DISTRICT Removal and Sale.** If CONTRACTOR does not remove such work within a reasonable time, fixed by written notice, DISTRICT may remove it and may store the material at CONTRACTOR’S expense. If CONTRACTOR does not pay expenses of such removal within ten (10) days' time thereafter, DISTRICT may, upon ten (10) days written notice, sell such materials at auction or at private sale and shall account for net proceeds thereof, after deducting all costs and expenses that should have been borne by CONTRACTOR.

ARTICLE 64  EXTENSION OF TIME - LIQUIDATED DAMAGES

64.1. **General.** The CONTRACTOR and DISTRICT hereby agree that the exact amount of damages for failure to complete the work within the time specified is extremely difficult or impossible to determine. CONTRACTOR shall be assessed liquidated damages for each and every day the work required under the Project Documents remains unfinished past the time for completion, as set forth in the Agreement, and any extensions of time granted by the DISTRICT to the CONTRACTOR under the terms of the Project Documents. The CONTRACTOR will pay to the DISTRICT or DISTRICT may retain from amounts otherwise payable to the CONTRACTOR, said amount for each day after failure to meet the requirements of the contract completion as scheduled in the Agreement. Government Code Section 53069.85 For purposes of this article, the work shall be considered “complete” in accordance with the provisions of the Article, "COMPLETION", except that the work may be considered complete without formal Acceptance by the DISTRICT Governing Board so long as the Governing Board, at its next regularly scheduled meeting, accepts the work.

64.2. **Exemptions.** CONTRACTOR shall not be charged for liquidated damages, as set forth above, because of any delays in completion of work which are not the fault or negligence of CONTRACTOR, including but not restricted to Acts of God. CONTRACTOR shall within ten (10) days of beginning of any such delay, notify DISTRICT in writing of causes of delay. CONTRACTOR shall provide documentation and justification to substantiate the delay and its relation to the Project's critical path. DISTRICT shall ascertain the facts and extent of delay and grant extension of time for completing work when, in its judgment, the findings of fact justify such an extension. The DISTRICT’s finding of fact thereon shall be final and conclusive on the parties hereto. Extension of time shall apply only to that portion of work affected by the delay, and shall not apply to other portions of work not so affected.

ARTICLE 65  PAYMENTS WITHHELD

65.1. **General.** In addition to amount which DISTRICT may retain under Article entitled "COMPLETION" and Article entitled "PAYMENTS," DISTRICT may withhold a sufficient amount or amounts of any
payment or payments otherwise due to CONTRACTOR, as in its judgment may be necessary to cover:

a. Payments which may be past due and payable for just claims against CONTRACTOR or any subcontractors, or against and about the performance of work on the Project, including, without limitation, payments made pursuant to the Article entitled "PAYMENTS BY CONTRACTOR."

b. The cost of Defective Work which CONTRACTOR has not remedied.

c. Liquidated damages assessed against CONTRACTOR.

d. Penalties for violation of labor laws.

e. The cost of materials ordered by the DISTRICT pursuant to Article entitled "MATERIALS AND WORK."

f. The cost of completion of this Agreement if there exists a reasonable doubt that this Agreement can be completed for the balance then unpaid to CONTRACTOR.

g. Damage to DISTRICT, another contractor, or subcontractor.

h. Site clean-up as provided in Article entitled "CLEANING UP."

i. Payments to indemnify, defend, or hold harmless the DISTRICT.

j. Any payments due to the District including but not limited to payments for failed tests, utilities or imperfections.

k. Extra services for ARCHITECT.

l. Extra services for the INSPECTOR including but not limited to re-inspection required due to CONTRACTOR’S failed tests or installation of unapproved or defective materials and CONTRACTOR’S requests for inspection and CONTRACTOR’S failure to attend the inspection.

m. Failure of CONTRACTOR to submit on a timely basis, proper and sufficient documentation required by the Project Documents, including without limitation, monthly progress schedules, shop drawings, submittal schedules, schedule of values, product data and samples, proposed product lists, executed change orders and verified reports.

n. Any other obligation(s) of the DISTRICT which the DISTRICT is authorized and/or compelled by law to perform.

65.2. **Payments on Behalf of the CONTRACTOR.** DISTRICT may apply such withheld amount or amounts to payment of such claims or obligations at its discretion. In so doing, DISTRICT shall make such payments on behalf of CONTRACTOR. If any payment is so made by DISTRICT, then such amount shall be considered as a payment made under contract by DISTRICT to CONTRACTOR and DISTRICT shall not be liable to CONTRACTOR for such payments made in good faith. Such payments may be made without prior judicial determination of claim or obligations. DISTRICT will render CONTRACTOR an accounting of such funds disbursed on behalf of CONTRACTOR.
65.3. **Adjustment.** As an alternative to payment of such claims or obligations, DISTRICT, in its sole discretion, may reduce the total contract price as provided in Article entitled "ADJUSTMENTS TO CONTRACT PRICE."

**ARTICLE 66 TAXES**

66.1. **General.** CONTRACTOR will pay all applicable federal, state and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Project Documents.

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

**ARTICLE 67 NO ASSIGNMENT OR THIRD PARTY RIGHTS**

67.1. **No Assignment.** The CONTRACTOR shall not assign, transfer, convey, sublet or otherwise dispose of this Agreement or of its rights, title or interest in or to the same or any part thereof. If the CONTRACTOR shall assign, transfer, convey, sublet or otherwise dispose of the Agreement or its right, title or interest therein, or any part thereof, such attempted or purported assignment, transfer, conveyance, sublease or other disposition shall be null, void and of no legal effect whatsoever; and the Agreement may, at the option of the DISTRICT, be terminated, revoked and annulled, and the DISTRICT shall thereupon be relieved and discharged from any and all liability and obligations growing out of the same to the CONTRACTOR, and to its purported assignee or transferee.

67.2. **No Third-Party Rights.** Nothing contained in the Contract Documents is intended to make any person or entity who is not a signatory to this Contract a third-party beneficiary of any right of CONTRACTOR (including, without limitation, any right of CONTRACTOR to a benefit derived from, or to the enforcement of, an obligation assumed by DISTRICT) that is expressly or impliedly created by the terms of the Contract Documents or by operation of Applicable Laws.

**ARTICLE 68 NOTICE**

68.1. **General.** Any notice from one party to the other or otherwise under the Agreement shall be in writing and shall be dated and signed by party giving such notice or by a duly authorized representative of such party. Any such notice shall not be effective for any purpose whatsoever unless served in one of the following manners:

a. If notice is given to DISTRICT, by personal delivery thereof to DISTRICT, or by depositing same in United States mail, enclosed in a sealed envelope addressed to DISTRICT, and sent by registered or certified mail with postage prepaid;

b. If notice is given to CONTRACTOR, by personal delivery thereof to said CONTRACTOR, or to CONTRACTOR’s superintendent at Site of Project, or by depositing same in United States mail, enclosed in a sealed envelope addressed to said CONTRACTOR at its regular place of...
business or at such address as may have been established for the conduct of work under this Agreement, and sent by registered or certified mail with postage prepaid;

c. If notice is given to Surety or other persons, by personal delivery to such Surety or other person, or by depositing same in United States mail, enclosed in a sealed envelope, addressed to such Surety or person at the address of such Surety or person last communicated by Surety or other person to party giving notice, and sent by registered or certified mail with postage prepaid.

68.2. **Extent of Agreement.** The Contract Documents represent the full and complete understanding of every kind or nature between the parties and all preliminary negotiations and prior representations, proposals and contracts, of whatever kind or nature, are merged herein and superseded hereby. No verbal agreement or implied covenant shall be held to vary the provisions of the Contract Documents. Any modification the Contract Documents will be effective only by written instrument signed by both DISTRICT and CONTRACTOR and shall, if required by Applicable Laws, be formally approved or ratified by the Board of Trustees.

**ARTICLE 69 NO WAIVER AND SEVERABILITY**

69.1. **No Waiver.** The failure of the DISTRICT in any one or more instances to insist upon strict performance of any of the terms of this Agreement or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion.

69.2. **Severability.** Should any part, term, portion or provision of the Contract Documents, or the application thereof to any party or circumstance, be held to be illegal, invalid or in conflict with Applicable Laws, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining parts, terms, portions or provisions, or the application thereof to any other party or circumstances, shall be deemed severable and the same shall remain enforceable and valid to the fullest extent permitted by Applicable Laws.

**ARTICLE 70 NON-UTILIZATION OF ASBESTOS MATERIAL**

70.1. **General.** The CONTRACTOR will be required to execute and submit the Certificate Regarding Non-Asbestos Containing Materials.

70.2. **Criteria for Removal.** Should asbestos containing materials be installed by the CONTRACTOR in violation of this certification, or if removal of asbestos containing materials is part of the Project, decontaminations and removals will meet the following criteria:

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

b. The asbestos removal contractor shall be an EPA accredited contractor qualified in the removal of asbestos and shall be chosen and approved by the asbestos consultant who shall have sole discretion and final determination in this matter.
c. The asbestos consultant shall be chosen and approved by the DISTRICT who shall have sole discretion and final determination in this matter.

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

70.3. **Cost.** Cost of all asbestos removal, including, but not necessarily limited to the cost of the asbestos removal contractor, the cost of the asbestos consultant, analytical and laboratory fees, time delays and additional costs as may be incurred by the DISTRICT shall be borne entirely by the CONTRACTOR.

70.4. **Hold Harmless.** Interface of work for the Project with work containing asbestos shall be executed by the CONTRACTOR at his/her risk and at his/her discretion with full knowledge of the currently accepted standards, hazards, risks and liabilities associated with asbestos work and asbestos containing products. By execution of the Agreement, the CONTRACTOR acknowledges the above and agrees to hold harmless the DISTRICT, its Governing Board, employees, agents, and ARCHITECT and assigns for all asbestos liability which may be associated with this work. The CONTRACTOR further agrees to instruct his/her employees with respect to the above mentioned standards, hazards, risks and liabilities.

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**ARTICLE 71 LEAD**

71.1. Pursuant to the Lead-Safe Schools Protection Act (Education Code Sections 32240, et seq.) and other applicable law, the CONTRACTOR shall not use lead-based paint, lead plumbing and solders, or other potential sources of lead contamination in the construction of any new school facility or the modernization or renovation of any existing school facility.

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**ARTICLE 72 GOVERNING LAW**

72.1. The laws of the State of California shall govern the Project and the Agreement.
SPECIAL CONDITIONS

1. **Application of Special Conditions.** These Special Conditions form a part of the Contract Documents for the Work generally described as:

   **Saddleback College BGS Fire Repairs**

2. Contractor shall indicate the name of their Project Manager and provide a summary of his/her previous experience and mobile phone number to be reached 24-hours a day, seven days a week.

3. Shutdown of any systems must be coordinated and scheduled with Saddleback College Maintenance and Operations staff. Provide 48-hrs. Minimum notice. Any premium paid required to perform system shutdowns shall be included in bid price.

4. Contractor to provide and coordinate all permits, inspections and fees with AQMD as necessary.

5. Contractor is required to recycle material removed by this project and to provide the District with manifests indicating recycled quantities.

6. Contractor is responsible for the hauling of all debris and disposal at a legal dumpsite on a daily basis. Contractor will be required to broom sweep work areas on a daily basis.

7. The Contractor is to provide vehicular and pedestrian traffic control as required to facilitate on-campus safety on an as required basis. Roadways are to remain clear and unobstructed during the course of construction. Limited blockage for material delivery will be allowed through coordination with the District’s representative.

8. Standard working hours are from 7:00am to 3:30pm. Alternate shifts and weekend work may be approved upon request. The Contractor is to provide 48 hours notice prior to the date extended hours are to be provided. All overtime or extended hours inspection charges will be paid by the Contractor.

9. Construction parking is to be contained within the designated construction parking area (to be determined at the kick-off-meeting). Temporary parking permits up to (25) will be issued at no cost to the Contractor for the duration of the project.

10. Construction materials are to be located within the designated staging area (to be determined at the kick-off meeting) per District direction. Contractor to install and maintain temporary fencing.

11. Contractor to maintain appropriate building access and exiting points of all existing buildings in the work area during all phases of the construction work.

12. Contractor is to provide temporary sanitary conveniences for the use of employees and persons engaged in the construction work, including subcontractors and their employees, as required by law, ordinances, or regulations of public authorities having jurisdiction.

13. Any damage to existing facilities is to be repaired to the condition it was at the beginning of construction. The Contractor will be required to repair interior and exterior surfaces and finishes, utility systems, asphalt in the parking lot, curbs, driveways, walkways, signage, turf, landscaping, and irrigation around the construction area, etc., that is damaged as a result of construction.

14. The Contractor may use electrical utilities within the construction site. Power will be provided by the Owner. Power cords, spider boxes, junction boxes, etc. to be provided the Contractor.

15. The Contractor is to allow the Owner, faculty, students, staff, and other related persons including furniture & equipment movers, maintenance and operations personnel, etc., access to all existing buildings surrounding the construction site during construction.

16. The Contractor shall provide and maintain administrative field office facilities within the staging area.
17. The Contractor is to mobilize within 5 days of receipt of the Notice to Proceed. The Contractor is to initiate field investigation and preparation of shop drawings and submittals so as to submit these for review and approval by the Architect within the first 15 days of the project.

18. The Contractor shall provide an on-site English-speaking representative with cellular phone and the phone number shall be provided to the District at the time of Contractor mobilization.

19. The Contractor to provide all hoisting, lifts, off-loading, rigging, scaffolding, equipment, etc. for all material and personnel required for installation of the scope of work.

20. The Contractor is responsible for providing and maintaining all required safety measures and procedures per OSHA standards.

21. The College holds the right to salvage any existing items shown to be demolished in the contract documents.

22. The Contractor to provide interior protection to existing finishes (carpet, walls, doors, etc.) as required by the College.

23. The Contractor is responsible for the compatibility of all materials specified and shown on the drawings with the existing conditions.

24. The Contractor is to furnish and install all new products included in the specifications and drawings.

25. The Contractor is responsible for all means and methods of completing the project including the removal and storage of existing material as required.

26. The Contractor is responsible for all mockup and testing requirements as noted.

27. The Contractor is responsible for final cleaning of all work areas and products, including glass and window frames, at the end of the project.

28. Due to the nature of this project, unforeseen conditions may be encountered during construction. An allowance in the amount may be negotiated with the contractor and will be used for unforeseen conditions. Work under this allowance will only commence upon specific written direction from the District. Field tickets must be signed by the District on a daily basis to account for the daily cost to be allocated towards this allowance. All cost associated with this allowance shall be tracked and all money not spent will be credited to the District at the end of the project in the form of a deductive change order.
SECTION 01 11 00 - Summary

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. Related Sections include:

1. Section 01 32 00 “Construction Progress Documentation.”
2. Section 01 50 00 “Temporary Facilities and Controls.”
3. Section 01 57 23 “Storm Water Pollution Prevention.”
4. Section 01 73 00 “Execution Requirements.”
5. Section 01 74 19 “Construction Waste Management.”

1.2 Summary

A. Project Name: Saddleback College BGS Building Fire Damage Repair.

B. Project Location: 28000 Marguerite Parkway, Mission Viejo, CA 92692.

C. Owner: South Orange County Community College District, 28000 Marguerite Parkway, Mission Viejo, CA 92692.

D. Owner's Representative: Mr. Jim Rogers, Assistant Director, Facilities – Capital Outlay Projects, Saddleback College, 28000 Marguerite Parkway, Mission Viejo, CA 92692.

E. Architect: R²A Architecture, 2900 Bristol Street, Suite E-205, Costa Mesa, CA 92626, telephone 714.435.0380, fax 714.435.0383, contact Mr. Etienne G. Runge, AIA.

F. The work consists of the following:

1. This project consists of fire damage repair/replacement to the existing Lecture Hall Room 356 (1,416 s.f.), Storage Room 356-1 (104 s.f.) and ceiling replacement only at AV Room 358 (210 s.f.) at the existing BGS building on the Saddleback College campus.

2. Additional scope of work is based on a pre-design meeting with DSA on 9/4/2013 and shall consist of demonstrating/upgrading accessibility to the following existing features of the site and building:

   a. Accessible parking. (per DSA App No. 04-110738, no upgrades are required)
   b. Path of travel from the nearest accessible parking to the area of fire damage repairs.
   c. Accessible features of the elevator.
   d. Accessible entrance of building nearest to the fire damaged area.
   e. Accessible restrooms on the same floor as the fire damaged area.
   f. Accessible drinking fountains on the same floor as the fire damaged area.
   g. Doors accessing the existing restrooms and the fire damaged spaces.
   h. All new work in Lecture Hall Room 356 & Storage Room 356-1 shall meet all 2013 CBC Chapter 11B requirements.

3. Fire alarm scope of work:
a. All new work in Lecture Hall Room 356 and Storage Room 356-1 shall meet all 2013 CBC Chapter 11B requirements.

b. Fire alarm system will be a one-for-one replacement based on the last DSA approved containing fire alarm plans.

4. Mechanical, plumbing, electrical and telecom scope of work:
   a. All new work on this project shall meet all 2013 CBC requirements.

5. The following will be excluded as part of the fire damage repair scope of work:
   a. Upgrading the exiting, stairs, stair handrails and guardrails within the existing building.
   b. Upgrading/reconfiguring the exiting from lecture Hall Room 356.
   c. Upgrading/reconfiguring exiting, ramp & stairs within the Projection Room 358. (This area was not affected by the fire.)

G. Provide all labor, materials, equipment, freight, taxes, services and administration to complete the work.

H. The Bid Drawings and Specifications indicate the scope of the work in terms of the design concept, the dimensions of the work, and the elements of construction. The Bid Drawings and Specifications do not necessarily indicate or describe all work required for the full performance and completion of the work. Contractor shall be solely responsible for the inclusion of adequate amounts in the bid price to include all items, regardless of whether items are indicated, described, implied, or necessary in order to produce a completed project. Decisions by the Owner’s Representative as to the items of work included within the scope of these Drawings and Contract Documents shall be final and binding on the contractor.

I. By signing this contract, contractor confirms that he has familiarized himself with the conditions of the site and that he has made his own estimates regarding the facilities and the difficulties, which may arise in connection with the execution of the work.

J. By signing this contract, contractor confirms that he has read, reviewed and understands the requirements of all contract documents and that all subcontracted trades have read, reviewed and understand all applicable requirements of the contract documents, including requirements of other trades which may impact each subcontracted portion of work.

K. Contractor shall pay all fees charged by authorities having jurisdiction and from serving utility companies and agencies, for tests and inspections conducted by those authorities, companies and agencies. Owner will reimburse contractor for actual amount of such fees, without mark-up.

1.3 Contract

A. Project will be completed under:


1.4 Work Under Other Contracts

A. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the work of this Contract with work performed under separate contracts. Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing. Provide necessary backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection.
B. Owner will make available, in a timely manner, drawings and specifications of work under separate contracts for coordination and further description of that work.

1.5 Use of Premises

A. Contractor shall have full use of premises for construction operations, including use of project site, during construction period. Coordinate use of sight with Owner prior to start of construction. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of project. Perform work so as not to interfere with Owner's day to day operations. Limit construction operations to the following days and times:

1. Monday through Friday. 7:00 a.m. to 5:00 p.m.

B. Smoking is not permitted within Building or Site, or within 25 feet of entrances, windows or air intakes.

C. Within ten (10) days of date of Notice to Proceed submit written/graphic construction plan describing intended use of construction site. Address the following items:

1. Daily work hours of construction personnel.
2. Parking area for construction personnel and visitors.
3. Staging area.
4. Delivery points.
5. Construction traffic patterns.
6. Construction office location.
7. Temporary toilet location.
9. Maximum number of workers expected in a single day.
10. Crane location.
11. Temporary utility connection location(s)
12. Soil stockpile areas.
13. Construction fencing layouts and pedestrian protection.
15. Trash collection points.
16. Recycled material sorting areas.
17. Scaffold locations.
18. Pedestrian and automobile traffic patterns around site enclosures. Written description and location of protection for people and devices.
19. Identify on the plan surrounding and neighboring uses within a distance of 1,000 feet of the project location.
20. Location of project identification sign.
21. Pedestrian circulation around project site.
22. Order, and sequence of work.

D. Review construction plan with Owner and revise per comments received and resubmit plan along with first payment application. Limit areas of activity as directed by Owner. Copy of plan shall be maintained at project site.

E. Keep driveways and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

1. Schedule deliveries to minimize use of driveways and entrances.
2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
F. Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

G. Contractor is aware that adjacent buildings and pedestrian areas are occupied. Contractor must conduct operations to ensure least inconvenience to public and occupied areas in adjacent buildings. Indicate adjacent building occupancy dates in construction schedule and coordinate construction activity with Owner.

1. Minimum noise impact on adjacent existing occupancies.
2. Minimum dust and debris impact on adjacent existing buildings and occupancies.
3. Maintain and provide pedestrian barricades and protection.
4. Maintain and protect exits from occupied areas at all times.

H. Arrange and pay for parking needed for contractors, workers, subcontractors and employees.

I. Arrange and pay for additional work areas as needed.

J. Access to and egress from construction site shall be in strict conformance with Owner’s requirements and City requirements. Obtain approval for construction routes from Owner and City agencies. Damage to Owner’s landscaping, paving and utilities due to contractor’s use of access route shall be repaired or replaced, as determined by and to the satisfaction of Owner, to match construction of temporary access at no additional cost or time to Contract.

K. Prior to commencement of work, the contractor shall jointly survey, photograph and video tape the site, and all other pertinent items with the Owner, noting and recording existing damage such as cracks, sags, and other damage to existing facilities.

1. This record shall serve as a basis for determination of subsequent damage to these items due to contractor’s operations.
2. Existing damage observed shall be marked and documented in a report to the Owner and the report of existing damage shall be signed by Owner and contractor and submitted to the Owner prior to start of work.
3. Damage to the site, and other items not noted in the original survey but subsequently observed shall be reported immediately by contractor to the Owner.
4. Contractor shall not unreasonably encumber the site with materials or equipment.
5. Contractor shall assume full responsibility for protection and safekeeping of products stored on the premises.
6. Contractor shall move any stored products which interfere with operations of Owner or contractors performing work under separate contracts for Owner.
7. Temporary closures or restrictions of use of public thoroughfares, necessary to accomplish the Work, shall be made only as approved in advance by public safety and parking authorities having jurisdiction, as directed by Owner.
8. Access to and egress from project area shall be in strict conformance to prearranged routes approved by Owner and jurisdictional authorities, with the understanding that curtailment of construction traffic or revision of access routes may be required on short notice if Owner’s operations mandate such changes because of excessive noise or problems of safety, service or supply.

L. Provide pathways, drives, gates, directional signage and other provisions as required by authorities having jurisdiction for emergency access and egress to project area and adjoining facilities.

M. Contractor shall be completely responsible for safety and security of the work site. Contractor shall keep all tools, equipment and building materials in locations where they will not be accessible to public and to vandals, so as not to present safety or security problems at work site.
N. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.

1.6 Owner's Occupancy Requirements

A. Owner reserves the right to place and install equipment in completed areas of work, before Substantial Completion, provided such installation does not interfere with completion of the work. Such placement of equipment shall not constitute acceptance of the work, or substantial completion.

1.7 Work Not in Contract

A. The following will be provided by the Owner under separate contracts.

1. Encapsulation, removal and disposal of any hazardous materials on the site or in the existing Buildings.
2. Tests and inspections specified to be provided by the Owner in the Contract Documents.
3. Items noted NIC (Not in Contract) on the Drawings or in the Specifications.

B. When work of this Contract requires the contractor to make allowance for interfacing his work with other work indicated as NIC, the contractor shall include all costs associated therein.

1.8 Documents

A. The Contract Drawings and Specifications are not intended to be comprehensive directions on how to produce the work. Rather, the Drawings and Specifications are instruments of service prepared to generally describe the design intent for the completed work.

B. It is intended that all equipment, systems and assemblies be complete and fully functional even though not fully described. Provide all products and operations necessary to achieve the design intent described in the Contract Documents.

C. Contractor shall report to Architect immediately when elements essential to proper execution of the work are discovered to be missing or misdescribed in the Drawings and Specifications or if the design intent is unclear.

D. Should an obvious omission or misdescription of a necessary element be discovered and reported after execution of the Contract, contractor shall provide the element as though fully and correctly described, and a no-cost no time Change Order shall be executed.

E. The documents use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Language used in the Specifications and other Contract Documents is abbreviated. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications and Drawings. Requirements expressed in the imperative mood are to be performed by contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by contractor or by others when so noted.
a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

b. Where the terms “as shown,” “as indicated,” “as noted,” “as installed,” “as scheduled,” or terms of like meaning are used in the Drawings or Specifications, it shall be understood that reference is being made to Drawings listed in the Drawing index.

c. Where reference to the word “plans” is made anywhere in Drawings, Specifications and related Contract Documents, it shall be understood to mean the Drawings listed in the Drawing index in the set of Drawings.

F. Unless stated in the Contract Documents, technical words and abbreviation contained in the Contract Documents are used in accordance with commonly understood construction industry meanings; and non-technical words and abbreviations are used in accordance with their commonly understood meanings.

G. Contract Documents may omit modifying words such as “all” and “any,” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement. Use of the word “including,” when following any general statement, shall not be construed to limit such statement to specific items or matters, whether or not non-limiting language (such as “without limitation,” “but not limited to,” or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.

H. Whenever context so requires, use of the singular number shall be deemed to include the plural and vice versa.

1. Each gender shall be deemed to include any other gender, and each shall include corporation, partnership, trust or other legal entity whenever context so requires.

2. Captions and headings of various subdivisions of Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of Contract Documents or any subdivision thereof.

I. Dates indicated on each Drawing and on each page of the Specifications and other Bidding and Contract Documents in the Project Manual are for identification only. Such dates are not intended to correspond with the date of issue or Contract date.

1.9 Contractor Acknowledgement

A. Contractor acknowledges that Architect’s office hours are Monday through Thursday 7:30 a.m. to 5:30 p.m. and Friday 7:30 a.m. to 11:30 a.m. Any correspondence, including but not limited to RFI’s, submittals, change orders, phone calls, memos, letters, etc., received after 5:00 p.m. Monday through Thursday and 11:00 a.m. on Friday’s shall be considered to have been received on the next business day.

PART 2 - Products (Not Used)

PART 3 - Execution (Not Used)

End of Section 01 11 00
SECTION 01 26 00 - Contract Modification Procedures

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 29 00 “Payment Procedures.”
2. Section 01 31 00 “Project Management and Coordination.”
3. Section 01 32 00 “Construction Progress Documentation.”
4. Section 01 33 00 “Submittal Procedures.”
5. Section 01 73 00 “Execution Requirements.”
6. Section 01 77 00 “Closeout Procedures.”
7. Section 01 78 39 “Project Record Documents.”

C. Title 24, Part 1, Section 4-338.

1.2 Proposal Requests

A. Include within the contractor’s quality assurance program such measures as are needed to assure familiarity of the contractor’s staff and employees with all Contract requirements and these procedures for processing Change Order data.

B. Make submittals through the Architect. Submit the number of copies called for under the various items listed in this Section.

C. Based upon Owner’s request for changes in scope, RFI responses, or other changes, Architect will issue a detailed description, or Field Change Directive (FCD) that may require adjustment to the Contract Sum or Time. If necessary, the description, or FCD will include revised Drawings and Specifications.

1. Proposed Changes issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 20 days after receipt of proposed changes, submit a quotation estimating adjustments to the Contract Sum and the Contract Time necessary to execute the change.
   a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   c. Include costs of labor and supervision directly attributable to the change.
   d. Include proposed Contractor’s Construction Schedule that indicates the effect, if any, of the change to the construction schedule. Including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
1.3 Change Order Procedures

A. On Owner's approval of a Proposal Request, issue a Change Order for signatures of Owner, Contractor and Architect on form approved by Owner.

B. Change Orders will be dated and numbered in sequence.

C. Each Change Order shall include the following information:

1. DSA Application number.
2. Project Name and Address.
3. A detailed description of the change required, with back-up documentation (Bulletin, Change Order Request, cost data, letters, etc.)
4. The reason for the change.
5. Who requested the change.
6. The dollar amount of each item (add, deduct, or no cost.)
7. Time adjustment if warranted.
8. All necessary back-up information, including sales receipts, time cards, field logs, test results, etc., necessary to justify the amounts of time indicated.

D. The Owner, DSA Inspector, Architect and the construction manager shall review, approve, and sign the Change Order.

E. The construction manager will distribute the required number of copies (minimum of seven) of each Change Order prepared and signed and submitted through the construction manager to the Owner.

1. The Architect will retain one signed copy in his file, will forward the other signed copies to the Division of the State Architect (DSA).
2. The Owner, upon approval, will sign all copies, retain one signed copy for the Owner’s files and return the remaining copies to the construction manager for distribution to the Architect.
   a. All Change Orders must be approved by DSA prior to change being made in the work.
3. All Change Orders must be approved by the Owner’s Board prior to the contractor invoicing the Owner for that change.

PART 2 - Products (Not Used)

PART 3 - Execution (Not Used)

End of Section 01 26 00
SECTION 01 29 00 - Payment Procedures

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 01 26 00 “Contract Modification Procedures.”
   2. Section 01 31 00 “Project Management and Coordination.”
   3. Section 01 32 00 “Construction Progress Documentation.”
   4. Section 01 77 00 “Closeout Procedures.”

1.2 Schedule of Values

A. Submit Schedule of Values prior to submittal of initial application of payment within 10 days from date of Notice to Proceed.

B. Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Include the following project identification on the Schedule of Values:
   1. Project name and location.
   2. Name of Architect.
   3. Architect’s project number.
   4. Contractor’s name and address.
   5. Date of submittal.
   6. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   7. Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
   8. Update and submit the Schedule of Values with each Application for Payment.
   9. Arrange the Schedule of Values in tabular format with separate columns to indicate the following:
      a. Related specification sections.
      b. Description of work.
      c. Name of subcontractor.
      d. Approved change orders that affect value.
      e. Dollar value.
      f. Total contract sum of base contract.
      g. Total Contract sum with total of approved change orders added it.
      h. Percent complete for each line item as work progresses.

10. Differentiate between items stored on site and items stored offsite. Include evidence of insured or bonded and secure warehousing for items stored offsite.

11. Payment for materials and equipment delivered to the project site but not yet incorporated in the work may be made at the discretion of the Owner. Such materials and equipment must be stored at the project site, properly stacked, crated or boxed and, if necessary, covered or protected from
the weather. Documentation of cost of the materials and equipment must be provided with the Application for Payment.

1.3 Applications For Payment

A. Make each Application for Payment consistent with previous applications and payments as certified by Architect and paid for by Owner. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment may involve additional requirements.

B. The date for each progress payment is indicated in the Agreement between Owner and contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Submit Application for Payment to Architect on a day of each month agreed to by Owner, contractor and Architect.

D. Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

E. Complete every entry on form. Notarize and execute directly on each copy of the pay application itself by a person authorized to sign legal documents on behalf of contractor. Notarization on “loose leaf certificates” is not acceptable. Architect will return incomplete applications without action.

   1. Match data on the current Schedule of Values and current Construction Schedule.
   2. Include amounts of Approved Change Orders issued before last day of construction period covered by application.

F. Submit 3 (three) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. All copies shall include waivers of lien and other required attachments. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. With each Application for Payment, submit waivers and releases from every entity that is lawfully entitled to file a lien arising out of the Contract and related to the work covered by the payment.

   1. Submit conditional waiver and release upon progress payment on each item for amount requested in current application, after deduction for retainage, on each item.
   2. Submit an unconditional waiver and release on each item for the amount paid in the previous application, prior to deduction for retainage.
   3. When an application shows completion of an item, submit conditional waiver and release upon final payment.
   4. Owner reserves the right to designate which entities involved in the work must submit waivers.
   5. Submit waivers of lien on forms, executed in a manner acceptable to Owner.
   6. Within 10 (ten) days of receipt of payment that includes final payment on an item of work, submit an unconditional waiver and release upon final payment for the item.

H. Submit substantiating information, as required to substantiate dollar amounts on Application for Payment.

   1. Substantiating information will normally be required only for those portions of work whose completion state cannot be readily determined by observation of the completed work.
   2. Provide one copy of substantiating information with each copy of the Application for Payment.

I. Administrative actions and submittals that must precede submittal of first Application for Payment include the following:
1. List of subcontractors.
2. Schedule of Values.
3. Construction Schedule.
5. List of contractor's staff assignments.
7. Copies of building permits.
8. Copies of authorizations and Business Licenses from authorities having jurisdiction in location of work.
10. Minutes from preconstruction meeting.
11. Certificates of insurance and insurance policies.
12. List of subcontracts.

J. After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the work claimed as substantially complete.

1. Include documentation supporting claim that the work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. Reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the work.

K. Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the work.
10. Warranty and Maintenance information.
11. Record documents.

PART 2 - Products (Not Used)

PART 3 - Execution (Not Used)

End of Section 01 29 00
SECTION 01 31 00 - Project Management and Coordination

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 26 00 “Contract Modification Procedures.”
2. Section 01 29 00 “Payment Procedures.”
3. Section 01 32 00 “Construction Progress Documentation.”
4. Section 01 33 00 “Submittal Procedures.”
5. Section 01 40 00 “Quality Requirements.”
6. Section 01 60 00 “Product Requirements.”
7. Section 01 73 00 “Execution Requirements.”
8. Section 01 77 00 “Closeout Procedures.”

1.2 Definitions

A. RFI: Request For Interpretation by contractor seeking interpretation or clarification of the Contract Documents.

1.3 Coordination

A. Coordinate all construction operations to ensure efficient and orderly installation of each part of the work. Coordinate construction operations that depend on each other for proper installation, connection, and operation. Establish and maintain clear communication between all trades.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation and to comply with the project schedule.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
5. Provide and maintain sufficient crew to manage, supervise, execute and complete the work by the required completion date.
6. Observe work of each subcontractor to monitor compliance with schedule and requirements of the Contract Documents.
7. Report noncompliance to Inspector of Record, with recommendation for changes.
8. Contractor shall notify Owner in writing within 10 days of completion of work installed by Owner under separate contract of the defects or discrepancies that will cause delay or cost to the Contract. Failure to notify the Owner in writing shall constitute acceptance of the work as complying with the Contract and coordinated with contractor’s interface and work to be completed.
9. Maintain a current set of DSA approved drawings, project manual, addenda and FCD’s at the site at all times. In addition, maintain sufficient number of copies of these documents to execute the work.
B. Require each subcontractor to:

1. Coordinate work of his own employees and suppliers.
2. Expedite his work to assure compliance with schedules.
3. Coordinate his work with that of other prime contractors, subcontractors and work by Owner.
4. Prepare sub-schedules to comply with critical path.
5. Monitor schedules as work progresses.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

D. Coordinate scheduling and timing of required administrative procedures with construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the work. Time progress meetings to coincide with review of payment applications. Such administrative activities include, but are not limited to, the following:

1. Preparation of Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation meetings.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.
10. Monitor order, shipping and delivery of products and materials to assure timely arrival at project site.
11. Communicate with subcontractors to assure necessary labor and equipment is at the project site at time work is needed.

E. Coordinate and check layout and installation of work between all trades. Coordinate and sequence work in a logical manner to minimize impact to work in place.

F. Require all subcontractors to read, understand and comply with all applicable requirements of the contract documents. Review documents with subcontractors to assure they are aware of all applicable requirements and to determine if problems or conflicts exist between contract requirements and subcontractor’s intended work plan. Resolve all issues of material order, workflow, and coordination of subcontractors to the satisfaction of the contract requirements.

G. Carefully read, review and understand all contract documents and promptly issue an RFI in writing noting errors, inconsistencies or omissions found, prior to starting any work.

H. Field verify all dimensions needed for fabricated components.

I. Coordinate construction activities so that operations are carried out with consideration for efficient use of power, water and material.

J. Within 10 (ten) days of the date of Notice to Proceed and prior to submitting first Application of Payment, submit a list of names for the following general contractor staff. List phone numbers, email addresses, fax numbers and any other relevant contact information:

1. Principal in charge.
2. Project manager(s).
3. Project superintendent(s).
4. Key administrative staff.

K. Within 10 (ten) days of Notice to Proceed, contractor shall assemble and submit 3 (three) complete sets of Contract Documents that represent the agreement between Owner and contractor. One set shall be retained and kept up to date by the contractor at the jobsite, one set provided to the Owner and one set provided to the Architect. Identify all documents as “Contract Documents” and indicate date of contract. The sets shall include the following:

1. General Conditions.
2. Supplemental Conditions.
3. Technical Specifications.
4. Drawings.
5. Addenda.

1.4 Submittals

A. Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Include project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

   a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. Number of Copies: Submit 5 (five) opaque copies of each submittal. Architect will return 3 (three) copies.

1.5 Project Meetings

A. Schedule and conduct meetings at project site on a regular basis to coordinate the work. Prepare agenda and lead the meeting. Issue meeting minutes to all concerned parties.

1. Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Distribute the agenda to all invited attendees.
3. Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 2 days of the meeting.
4. Those persons designated by the contractor to attend and participate in project meetings shall be deemed authorized to commit the contractor to solutions agreed upon or commitments of the contractor made in the project meetings.
5. The contractor will assign the same person or persons to represent the contractor at the project meetings throughout progress of the work.
B. Schedule preconstruction meeting at a time convenient to Owner and Architect, but no later than 10 working days after the date of the Notice to Proceed. Hold the meeting at project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Authorized representatives of Owner, Architect, and their consultants; contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. All participants at the meeting shall be familiar with project and authorized to conclude matters relating to the work.

2. Discuss items of significance that could affect progress, including but not limited to, the following:
   a. Construction schedule and work plan.
   b. Phasing.
   c. Critical work sequencing and long-lead items.
   d. Designation of key personnel and their duties.
   e. Procedures for processing field decisions and Change Orders.
   f. Procedures for RFIs.
   g. Procedures for Bulletins and Field Change Directives.
   h. Procedures for testing and inspecting.
   i. Procedures for processing Applications for Payment.
   j. Distribution of the Contract Documents.
   k. Submittal procedures.
   l. LEED requirements.
   m. Preparation of Record Documents.
   n. Use of the premises.
   o. Work restrictions.
   p. Owner's occupancy requirements, use of facilities and protection of occupants.
   q. Responsibility for temporary facilities and controls.
   r. Construction waste management and recycling.
   s. Parking availability.
   t. Office, work, and storage areas.
   u. Equipment deliveries and priorities.
   v. First aid and safety procedures.
   w. Security.
   x. Progress cleaning.
   y. Working hours.
   z. Safety program.
   aa. Communication channels and procedures.
   bb. Rules and Regulations governing work.
   cc. Safety procedures.
   dd. Review substrate conditions.
   ee. Review project conditions as required by warranties.
   ff. Special inspections required.
   gg. Punch list procedures.
   hh. Project closeout procedures and requirements.
   ii. As-built requirements.

3. Record and distribute meeting minutes.

C. Conduct prefabrication/pre-installation meetings at project site prior to ordering materials for each activity required to have a prefabrication or pre-installation meeting.
1. Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner of scheduled meeting dates.

2. Review progress of other construction activities and preparations for the particular activity under consideration, including but not limited to the following:

   b. Options.
   c. Related RFIs.
   d. Related Change Orders.
   e. Lead time.
   f. Deliveries.
   g. Submittals.
   h. Review of mockups.
   i. Possible conflicts.
   j. Compatibility problems.
   k. Time schedules.
   l. Weather limitations.
   m. Manufacturer's written recommendations.
   n. Warranty requirements.
   o. Compatibility of materials.
   p. Acceptability of substrates.
   q. Temporary facilities and controls.
   r. Space and access limitations.
   s. Regulations of authorities having jurisdiction.
   t. Testing and inspecting requirements.
   u. Installation procedures.
   v. Coordination with other work.
   w. Required performance results.
   x. Protection of adjacent work.
   y. Protection of construction and personnel.
   z. Review substrate conditions.
   aa. Review project conditions with manufacturer present as related to and required by warranties.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Distribute minutes of the meeting to each party present and to all other concerned parties.

5. Do not proceed with installation if meeting cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.

6. Obtain written statement on manufacturer’s letterhead that substrate conditions are in compliance with and satisfy manufacturer’s written requirements and warranty requirements.

D. Conduct regular coordination meetings at weekly intervals with subcontractors to coordinate construction activities.

1. In addition to representatives of each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with project and authorized to conclude matters relating to the work.

2. Review and correct minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of project.
a. Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.

b. Review present and future needs of each entity present, including but not limited to the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Work hours.
8) Quality and work standards.
9) Status of correction of deficient items.
10) Field observations.
11) RFIs.
12) Safety programs.

3. Record and distribute minutes of the meeting to each party present and to all other concerned parties.

E. Conduct regular progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. In addition to representatives of Owner, Architect, contractor, any other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with project and authorized to conclude matters relating to the work.

2. Review and correct minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of project.

a. Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.

b. Review present and future needs of each entity present, including but not limited to the following:

1) Construction progress and immediate issues.
2) Overall schedule review and look ahead schedule review.
3) Status of submittals.
4) Quality and work standards.
5) Status of correction of deficient items.
6) Status of proposal requests.
7) Status of current unresolved issues.
8) Field observations.
9) RFIs and RFI log.
10) Submittals and submittal log.
11) Change orders and change order log.
12) Pending changes.

3. Record and distribute minutes of the meeting to each party present and to all other concerned parties.

F. The Owner’s Representative may call a special meeting at any time during the course of the project. Special project meetings shall include representatives of any members of the project team requested in order to discuss problems and/or solutions that are common to the project.

1.6 Requests For Interpretation (RFIs)

A. Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI in the approved form.

1. RFIs shall originate with contractor. RFIs submitted by entities other than contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the work.
3. Review all RFIs with Inspector of Record and Contract Documents prior to submitting RFI to Architect to assure that necessary information is not in the Contract Documents. No time or schedule extension will be approved for RFIs when information is clearly shown in the Contract Documents.

B. Include a detailed, legible description of item needing interpretation and the following:

1. Project name.
2. Date.
3. Name of contractor.
5. RFI number, numbered sequentially.
6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Include contractor's suggested solution. If contractor's solution impacts the Contract Time or the Contract Sum, contractor shall state impact in the RFI. RFIs submitted without solution will be returned unreviewed, and no extension of time will be approved.
10. Contractor's signature.
11. Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
12. Enumerate each page and attachments of RFI with sequential number. Indicate total number of pages on RFI form.

C. Architect will review each RFI and determine action required. RFIs received after 3:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

   a. Requests of Means and Methods.
   b. Requests for approval of submittals.
   c. Requests for approval of substitution of products or alternate methods.
   d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or RFIs with numerous errors.
h. RFIs which do not propose a solution.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.

3. If contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 working days after receipt of the RFI response.

D. On receipt of Architect's action, immediately review response and notify Architect within one day if contractor disagrees with response. After acceptance of response, update the RFI log and distribute the RFI response to affected parties.

E. Prepare and maintain a tabular log of RFIs organized by the RFI number. Include the following:

1. Owner and project name.
2. Name of contractor.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

PART 2 - Products (Not Used)

PART 3 - Execution (Not Used)

End of Section 01 31 00
SECTION 01 31 14 – Additional Requirements for DSA Reviewed Projects

PART 1 - General

1.1 Section Includes

A. Additional requirements for projects reviewed by the Division of the State Architect (DSA).

B. DSA Deferred Approvals.

C. DSA Incremental Submittals.

D. DSA Forms:
   1. DSA-6 – Verified Report.
   2. DSA-103 – Statement of Structural Tests and Inspections.

1.2 Related Sections Include:

1. Section 01 40 00 “Quality Requirements.”
2. Section 01 73 00 “Execution Requirements”
3. Section 01 77 00 “Closeout Procedures.”

1.3 References

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Section 01 42 00 for definitions, acronyms, and abbreviations.

B. Unless otherwise noted, standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes as of the date of issue of this Project Manual.

C. California Code of Regulations (CCR).
   1. Title 8, Division 1, Chapter 3.2 – California Occupational Safety and Health Regulations (Cal/OSHA).
   2. Title 8, Division 1, Chapter 4, Sub-Chapter 4 – Construction Safety Orders.
   3. Title 8, Division 1, Chapter 4, Sub-Chapter 7 – General Industrial Safety Orders.
   4. Title 19, Division 1 –State Fire Marshal (SFM).
   5. California Administrative Code, California Code of Regulations, Title 24, Part 1: Refer to Chapter 4, Group 1, Safety of Construction of Public Schools.

D. Division of the State Architect Interpretation of Regulations Manual (DSA IR)
   1. DSA IR A-6 – Change Order and Field Change Approval Processes.
   2. DSA IR A-7 – Project Inspector Certification and Approval.
   3. DSA IR A-8 – Project Inspector and Assistant Inspector Duties and Performance.
   5. DSA IR A-12 – Assistant Inspector Approval.

E. Division of the State Architect Website: www.dsa.dgs.ca.gov
1.4 General Requirements

A. Design-Build Entity’s Duties:

1. Comply with California Administrative Code, Chapter 4, Article 6, Paragraph 4-343, “Duties of the Contractor” in addition to the duties described in the Contract Documents.

2. Comply with CCR Title 8, Division 1, Chapter 3.2, California Occupational Safety and Health Regulations (Cal/OSHA).

3. Comply with CCR Title 8, Division 1, Chapter 4, Sub-Chapter 4, Construction Safety Orders.

4. Comply with requirements of CCR Title 19, Division 1, State Fire Marshal (SFM). Comply with requirements of California Administrative Code, Chapter 4, Article 6, Paragraph 4-341, “Duties of the Architect, Structural Engineer or Professional Engineer” and Paragraph 4-344, “Duties of Mechanical and Electrical Engineers,” in addition to the duties described in the Contract Documents.

B. Architect of Record’s (AOR) and AOR’s Consultants’ Duties: Comply with requirements of California Administrative Code, Chapter 4, Article 6, Paragraph 4-341, “Duties of the Architect, Structural Engineer or Professional Engineer” and Paragraph 4-344, “Duties of Mechanical and Electrical Engineers,” in addition to the duties described in the Contract Documents.

C. Arbitration: DSA is not subject to arbitration proceedings.

D. All work shall comply with Title 24, CCR at a minimum, for alteration, rehabilitation, or reconstruction work. Should any deterioration or non-complying existing conditions be discovered that could not reasonably have been known or anticipated and cause non-compliance with Title 24, CCR requirements, a Change Order (CO) or Field Change Directive (FCD) shall be submitted to DSA for approval, prior to proceeding with remedial work.

1.5 Regulatory Requirements

A. Perform all work in accordance with applicable laws, codes, ordinances, rules, and regulations including, without limitation, Parts 1 through 5, Part 9, and Part 12, Title 24, CCR. Maintain a copy of these documents at the project site at all times. Codes adopted by the City, County, State, and Federal agencies govern minimum project requirements. Comply with the latest edition of applicable regulatory requirements and standards unless otherwise indicated or specified.

1.6 DSA Deferred Approvals

A. Portions of the Work may be DSA Deferred Approval in accordance with California Administrative Code, Chapter 4, Article 3, Paragraph 4-317(g), “Deferred Approvals.” Cost of preparing and submitting documentation per DSA Deferred Approval requirements including required modifications to the Design-Build Entity’s Drawings and Specifications, whether or not indicated in the Contract Documents, shall be borne by Design-Build Entity.

B. Do not begin fabrication and installation of deferred approval items without first obtaining DSA approval of Design-Build Entity’s Drawings and Specifications.

C. Schedule of Work Subject to DSA Deferred Approval:

1. Elevators.
2. Window wall systems exceeding 10 feet in span.
3. Pre-manufactured roof curbs.

1.7 DSA Incremental Submittals

A. Prepare and submit Incremental Submittals under provisions of DSA IR A-11.

1.8 Inspection and Supervision

A. Supervision by DSA shall be in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-334.

B. Owner will select and pay for the services of a Project Inspector, certified and approved by DSA in accordance with DSA IR A-7.

1. When required, Owner will select and pay for the services of additional full-time Assistant Project Inspector(s) certified and approved by DSA in accordance with DSA IR A-12.

C. Project Inspector shall inspect construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(b), “Inspection by Project Inspector,” and Article 6, Paragraph 4-342, “Duties of the Project Inspector”; and DSA IR A-8.

1. Project Inspector performance rating by DSA shall be in accordance with DSA IR A-8, Section 2, “DSA’s Rating of the Inspector’s Performance.”

D. Reports: Project Inspector shall submit the following in accordance with DSA IR A-7.

1. Notice of Start of Construction: Notify DSA of start of construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-331.
2. Semi-Monthly Reports: Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-337.
3. Verified Reports: Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-336.

E. Special Inspection Requirements:

1. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(c), “Special Inspection.”
2. Special inspection costs to be paid by Owner.
3. Conduct special inspection in accordance with DSA-103, Statement of Structural Tests and Inspections.

1.9 Testing Agency Requirements

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-335, “Tests.”

B. Owner will select the Testing Agency, acceptable to DSA.

C. Sampling and testing shall be performed by properly qualified persons in accordance with applicable American Society for Testing and Materials (ASTM) standards.

D. Conduct tests in accordance with DSA-103, Statement of Structural Tests and Inspections.

E. Submit one copy of test reports to DSA.
1.10 **Substitutions and Requests for Information**

A. Substitutions and Requests for Information (RFIs) that affect structural safety, fire and life safety, access compliance or energy (as applicable) shall be submitted to DSA for review and approval prior to fabrication and installation on the project.

1.11 **Addenda and Change Orders**

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-338, “Addenda and Change Orders.”

B. Comply with DSA IR A-6.

C. Obtain DSA approval for changes to Code-regulated construction and inspection/testing functions prior to start of that Work. Code-regulated construction refers to Work that is regulated by Code provisions applicable to public school construction, including those adopted by Division of the State Architect-Structural Safety Section (DSA/SS), Division of the State Architect-Access Compliance Section (DSA/AC), and Division of the State Architect-Fire and Life Safety Section (DSA/FLS).

D. Changes can be approved by DSA through Field Change Document (FCD) Approval Process or Change Order (CO) Process, as applicable. Comply with DSA IR A-6, Article 3, Section 3.1, “Field Change Document (FCD) Approval Process,” and DSA IR A-6, Article 3, Section 3.2, “Change Order (CO) Approval Process.”

E. Do not begin any work under addendum or change order until required DSA written approval is obtained.

**PART 2 - Products (Not Used)**

**PART 3 - Execution (Not Used)**

End of Section 01 31 14
SECTION 01 32 00 - Construction Progress Documentation

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. Related Sections include:

1. Section 01 26 00 “Contract Modification Procedures.”
2. Section 01 29 00 “Payment Procedures.”
3. Section 01 31 00 “Project Management and Coordination.”
4. Section 01 32 33 “Photographic Documentation.”
5. Section 01 33 00 “Submittal Procedures.”
6. Section 01 40 00 “Quality Requirements.”
7. Section 01 60 00 “Product Requirements.”
8. Section 01 73 00 “Execution Requirements.”
9. Section 01 77 00 “Closeout Procedures.”
10. Section 01 78 39 “Project Record Documents.”

1.2 Definitions

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

B. CPM: Critical Path Method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall project duration and contains no float.

D. Float: The measure of leeway in starting and completing an activity. Float time belongs to Owner.

E. Major Area: A story of construction, a separate building, or a similar significant construction element.

F. Milestone: A key or critical point in time for reference or measurement.

1.3 Procedures

A. Submit 5 copies minimum of schedule prior to submittal of first Payment Application. Submit schedule large enough to show entire schedule for entire construction period. Submit an electronic copy of schedule in PDF format.

B. Construction Schedule: Submit 5 opaque copies of initial schedule, large enough to show entire schedule for entire construction period. Submit an electronic copy of schedule in PDF format.

C. Daily Construction Reports: Submit 2 copies at weekly intervals.

D. Field Condition Reports: Submit 2 copies at time of discovery of differing conditions.
E. Provide 2 week look ahead at each progress meeting.

1.4 Coordination

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Construction Schedule with the Schedule of Values, Submittals Schedule and payment requests.

1.5 Quality Assurance

A. Contractor shall maintain skilled personnel with experience in Construction Project Management (CPM) scheduling and reporting techniques. Scheduler must have a minimum of two (2) years of experience preparing CPM schedules.

PART 2 - Products

2.1 Submittals Schedule

A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates. Coordinate Submittal Schedule with Construction Schedule. Submit concurrently with submittal of Construction Schedule. Include the following:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the work covered.
6. Scheduled date for Architect's final release or approval.

2.2 Construction Schedule

A. Extend schedule from date established for Notice to Proceed to date of Final Completion. Show the following dates and portions of time:

1. Notice to Proceed.
2. Contract Completion Date.
3. Date of Substantial Completion.
4. Start and Finish dates for each Activity.
5. Critical Path.
6. Float Time. Do not sequester float time through strategies such as extending activity durations to consume available float time associated with non critical activities to cause the work to become critical.
7. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
8. Show all contractual milestone dates, fabrication completion dates, delivery dates, lead times, and curing times.
9. Deliverable dates such as submittal approval dates, mockup approval dates, deferred approval dates, testing and inspection dates and all other dates affecting progress of the work.
10. Dates that designated working spaces, storage areas, access, and other facilities to be made available by the Owner.
11. Dates for critical decisions from the Owner.
12. Dates required for Owner-furnished contractor-installed items, and Owner-furnished Owner-installed items.
13. Include a separate activity for each portion of work performed by Owner.
14. Connection and relocation of existing utilities.
15. Connections to or penetration(s) of existing structures.
16. Earliest dates when infrastructure and systems are ready for telecom wiring and low voltage installation.
17. As-built documentation preparation time.
18. Start up and operational testing times and dates.

B. Treat each story or separate area as a separate numbered activity for each principal element of the work.

1. Define and arrange activities so no activity is longer than 10 (ten) days.
2. Include procurement time for long lead items requiring more than 10 (ten) days procurement time, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery. Include procurement time within Activity time.
3. Include review and resubmittal times for submittals. Coordinate submittal review times in Construction Schedule with Submittals Schedule.
4. Include time necessary for startup and testing.
5. Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion. Show substantial completion date.

C. Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the work is affected.

1. Arrange list of activities on schedule by phase.
2. Include a separate activity for each portion of the work performed by Owner.
3. Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use of premises restrictions.
   g. Seasonal variations.
   h. Environmental control.
   i. Required inspections.
4. Indicate important stages of construction for each major portion of the work.
5. Include critical milestone dates such as Inspections and Completion dates.

D. For each proposed contract modification that affects contract time, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule. Submit analysis with proposed change.

E. Prepare Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the work. Failure to include any work item required for performance of this Contract shall not excuse contractor from completing all work within applicable completion dates, regardless of Owner/Architect approval of the schedule.
1. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
2. Use "one workday" as the unit of time. Include nonworking days and holidays in the schedule.
3. Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities.
4. Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

2.3 Reports

A. Prepare a daily construction report recording the following information concerning events at project site:

1. Equipment at project site.
2. Material deliveries.
3. High and low temperatures and general weather conditions.
4. Accidents.
5. Stoppages, delays, shortages, and losses.
6. Meter readings and similar recordings.
7. Orders and requests of authorities having jurisdiction.
8. Services connected and disconnected.
9. Equipment or system tests and startups.
10. Number of workers on site.
11. Estimated completion date of each activity.
12. Specific problems, if any, with the actions and/or inaction of subcontractors, the Owner, Architect, consulting engineers, or the Contract Documents which are preventing contractor’s work from being properly completed per the schedule.
13. Weather conditions.
14. Subcontractors and trades performing work under the Contract on the Site, and number of workers each and number of hours worked by each worker.
15. Others on the Site performing work for Owner under separate contracts.
16. List of visitors to site, giving name, company or agency affiliation and telephone number.
17. Description of situations and circumstances which could delay normal progress of work or which could be basis of claim for change in Contract Time or Contract Sum.
18. Changes to work and who authorized changes.
19. Comments, as contractor determines are appropriate for project record.
20. Current construction activities and tasks completed.

B. Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions and photographs, together with recommendations.

C. When an event of an unusual and significant nature occurs at the project site, whether or not it is directly related to the work, prepare and submit a report. List chain of events, individuals involved, photographs and written description.

D. Submit daily report to Owner’s Representative by 4:00 p.m. daily on each and every working day.

PART 3 - Execution

3.1 Construction Schedule

A. Within 10 (ten) days of Notice to Proceed conduct pre-scheduling meeting to review methods and procedures related to the contractor’s construction schedule, including, but not limited to, the following:
1. Review software limitations, schedule content and format.
2. Verify qualifications of personnel that will develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, substantial completion, partial occupancy, and completion dates.
4. Review schedule for work of Owner’s separate contracts.
5. Review time required for review of submittals and re-submittals. Review time requirements for long lead items.
6. Review requirements for tests and inspections by independent testing and inspecting agencies.
7. Review time required for completion of startup procedures.
8. Review procedures for updating schedule.

B. Issue schedule at each regularly scheduled progress meeting. At monthly intervals, update schedule to reflect actual construction progress and activities. Issue updated schedule with each Application for Payment.

C. Distribute copies of construction schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other interested parties.
1. Post copies in project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in performance of construction activities.

3.2 Corrective Actions

A. Contractor agrees that whenever it becomes apparent to the Owner from the current monthly updated Contract Baseline Schedule that the contract completion date will not be met, the contractor, within 5 working days, will take corrective actions, at no additional cost or time to Owner, including but not limited to:
1. The contractor shall prepare a recovery schedule to demonstrate how lost time will be re-couped and how the project will be completed by the original agreed upon completion date. Prior to revising the baseline schedule the recovery schedule shall be approved by the Owner.
2. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of work.
3. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of work. This paragraph shall not be construed to permit contractor to violate the work hour restrictions specified in the Contract Documents.
4. Reschedule activities to achieve maximum practical concurrence of accomplished activities.

B. Should the contractor fail to complete the work per the agreed schedule and requires overtime and/or weekend work and/or holiday work to remedy schedule deficiencies, the contractor will bear all expenses associated with the unscheduled overtime work. In the event the contractor requires unscheduled overtime, the contractor will be required to reimburse the Owner, through deductive change order, for inspection and construction manager support. This requirement is in addition to any specified liquidated damages.

C. Should contractor fail to complete project by completion date and project work time runs past completion date, contractor shall be responsible for all costs and expenses associated with extended work time. Contractor shall reimburse Owner, through deductive change order, cost for professional design fees. This requirement is in addition to any specified liquidated damages.
3.3 Two Week Look-Ahead Schedule

A. At each weekly project meeting and based upon the latest approved schedule, the contractor shall submit a weekly two-week look-ahead schedule with actuals through two days prior to the scheduled meeting. The schedule shall show summary of non-critical activities and each critical activity. In addition, a comparison between the planned versus actual of the preceding activities shall be shown.

End of Section 01 32 00
SECTION 01 32 33 - Photographic Documentation

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 01 31 00 “Project Management and Coordination.”
   2. Section 01 32 00 “Construction Progress Documentation.”
   3. Section 01 40 00 “Quality Requirements.”
   4. Section 01 50 00 “Temporary Facilities and Controls.”
   5. Section 01 57 23 “Storm Water Pollution Prevention.”
   6. Section 01 73 00 “Execution Requirements.”
   7. Section 01 73 29 “Cutting and Patching.”
   8. Section 01 77 00 “Closeout Procedures.”
   9. Section 01 78 39 “Project Record Documents.”

1.2 Submittals

A. Submit electronic copies of photographs taken since last progress meeting, at each progress meeting.

B. Identify each set of images on transmittal with the following information:
   1. Name of project.
   2. Name of contractor.
   3. Date stamped by camera.
   4. Unique sequential identifier.

C. Submit a complete set of digital image electronic files at completion of project. Identify electronic media with date photographs were taken at time of Substantial Completion. Submit images that have same aspect ratio as the sensor, uncropped.

PART 2 - Products

2.1 Photographic Media

A. Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels, 150 DPI minimum.

PART 3 - Execution

3.1 Construction Photographs

A. Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photographs with blurry or out-of-focus areas will not be accepted.

B. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Include date and time in filename for each image.
2. Maintain one set of images on CD-ROM in the field office at project site, available at all times for reference. Identify images same as for those submitted to Architect.

C. Before commencement of the work, take color, digital photographs of project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before taking construction photographs.
2. Take photographs to show existing conditions adjacent to property before starting the work.
3. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Photograph construction and fabrication of all mockups as well as each completed version of mockup and final accepted mockup.

E. Take periodic construction photographs one day before the cutoff date associated with each Application for Payment. Select vantage points to show status of construction, progress and adjacent properties since last photographs were taken.

F. Take photographs of substrate conditions just prior to the start of each portion of the work.

G. Take digital color photographs of entire scope of work at time of Substantial Completion. Submit photographs to Owner and Architect with transmittal.

H. Take color digital photographs of entire scope of work at time of Completion. Submit photographs to Owner and Architect with each transmittal.

End of Section 01 32 33
SECTION 01 33 00 - Submittal Procedures

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary and other Division 1 Specification Sections, apply to this section.

B. Related Sections include:

1. Section 01 31 00 “Project Management and Coordination.”
2. Section 01 32 00 “Construction Progress Documentation.”
3. Section 01 40 00 “Quality Requirements.”
4. Section 01 60 00 “Product Requirements.”
5. Section 01 73 00 “Execution Requirements.”
6. Section 01 73 29 “Cutting and Patching.”
7. Section 01 77 00 “Closeout Procedures.”
8. Section 01 78 39 “Project Record Documents.”

1.2 Definitions

A. Action Submittals: Written and graphic information that requires the Architect's review. The submittal will only be “approved” by the submitting contractor. By submitting to the Architect, the submitting contractor has approved his submittal and that of his subcontractor and is requesting that the Architect review the contractor’s approved submittal.

B. Informational Submittals: Written information that does not require Architect's review. Submittals may be rejected for not complying with requirements.

1.3 Submittal Procedures

A. The Contractor shall review, confirm, approve and submit to the Architect with the number of copies of Submittals within [35] calendar days of the Notice to Proceed.

B. Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the work so processing will not be delayed because of need to review submittals concurrently for coordination. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Make all submittals of related products and materials in groups containing all associated items. Architect may reject partial submittals as incomplete or hold them until related submittals are received.
4. Do not use submittals to obtain review or approval of substitutions and alternate methods.
5. Do not use submittals to obtain review or approval of means and methods.

C. Allow [10] working days for submittal review, including [10] working days for each resubmittal, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure by contractor to transmit the contractor approved submittals early enough in advance of lead times, fabrication times or work times to permit adequate
review and processing, including resubmittals in order to complete the work on time. Contractor is advised to make early submittals for long lead items.

1. Allow for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise contractor when the time period for submittal processing must be extended for coordination.
2. If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Allow for review of each resubmittal.

D. The contractor shall place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 x 8 inches on label or beside title block to record action taken by Architect during the review process.
3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Submittal number or other unique identifier, including revision identifier. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
   i. A statement certifying that the submitting contractor has distributed the complete set of construction documents and specifications to his vendor/suppliers for their use in preparing their submittal for the contractor’s approval. The construction documents are not considered dividable. Contractor should be aware that there may be requirements for his trades distributed throughout the construction documents and shall review the entire set with his subcontractors to ensure their scope of work is examined thoroughly as it relates to every sheet of the construction documents.

E. Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals. Provide a written statement as to the nature of the deviation including specific reasons why this is proposed.

F. Contractor shall document and explain all proposed deviations from reference standards and building code research report requirements as well as manufacturer’s product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable with warranty requirements and are appropriate for the project. Contractor to provide a statement of code compliance for the submittal.

G. Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Coordinate submittal of related items. Do not group unrelated submittals from different specification sections under a single transmittal and single submittal number; such submittals will be returned without action. Rejection of one portion of a submittal will be a rejection of the entire submittal. Architect will return submittals, without review, received from sources other than contractor. Use transmittal form approved or supplied by Architect.

H. Clearly mark each copy of each submittal to identify pertinent materials, products, models, options, and other data.
I. Indicate dimensions and clearances required.

J. Supplement manufacturer’s standard data to provide information unique to this project, including dimensions and clearances required, performance characteristics and capabilities, and/or wiring diagrams and controls.

K. Delete information that is not applicable to project.

L. Supplement the standard Drawings to provide additional information applicable to project.

M. Identify and highlight conflicts between manufacturer’s instructions and Contract Documents. If conflict exists, the contractor shall provide the higher cost material, assembly or finish (etc.) at no additional cost to the Owner.

N. Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly identify all revisions.

O. Submit and obtain Inspector of Record’s approval on all submittals prior to distribution of reviewed submittals, ordering or fabricating materials and products.

P. Furnish copies of final submittals with mark indicating Architect’s review action to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

Q. Contractor to utilize final submittals indicating Architect’s ‘review’ or ‘furnish as corrected’ without a requested resubmittal only.

R. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the contractor to submit additional copies as necessary for enforcement of requirements.

S. Contractor shall maintain complete and current submittal log, indicating status of all submittals and resubmittals. Provide summary of submittal status at each progress meeting and as requested by the Architect.

T. Modify pre-printed data to indicate precise conditions of the project. Comply with requirements as for shop drawings. Provide space for review action stamps and, if required by authorities having jurisdiction, license seal of the contractor’s design professional, as applicable.

U. Provide hard copies of submittals, electronic copies are not acceptable unless approved in writing by the Architect.

V. In addition to the process, documentation and procedures required in this Section, comply with submittal requirements for electrical, mechanical, plumbing, low voltage and communication material and any other product as described in all other specification sections which requires coordination with the contractor’s submittal.

W. Submittals must clearly identify and show compliance with Part 2 of each specification’s section.

1.4 Contractor’s Use of Architect’s CAD Files
A. Contractor is responsible for completing all tasks and pay all associated costs related to the preparation and drafting of all submittals including editing product data, preparing samples and preparation / production of shop drawings. No extended project completion date will be granted for contractor’s lack of timeliness in preparing submittals.

B. As a courtesy to the contractor, the Architect will make available requested CAD files indicating background information for use by contractor in preparation of submittals. Prior to receiving any CAD files from the Architect, contractor will be required to sign a release letter and pay a fee of $150 per drawing sheet.

C. Submittals based upon provided CAD files shall not have any indication referencing the Architect or Owner or Architect’s consultants. Any submittals received bearing such information will be immediately returned without review. Upon submission, the contractor certifies that his submittal meets all applicable codes for its proposed use.

D. Contractor is not allowed to resubmit the Architect’s CAD files, or printed copies of Architect’s drawings for their shop drawings.

PART 2 - Products

2.1 Action Submittals

A. Prepare and submit Action Submittals required by individual Specification Sections.

B. Contractor is responsible for providing complete and thorough information in each submittal so Architect can easily compare submittal information with specified requirements and determine if submitted product qualifies on an “or equal” basis.

C. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. Provide all required information in each submittal so that reviews may be conducted efficiently.

1. If information must be specially prepared for submittal because standard printed data is not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Manufacturer's catalog cuts.
   e. Wiring diagrams showing factory-installed wiring.
   f. Printed performance curves.
   g. Operational range diagrams.
   h. Compliance with specified referenced standards.
   i. Testing by recognized testing agency.

D. Prepare written statement that the submitted material/product fully complies with building code in effect for project and is acceptable to all agencies having jurisdictional control over the project.

E. Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction that the submitted assembly fully complies with all applicable building codes in effect for project and is acceptable to all agencies having jurisdictional control over the project.
1. Submit seven (7) copies of Product Data, unless otherwise indicated. Architect will return three (3) copies. Retain one returned copy as a Project Record Document. Provide one returned copy to Owner; provide one returned copy to IOR.

F. Shop Drawings: Prepare project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Dimensions; the contractor is responsible for verifying all dimensions work properly. The Architect will not review the contractor’s dimensions or be responsible for costs to correct the installation.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   f. Shopwork manufacturing instructions.
   g. Templates and patterns.
   h. Schedules.
   i. Notation of coordination requirements.
   j. Notation of dimensions established by field measurement.
   k. Relationship to adjoining construction clearly indicated.
   l. Seal and signature of contractor’s professional engineer as specified and/or as required by the Architect.
   m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
   n. Statement of code compliance for all materials/products and assemblies.

2. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.

3. Submit seven (7) opaque (bond) copies of each submittal. Architect will return three (3) copies. Retain one returned copy as a Project Record Document. Provide one returned copy to Owner; provide one returned copy to IOR.

G. Samples: Submit Samples for review of kind, color, pattern, and texture for a review of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and to be installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Attach label on unexposed side of each Sample that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Submittal number.
   e. Contractor’s approval stamp, date and wet signature.

3. Maintain sets of approved Samples at project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
4. Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
a. Submit seven (7) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return three (3) submittals with options selected.

5. Submit full-size units or Samples of size indicated, prepared from same material to be used for the work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected.

a. Submit seven (7) sets of verification Samples. Architect will return three (3).

### 2.2 Informational Submittals

A. Prepare and submit Informational Submittals required by Specification Sections.

1. Submit four (4) copies of each submittal to the Architect for record keeping only. No action will be taken by the Architect.

2. Provide a notarized statement that includes signature of entity responsible for preparing certifications. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. The contractor shall provide one copy to the owner, one copy to the IOR and one copy for the project file.

B. Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

C. Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

D. Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and is authorized by manufacturer for this specific project.

E. Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents and all applicable codes and regulations. Include evidence of manufacturing experience where required.

F. Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents and all applicable codes and regulations.

G. Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

H. Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

I. Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
J. Prepare written or published information that documents manufacturer's written recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

K. Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
   2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

L. Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

M. Submit Material Safety Data Sheets (MSDSs) directly to Owner; do not submit to Architect. Architect will not review submittals that include MSDSs and will return them unreviewed for submittal to Owner.

2.3 Delegated Design and Deferred Approvals

A. Where professional design services or certifications by a design professional are specifically required of contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. If criteria indicated are not sufficient to perform design services or certification required, submit written Request for Interpretation (RFI).

B. In addition to Shop Drawings, Product Data, and other required submittals, submit seven (7) copies of a statement, signed and sealed by the contractor’s responsible design professional, for each product and system specifically assigned to contractor to be designed or certified by a design professional. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, structural load calculations, and other factors used in performing these services.

C. If any portion of work is designated as a “Deferred Approval” item, provide preparation of design, drawings and calculations to substantiate design in a timely manner so as to not delay or hinder work.
   1. Coordinate “Deferred Approval” items with all other related and interfacing work.
   2. Provide a registered Engineer wet stamp and signature on all drawings and calculations.
   3. Submit design to Architect for review.
   4. After review by Architect, submit to Building Authority and local Fire Official for their approval. Coordinate with governing authorities and manage deferred approval items through plan check / review process and obtain necessary approvals.
   5. Allow for Architect’s review time in the construction schedule.
   6. Allow for Building and Fire Official’s processing time in construction schedule.
   7. Allow for necessary correction time and resubmittals.
   8. Include all printing and distribution costs.

D. Fabrication and installation of deferred approval items shall not be started until detailed plans, specifications and engineering calculations have been reviewed by the Architect and approved by governing authorities.
2.4 Subcontract List

A. Prepare a written summary identifying individuals or firms proposed for each portion of the work, including those who furnish products, equipment or fabrications. Include the following in tabular format:

1. Name, address, telephone number, email and fax number.
2. Number and title of related specification section.
3. License number and grade of license.
4. Submit copies to Architect at time of first application for payment.
5. Retain one returned copy as Record Document. Provide one returned copy to Owner. Provide one returned copy to IOR.

PART 3 - Execution

3.1 Contractor's Approval of His Submittal prior to the Architect's Review

A. Approve each submittal and check for completeness, correctness, coordination with other work of the Contract, compliance with the Contract Documents and to verify that the submittal does not contain information that is a deviation from the requirements of the Contract Documents or requirements of governing authorities, all applicable codes and regulations. Note corrections and field dimensions. Mark each submittal with a wet signed and dated approval stamp before submitting to Architect for the Architect’s review.

B. The contractor shall place the contractor’s approval stamp on the index of the body of the submittal, do not place approval stamp on binding cover. Wet sign and date approval stamp. The contents of the submittal shall be tied to the index and every page shall be initialed by the contractor and by his subcontractor. The index shall identify the subcontractor’s and contractor’s initials by name and position within the company.

C. Along with date of contractor's review, provide statement certifying:

1. That submittal has been reviewed and checked for compliance with the Contract Documents.
2. Field measurements have been determined and verified.
3. Conformance with requirements of codes, regulations, standards and design criteria, is confirmed.
4. Product catalog numbers, names and similar data are correct.
5. Work being performed by various subcontractors and trades is coordinated.
6. Field construction criteria have been verified, including confirmation that information submitted has been coordinated with work being performed by others for Owner and with actual site conditions.
7. All proposed deviations from requirements of the Contract Documents have been identified and noted.

D. Submittals not reviewed by the subcontractor and approved by contractor will be returned without action.

E. Submittals containing information that is a deviation or contrary to the requirements of the Contract Documents will be rejected.

3.2 Architect's Action

A. Shop drawings are not part of the Construction Contract Documents (all submittals are of the contractor, by the contractor and for the contractor for their own use in their Work Plan, and for demonstrating their proposed construction means, methods, techniques, sequences and procedures to carry out requirements of the actual Contract Documents).
B. The Architect only reviews the contractor’s approved submittal. The Architect’s review does not constitute approval of this submittal. The review is for the limited purpose of verifying compliance with the specified materials and workmanship (and/or compliance with the reasonably inferable intent) of Architect’s design, as expressed in the Contract Documents. The contractor is responsible for all dimensions of his installation.

C. The shop drawing review is for conceptual compliance and its purpose is not to order quantities or give assembly instructions or protect the contractor or coordinate their subcontractors. The review does not extend to dimensions, quantities, field conditions, coordination of trades, installation instructions, performance of equipment or systems, or for means, methods, sequences or safety procedures of construction unless explicitly stated.

D. Upon submittal, the contractor/supplier certifies that this material/product or assembly meets the California Building Code and all other applicable codes and regulations.

E. Action on a single submittal does not indicate action of an assembly of which the submittal is a component. Action taken in review does not allow or approve deviations from the Contract Documents, unless the deviation is explicitly noted by the contractor and is distinctly accepted separately in writing by the Architect. Full adherence to the contract documents is the sole responsibility of the contractor.

F. The submittal review does not constitute approval of the submittal by the Architect, his employees or agents.

G. Architect will not review submittals that do not bear contractor's approval stamp, wet signature or date and will return them without action.

H. If the Architect returns a submittal as rejected or requiring correction(s) with resubmission, the contractor, so as not to delay the progress of the work, shall promptly thereafter resubmit a submittal conforming to the requirements of the Contract Documents; the resubmittal shall indicate the portions thereof modified in accordance with the Architect’s direction. When professional certification, code compliance, regulation compliance or performance criteria of material, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications accompanying submittals. The Architect’s review of the submittals is for the limited purposes described in the Contract Documents and as outlined in 3.2.A. of this Specifications Section.

I. Architect will review each action submittal, and make comments. Architect will stamp each submittal with a review action stamp and will mark stamp appropriately to indicate the action necessary. Submittals will only be reviewed for conformance with design intent and information in the Contract Documents as outlined in 3.2.A. of this Specifications Section.

J. Architect will retain four (4) copies of each informational submittal for record keeping purposes.

K. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

L. Submittals not required by the Contract Documents will not be reviewed and will be discarded.

M. Reviewed submittals will be returned to contractor. Four (4) of the seven (7) copies will be retained by the Architect.

N. Architect will review submittals as originally submitted and for the first resubmission. After two submissions, without successful review of a particular submittal, the contractor will bear the expense through deductive change order for the Architect and his consultants’ review and processing of that
submittal. Any new resubmittal to the jurisdictional agency which is required due to the contractor’s non-compliance with the original Construction Documents or the plan check agency approved Construction Change Document (CCD) will also be the financial responsibility of the contractor.

O. Include all costs for preparing and handling submittals including costs associated with printing and distribution of submittals to a subcontractor.

P. In review of the contractor’s submittals, Architect will not review or provide dimensions or elevations for field conditions, or for proposed conditions available from a detailed review and analysis by contractor of the Contract Documents. The contractor is solely responsible for all coordination of all field dimensions.

Q. Changes in the work shall not be authorized by submittal review actions. No review action, implicit or explicit, shall be interpreted to authorize changes in the work. Changes shall only be authorized by separate written direction, in accordance with the conditions of the Contract. Contractor assumes responsibility for proceeding with work based on reviewed submittals and shall be responsible for all corrections and modifications necessary to bring non-compliant work in compliance with Contract Documents and all applicable codes and regulations at no additional cost or time to Owner. Architect’s review of submittals does not relieve contractor of responsibilities of fully complying with requirements of Contract Documents and requirements of governing authorities and all applicable codes and regulations.

R. Contractor shall review all returned submittals upon receipt from Architect prior to installation by his subcontractor or his company’s labor force.

S. Review actions by Architect and Architect’s consultants shall not relieve contractor from compliance with requirements of the Contract Documents, all applicable codes and regulations.

T. Contractor accepts Architect’s right to ask for additional unspecified submittals as may be required to clarify contractor’s intent to complete the work as indicated.

3.3 Distribution of Submittals after Review

A. After receipt of reviewed submittals, contractor shall distribute one copy of reviewed submittals within three working days of receipt, as follows:

2. Record documents file.
3. Subcontractors.
4. Supplier or fabricator.
5. Other contractors performing work for Owner under separate contracts whose work is affected by information on submittal.
6. Owner’s inspector.
7. Owner’s representative.

End of Section 01 33 00
SECTION 01 40 00 - Quality Requirements

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.

2. Requirements for contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. See Divisions 02 through 26 Sections for specific test and inspection requirements.

1.2 Definitions

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the work will be judged.

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. Preconstruction Testing: Tests and inspections that are performed specifically for the project before products and materials are incorporated into the work to verify performance or compliance with specified criteria.

F. Product Testing: Tests and inspections that are performed by a qualified testing agency acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the work and for completed work.
I. Testing Agency: A professionally licensed entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

J. Installer/Applicator/Erector: Contractor or another entity engaged by contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. “Minimum experience” means having successfully completed a minimum of five (5) years' experience on projects similar in size and scope of the type of work required for this project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

L. IOR: DSA authorized Inspector of Record.

M. DSA: California Division of State Architect.

N. OAR: Owner’s Authorized Representative

O. CBC: California Building Code, Title 24, California Code of Regulations.

1.3 Conflicting Requirements

A. If compliance with two or more standards or code requirements is specified and the standards or code requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most expensive requirement at no additional cost to Owner. When uncertainties exist and requirements are different, but apparently equal, submit RFIs to Architect for a decision before proceeding.

B. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. When uncertainties exist submit RFI to Architect for a decision before proceeding.

C. If contractor is aware of, knows or should have known of conflicts within drawings provide Architect with RFI for clarification and provide more expensive option at no additional cost or time to Contract.

D. If contractor is aware of, knows or should have known of conflicts within specifications provide Architect with RFI for clarification and provide more expensive option at no additional cost or time to Contract.

E. If contactor is aware of, knows or should have known of conflicts between drawings and specifications provide Architect with RFI for clarification and provide more expensive option at no additional cost or time to Contract.

F. If contractor is aware of, knows of or should have known of conflicts between code requirements, authorities having jurisdiction and contract documents provide RFI to Architect for clarification and provide more expensive option at no additional cost or time to Contract.
G. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, the Drawings and Specifications shall take precedence so long as such increase is legal.

H. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.

I. Where laws, ordinances, rules and regulations require more care or greater time to accomplish work, or require better quality, higher standards or greater size of products, work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the execution date of the Contract.

J. Unless more stringent requirements are indicated or specified, comply with manufacturer’s instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing work.

K. In determining “most expensive requirement” and “options” in items “A” through “J” above, consider all factors, such as but not limited to, material cost, order processing, submittal time, delivery time, fabrication labor and time, labor and installation, and affects on overhead and general conditions.

1.4 Certifications and Qualifications

A. For testing agencies retained by contractor, submit proof of qualification to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the work and test and inspection method.
8. Complete test or inspection data.
9. Test and inspection results with interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Name and signature of laboratory inspector.
12. Recommendations on retesting and reinspecting.

C. For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the work.

D. Submit technical data, test reports, calculations, surveys, and certifications based on field tests and inspections by independent inspection and testing agency and by authorities having jurisdiction. Reports of results of inspections and tests shall not be considered Contract Documents.

1.5 Quality Assurance

A. Contractor shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of work. Contractor shall coordinate work to correctly
and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts by Owner, utility agencies and companies.

B. Contractor shall provide one person who shall be both knowledgeable and responsible for all work to be performed on this project at all times during normal work hours. Contractor’s appointed representative shall be responsible for all directions given to him and said directions shall be binding as if given to the contractor. Contractor’s representative shall be responsible to coordinate all work to be performed. Do not change contractor’s appointed representative without prior approval of Owner.

C. Provide firms and individuals trained and experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance. Provide direct supervision of all workers by supervisors trained and experienced in the type of work being performed. Provide workers performing the actual work that are trained and experienced in the type of work they are being asked to execute.

D. Require each portion of the work to be completed under the direct continuous supervision of a competent foreman, trained and experienced in that portion of work, capable of understanding the Contract Documents and implementing their requirements.

E. All work shall be installed by a knowledgeable contractor and defined “eligible” by the specified materials manufacturers. The specifications and recommendations of the manufacturer whose materials are used shall be strictly adhered to during the application or installation of materials; unless Contract Documents or referenced codes describe more stringent requirements.

F. The contractor shall be responsible for being current and knowledgeable for all building codes involved for all trades under his direction.

G. Provide firms and individuals experienced in manufacturing products or systems similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

H. Provide firms and individuals experienced in producing and fabricating products similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

I. Provide the services of professional engineers who are legally qualified to practice in jurisdiction where project is located and who is experienced in providing engineering services of the kind required. Engineering services are defined as those performed for design and installation of the systems, assemblies, or products that are similar to those indicated for this project in material, design, and extent.

J. Certain sections of the specifications require execution of the work by manufacturer certified installers. Certified installers are to provide supervisors to directly oversee and manage the workers executing the work. Certified installers shall provide supervisors and workers thoroughly trained in the handling and installation of products specified.

K. When required by either Contract Documents or manufacturer’s requirements, provide an authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products. Provide manufacturer’s review and inspection to verify that installation satisfies manufacturer’s installation and warranty requirements. If required by manufacturer, provide compensation to manufacturer for costs and expenses of site visits and inspections at no additional cost or time to Contract. Patch and repair any destructive analysis requested and required by manufacturers at no additional cost or time to Contract.
L. Before installing any portions of the actual work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect 7 (seven) days in advance of dates and times when mockups will be completed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction. Reconstruct mockup as necessary to obtain Architect's approval.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
6. Construct mockups of identical materials to be used in construction, throughout mockup.
7. Coordinate with all necessary trades to construct mockup to reflect actual construction. Obtain materials, and services and other trades to participate in mockup construction so mockup reflects construction and conditions proposed in finished work in all respects including but not limited to supporting structure, substrates, flashings, underlayments, attachments, backing and finished materials.
8. Architect’s review and comment, or no comment of mockup, does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work, whether noted or not noted in mockup, are contractor’s responsibility and must be corrected at no additional cost or time to Contract.
9. Demolish and remove mockups that are not included in the work.
10. Use workers trained and experienced in each particular trade required to construct each element of the mockup.
11. Indicate location of all mockups on record drawings.

M. Any additional work beyond that specified or illustrated, or any modifications thereto, that are necessary for the furnishing of required warranty shall be provided by the contractor without additional cost to the Owner.

N. Contract Documents may require that certain construction activities be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and the assignments are requirements over which the contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the contractor. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirement for specialists shall not supersede building codes and regulations governing the work.

1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
2. Use of titles such as “carpentry” is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
3. Requirement for specialists shall not supersede building codes and similar regulations governing the work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

O. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

P. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion and disfigurement.
Q. Furnish without extra charge any material and labor required in order to comply with jurisdictional authorities, applicable codes and regulations, and referenced standards.

R. Contractor has overall responsibility for all subcontractors, materials suppliers and others providing goods and services to and through the contractor under the Contract.

S. Contractor shall require all subcontractors, trades, crafts and suppliers to coordinate their portion of work with the contractor’s field superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.

T. Contractor shall coordinate and schedule work under the Contract with work being performed for project under separate contracts by Owner, serving utilities and public agencies. Contractor shall make direct contacts with parties responsible for work of the project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

U. The applicable edition of all codes shall be that adopted at the time of issuance of permits by the authority having jurisdiction and shall include all modifications and additions adopted by that authority. The applicable date of laws and ordinances shall be that of the date of performance of the work.

1.6 Quality Control

A. Owner will hire an independent testing agency to conduct tests, sampling, and testing of materials. Selection of material to be tested shall be by the agency or the IOR and not by contractor. Owner will engage a qualified testing agency and special inspectors to conduct special tests and inspections required by authorities having jurisdiction. Special inspections are indicated in the Contract Documents. Procedural and acceptance criteria shall be as set forth in the California Building Standards Administrative Code and as set forth in the California Building Code. Testing and inspections shall meet requirements of CBC 17A.

B. Travel, lodging and meal costs related to any and all off-site material and/or product fabrication testing and/or inspection required by the Contract Documents, DSA, State or Local codes and regulations, in excess of a 50 mile radius from the project site, related to this Contract, shall be paid for by contractor.

C. Owner will directly reimburse testing agency for all costs for all Building or Fire Official required tests and inspections, but may be reimbursed by contractor for such costs as noted in related sections of the Contract Documents.

1. Contractor will reimburse Owner or directly reimburse testing agency for all costs for retesting required by failed tests as set forth in Sections 4-333(c) and 4-335(c) of the California Building Standards Administrative Code.

2. Contractor will reimburse Owner for testing services requested by contractor which are beyond the scope of the work.

D. Independent testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the work.

E. Independent testing agency shall not perform any duties of contractor.

F. Contractor shall notify the Owner a sufficient time in advance of the manufacture of material to be supplied by contractor as required under the Contract Documents, which must by terms of the Contract Documents be tested, in order that the Owner may arrange for the testing of same at the source of supply. Contractor will supply and otherwise make materials to be tested available to the testing agency in time to receive results and make necessary corrections and retest, in order to not impact the project schedule.
G. Any material shipped by contractor from source of supply prior to having satisfactorily passed required testing and inspection shall not be incorporated into the work.

H. Where indicated, engage a factory-authorized service representative to inspect substrates, field-assembled components and equipment installation, including service connections. Report results in writing to Owner and Architect.

I. Regardless of whether original tests or inspections were contractor’s responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced work that failed to comply with Contract Documents.

J. Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at project site.
8. Make construction materials available to testing agency for testing.

K. Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. Schedule time for tests, inspections, obtaining samples, and similar activities.

1. By advanced discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings. Provide all required time within the construction schedule.
2. When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the work, all extra charges for testing attributable to the delay may be back-charged to the contractor and shall not be borne by the Owner.
3. All overtime costs required for testing and inspection shall be paid by Owner and deducted from monies due the contractor.

L. Local legally constituted public authorities having jurisdiction over this construction, the IOR, the Owner and their designated representative shall be the only authorized persons empowered to direct tests to be made when it appears to be necessary to determine compliance or non-compliance to the requirements of the work.

M. Contractor shall assist in all tests and inspections required by authorities having jurisdiction over the work under this Contract, including those required by Division of the State Architect (DSA), Public Works Department, Fire Department, Health Department and similar authorities having jurisdiction. Such assistance shall include notification of the Project Inspector when the work is ready for inspection or re-inspection.

N. If the contractor elects to change material sources after mix designs, formulations and fabrications have been established, the contractor shall reimburse the Owner for all costs incurred in the re-testing of materials and the re-design and review of mixes, formulations and fabrications.
O. Provide such other testing and inspecting as are specified to be furnished by the contractor in this Section and/or elsewhere in the Contract Documents.

P. Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.

Q. Contractor shall ensure that products, services, workmanship and site conditions comply with requirements of the Drawings and Specifications by coordinating, supervising, testing and inspecting the work and by utilizing only suitably qualified personnel.

R. When no quality basis is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the project, for similar projects and in compliance with applicable codes, laws, rules and regulations of authorities having jurisdiction.

S. Contractor shall employ and assign knowledgeable and skilled personnel as necessary to perform quality control functions to ensure that the work is provided as required.

T. Contractor shall coordinate and schedule field quality control activities of Owner’s independent testing and inspection agency and inspectors from authorities having jurisdiction. Contractor shall provide 48 hours minimum notice in advance of expected time of operations which require testing and inspection.

U. Work shall be subject to verification of quality by Owner, Architect, other responsible design professionals, authorities having jurisdiction, serving utilities and product manufacturers, in accordance with provisions of the Conditions of the Contract and requirements of product manufacturers.

V. Contractor shall provide all information and assistance necessary for verification of quality, including that by and from subcontractors, fabricators, materials suppliers, manufacturers, installers, applicators and others performing work. Such verification may include observation, inspection and testing at mill, plant, shop or project site locations where products for the work are manufactured, fabricated or assembled.

W. Employment of independent testing laboratory, including Project Inspector, and observations by Owner, Architect and Architect’s consultants shall in no way relieve contractor of duties and responsibilities to perform work in full conformance to all requirements of Contract Documents and applicable Building Code and other regulatory requirements.

PART 2 - Products (Not Used)

PART 3 - Execution

3.1 Testing and Inspection Log

A. Maintain a testing and inspection log at project site. Post changes and modifications as they occur. Provide access to log by Architect, IOR and Owner.

3.2 Repair and Protection

A. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

   1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.
C. Repair and protection are contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.3 Test Reports

A. One copy of each test report shall be forwarded directly to Owner, Inspector of Record, Architect, structural engineer, construction manager and contractor by the testing agency. Such 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 shall also be reports. Reports shall show that the material or materials were sampled and tested in accordance with the requirements of CBC, Title 24, Parts 1 and 2, and with the approved Contract Documents. Test reports shall show the specified design strength. Test reports shall also state whether or not material or materials tested comply with the specified requirements as set forth in Section 4-335(d) of the California Administrative Code, Title 24.

3.4 Verification of Test Reports

A. Testing agency shall submit to DSA a verified report, in duplicate, covering tests that were performed by that agency during the progress of the work. Additional copies of each test report shall be forwarded directly to Owner, Architect, contractor, project inspector, construction manager, and structural engineer by the testing agency. Such reports shall be furnished each time construction on the work is suspended, covering tests up to that time, and prior to Final Completion of the work, covering all tests as set forth in Sections 4-335(e) and 4-336 of the California Administrative Code, Title 24, Part I.

3.5 Site Visitations

A. Owner, Architect and IOR shall have access to the site at all times, to all parts of the work and to all shops/warehouses where materials or work is in preparation, fabrication or storage.

B. Owner, Architect and IOR shall have the right to reject materials and workmanship deemed defective Work, and to require their correction. Rejected work and materials shall be corrected in a satisfactory manner without charge to Owner. If contractor does not correct rejected work within a reasonable time, fixed by written notice and in accordance with the terms and conditions of the Contract Documents, Owner may correct rejected work and recover design, engineering, repair, replacement and administrative costs through deductive change order.

C. The Owner at any time prior to Final Completion reserves the right to make an examination of work already completed by removing work in place. The contractor shall, on request, promptly furnish all necessary facilities, labor, and materials. If work is found to be defective in any respect due to the fault of the contractor all expenses of such examinations and of satisfactory reconstruction will be at the contractor's expense. If work is found to meet the requirements of Contract Documents, the additional cost of examination and replacement shall be paid for by Owner.

D. Should Architect or Owner determine that it is not feasible or in Owner’s interest to require non-conforming work to be repaired or replaced, and should non-conforming work not be in conflict with the requirements of authorities having jurisdiction, an equitable reduction in Contract Sum shall be made by agreement between Owner and contractor. If equitable amount cannot be agreed upon, a Construction Change Directive will be issued and the amount in dispute resolved in accordance with applicable provisions of the Conditions of the Contract.

E. Contractor is responsible for compliance with all applicable local, state, and federal codes, regulations, ordinances, restrictions, and requirements.
F. Acceptance of non-conforming work, without specific written acknowledgement and approval of the Owner and, as applicable, authorities having jurisdiction, shall not relieve the contractor of the obligation to correct such work. Once discovered, contractor shall correct and modify work to bring it into compliance with Contract Documents at no additional cost or time to Contract.

G. Architect and Architect’s consultants will not accept any work not produced in full conformance with the Contract Documents and the requirements of authorities having jurisdiction, whether known or unknown by Architect or Architect’s consultants.

3.6 Special Inspector

A. Special Inspector:

1. As set forth in Section 4-333© of the California Building Standards Administrative Code.
2. As set forth in CBC Section 1701A.5, 1704A.1.

3.7 Inspector of Record

A. Project Inspector of Record (IOR), employed by the Owner in accordance with requirements of California Code of Regulations, Title 24, will be assigned to the work.

1. Project inspector shall be approved by Architect, Structural Engineer, and DSA.
2. As set forth in Section 4-333(b) of the California Administrative Code, Title 24, Part I.
3. Duties of Project Inspector are specifically defined in Section 4-342 of the California Administrative Code, Title 24, Part I.

B. The work shall be subject to the personal continuous observation of the IOR. He shall have free access to any or all parts of the work at any time.

C. Inspection of work shall not relieve contractor from obligation to fulfill all of the terms and conditions of the Contract Documents.

D. Contractor shall be responsible for scheduling times of inspection, tests, sample taking, and similar activities of the work. Provide 48 hour minimum notice to IOR and testing laboratory for tests and inspections.

E. All work must be inspected and approved by IOR prior to being covered by other work.

F. Excessive costs for the Project Inspector beyond normal services shall be charged to the contractor.

3.8 Tests and Inspections

A. The following tests and inspection requirements are based on the 2013 California Building Code, Part 2 of the California Code of Regulations, Title 24, California Building Standards Code, and (2006 International Building Code (IBC) with California Amendments).

B. Required tests and inspections include but are not limited to the following.

1. See CBC, project DSA Testing and Inspections form, and Divisions 2 through 16 Sections for additional information.

C. Light Weight Metals: CBC, Chapter 20A.

1. Materials:

2. Inspection:
   a. Welding: .

End of Section 01 40 00
SECTION 01 42 00 - References

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 Definitions

A. Basic Contract definitions are included in the Conditions of the Contract.

B. Approved Equal or Equal: As approved and accepted by the Architect and Owner.

C. Approved: The term “approved” or “approved as noted,” where used in conjunction with action on the submittals, applications, and requests, is limited to the responsibilities and duties of the Architect stated in General Conditions. Such approval shall not release the contractor from responsibility to fulfill Contract Document requirements, unless otherwise provided in the Contract Documents.

D. As Necessary: Essential to completion of work.

E. As Required: As demanded by Contract Documents.

F. As Selected, As Approved, As Directed: Or words of similar import mean as selected by, as approved by, or as accepted by the Architect. No implied meaning shall be interpreted to extend Architect’s responsibility into the contractor’s area of construction supervision.

G. As Shown, As Detailed: And words of similar import mean as indicated on the Drawings.

H. Building Department, Authorities Having Jurisdiction: All agencies, individually or collectively, charged by statute with administration/enforcement of requirements of the Building Code and other jurisdictional requirements at project location.

I. Concealed: Embedded and/or hidden in masonry, concrete or other construction, installed within furred spaces, within a wall/partition or above ceilings, in trenches, in crawl spaces, or other enclosures.

J. Days: Calendar days in every case.

K. Directed: Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “required,” and “permitted” mean “directed by the Architect through the construction manager,” “requested by the Architect through the construction manager,” and similar phrases. However, no implied meaning shall be interpreted to extend the Architect’s responsibility into the contractor’s area of construction supervision.

L. Division: Part of these Specifications except where obvious intent is the act or process of dividing. Divisions are groups of related Sections.

M. Equipment: Means a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

N. Exposed: Not installed or concealed as defined above.
O. Exterior: A space which does not meet the definition for "interior" above.

P. Fabricated: Items specifically assembled or made out of selected materials to meet individual design requirements for the project.

Q. Furnish: Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.

R. Indicated: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

S. Install: Operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

T. Installer: An entity engaged by the contractor either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform. The term “experienced,” when used with the term “installer” means having a minimum of five (5) previous projects similar in size and scope to this project, and familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.

U. Interior: A space completely enclosed by walls, solid door(s), floor and ceiling.

V. Manufactured: Applies to standard units or articles usually mass-produced.

W. Manufacturer’s Directions: Manufacturer’s written instructions, recommendations, specifications for use and installation.

X. Materials: Products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of work.

Y. Named Products: Items identified by manufacturer’s product name, including make or model designation, indicated in manufacturer’s published product literature current as of the date of the Contract Documents.

Z. Product(s): Materials, systems, and equipment, and terms of similar intent.

AA. Project Site: Space available for performing construction activities. The extent of project site may or may not be identical with the description of the land on which project is to be built.

BB. Provide: Furnish and install, complete and ready for the intended use.

CC. Regulations: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the work.

DD. Section: A distinct part of these Specifications, except where obvious intent is one of several components, a piece. Section is usually a basic unit of work.

EE. Shall: Is mandatory.

FF. Submit, Submittal: Furnish to Architect for review, unless otherwise stated.
GG. Testing Laboratories: An independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere and to report on, and, if required, to interpret, results of those inspections or tests.

1.3 Industry Standards

A. Unless the Contract Documents include more stringent requirements, applicable reference standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. In case of conflict between performance standard or regulation and contract documents provide more expensive requirement at no additional cost to Owner.

B. Comply with referenced standards in effect as of date of the Contract Documents. Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.

C. Comply with all conditions of approval from governing authorities.

D. In case of conflict between reference standards or reference standards and governing authorities, provide the most expensive requirements, at no additional cost to Owner.

E. The contractual relationship and responsibilities of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

F. Each entity engaged in construction on project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source. Maintain a copy of all applicable regulations and reference standards at the project site.

G. In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.

H. Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified on the Drawings or in the Specifications, provide the highest, best and greatest of the alternatives or options for the intended use and prevailing conditions.

I. Where abbreviations and acronyms are used in Contract Documents, they shall mean the recognized name of the entities in the following list. This list is not inclusive of all organizations.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI</td>
<td>ACI International (American Concrete Institute)</td>
</tr>
<tr>
<td>AISC</td>
<td>American Institute of Steel Construction</td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute</td>
</tr>
<tr>
<td>AITC</td>
<td>American Institute of Timber Construction</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
</tbody>
</table>

References
01 42 00 - 3
APA - APA - The Engineered Wood Association
ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM - American Society for Testing and Materials International
AWS - American Welding Society
CBC - California Building Code
CEC - California Electric Code
CENC - California Energy Code
CFC - California Fire Code
CGBS - California Green Building Standards
CMC - California Mechanical Code
CPC - California Plumbing Code
CRSI - Concrete Reinforcing Steel Institute
DHI - Door and Hardware Institute
FED-STD - Federal Standard
FS - Federal Specification
MILSPEC - Military Specification and Standards
NES - National Evaluation Service (See ICC-ES)
NFPA - National Fire Protection Association
NRCA - National Roofing Contractors Association
SMACNA - Sheet Metal and Air Conditioning Contractors' National Association
TCA - Tile Council of America, Inc.
UL - Underwriters Laboratory
WI - Woodwork Institute

PART 2 - Products (Not Used)

PART 3 - Execution (Not Used)

End of Section 01 42 00
SECTION 01 50 00 - Temporary Facilities and Controls

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 31 00 “Project Management and Coordination.”
2. Section 01 32 33 “Photographic Documentation.”
3. Section 01 40 00 “Quality Requirements.”
4. Section 01 57 23 “Storm Water Pollution Prevention.”
5. Section 01 60 00 “Product Requirements.”
6. Section 01 73 00 “Execution Requirements.”
7. Section 01 73 29 “Cutting and Patching.”
8. Section 01 74 19 “Construction Waste Management.”
9. Section 01 77 00 “Closeout Procedures.”
10. Section 32 12 16 “Asphalt Paving.”

1.2 Use Charges

A. Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner’s construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Coordinate with owner to determine point of connection.

C. Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. Coordinate with owner to determine point of connection.

D. Submit temporary utility reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.3 Quality Assurance

A. Comply with NECA, NEMA, ANSI A10.6, NFPA 241 and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Comply with industry standards and applicable laws and regulations of the authorities having jurisdiction, including but not limited to:

1. Cal OSHA.
2. Building Code requirements.
3. Health and safety regulations.
4. Utility company regulations.
5. Police, Fire Department and Rescue Squad rules.

D. Refer to “Guidelines for Bid Conditions for Temporary Job Utilities and Services,” prepared jointly by AGC and ASC, for industry recommendations.

E. Contractor is responsible for providing all materials and methods necessary for temporary facilities, controls and protection that are necessary to complete the work.

1.4 Project Conditions

A. Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. Provide barricades to protect pedestrian traffic around site.

C. Respond to complaints from Owner within 48 hours.

D. Provide immediate written RFI summarizing complaints received directly from neighbors, adjacent buildings, users or pedestrians.

E. Keep temporary services and facilities clean and neat in appearance. Maintain facilities in good operating condition until removal. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.

F. Contractor is responsible for site, building and individual room security, and security to all areas of work. In the event of loss or damage, promptly restore temporary construction facilities and controls by repair or replacement at no change in the Contract Sum or Contract Time.

   1. Provide security program and facilities to protect work from unauthorized entry, vandalism, and theft.
   2. At contractor’s discretion, employ guards to protect the site after working hours.

G. Relocate temporary services and facilities as required by progress of the work.

PART 2 - Products

2.1 Materials

A. Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended. Not all materials that may be necessary are listed in this Section.

B. Comply with Sections 32 12 16 “Asphalt Paving.”

C. Portable Chain-Link Fencing: Minimum 2-inch, 9 Ga., galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide privacy screen in fence and gates. Contractor is responsible for realigning, relocating and reestablishing temporary fence, privacy screen, and gates as required to accommodate access, circulation and progress of work.
D. Provide necessary construction grade lumber and CDX plywood in sizes and thickness needed.

E. Provide half inch regular gypsum board as needed.

F. Provide materials as indicated for temporary construction sign.

G. Provide 10-mil minimum polyethylene sheeting as needed to protect and screen work.

H. Provide paint as needed to comply with VOC requirements.

I. Provide sandbags as required.

J. Provide First Aid supplies. Comply with governing regulations and recommendations of the National Red Cross.

K. Provide security hardware and locks to secure the site and building. Coordinate with Owner on keying requirements and timing for change out.

L. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

M. Provide rubber hoses as necessary to serve project site.

2.2 Temporary Enclosures

A. Prefabricated occupiable units with serviceable finishes, lockable entrances, operable windows, heating and air conditioning temperature controls, and foundations adequate for normal loading.

B. Provide storage sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. Keep materials dry at all times.

C. Single-occupant self-contained toilet units of chemical, aerated re-circulation or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

D. Provide a mobile contractor’s field office of weather-tight construction, with lighting, power, ventilation, heating and cooling to house contractor.

1. Field office shall have private office for contractor’s superintendent.
2. Field office shall have space for project meetings, with table and chairs to accommodate a minimum of 12 persons.
3. Contractor shall ensure that neither contractor’s field office nor other jobsite facilities are used for living quarters.
4. Contractor’s field office shall present neat, business-like appearance at all times, internally and externally.
5. Provide field office with, but not limited to, the following:
   a. Phone service.
   b. Electrical power.
   c. High speed internet connection.
   d. Computer, fax, telephone, furnishings, etc. for a complete functional environment.

6. Provide trailer skirting, tie-downs, and “fall-stop” seismic anchoring.
7. Provide secure doors and windows. Provide steel security bars on all windows, releasable from inside for emergency egress.
8. Provide blinds on all windows.
E. The contractor shall provide a temporary office for the IOR to be located as directed by the IOR and to be maintained until removal is authorized by the Owner. This office shall be of substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. The door shall have a deadbolt lock. A table satisfactory for the study of plans and two chairs shall be provided by the contractor. The contractor shall provide and pay for adequate electric lights, private local telephone service with a loud exterior bell with disconnect switch, internet DSL service, fax machine with active line, and adequate heat and cooling for this field office until the completion of the Contract.

2.3 Equipment

A. Provide new equipment suitable for intended use.

B. Provide portable, hand-carried, UL rated fire extinguishers; with class, & extinguishing agent and in quantity & location as required by fire authority. Provide and maintain fire extinguishers in wood construction regardless of Fire Authority requirements. Provide extinguishers for all construction areas, storage areas and enclosures, temporary offices and similar spaces.

C. Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Provide heating units listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   3. If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV 8 (eight) at each return air grille in system and remove at end of construction. Verify that existing system can drain air through filter without undue stress on existing fans and motors.

D. Locate, place and use equipment so as not to impose excessive loads on supporting walls, floors, roofs and structures.

PART 3 - Execution

3.1 Installation, General

A. Locate temporary facilities where they will serve project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required by progress of the work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. If contractor’s materials are stockpiled in unapproved areas or creating interference or obstruction with the work of others, or if they are overloading the structure, then at the discretion of the Owner’s representative, the contractor shall be required to relocate these materials at contractor’s expense. If materials are not relocated in the specified time, the Owner reserves the right to move such materials and charge the contractor through deductive change order.

3.2 Temporary Utility Installation

A. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Provide 5 day minimum prior notice to Owner of any utility interruptions.
B. Provide temporary utilities to remove effluent lawfully.

C. Provide water service and distribution system in sizes and pressures adequate for construction.

D. Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

E. Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

F. Provide temporary ventilation, heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction or existing facilities from adverse effects of high or low temperatures or high or low humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Maintain a minimum temperature of 50° F in permanently enclosed portions of building for normal construction activities, and minimum 65° F for finishing activities and areas where finished work has been installed. Coordinate requirements to produce necessary ambient conditions to meet Contract requirements and minimize energy consumption.

G. Permanent heating and cooling equipment may be used after completion, testing and inspection of systems and approval of code authorities having jurisdiction.

1. Prior to operation of permanent heating equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place.
2. Contractor shall provide and pay for operation, maintenance and regular replacement of filters and worn or consumed parts.
3. Immediately prior to Substantial Completion review, change disposable filters and clean permanent filters of equipment used during construction.

H. Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

I. Provide weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Install temporary electric power service underground.

1. Provide properly configured, NEMA-polarized electrical outlets to prevent insertion of 100- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
2. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
3. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

J. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, emergency exiting and traffic conditions. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system. Provide the following minimum temporary lighting:
1. Provide one 100-W lamp per 500 sq. ft. uniformly distributed, for general lighting, or equivalent illumination.
2. Provide one 100-W lamp every 50 feet in traffic areas.
3. Provide one 100-W lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
4. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility where the work is being performed.

K. Provide temporary telephone service in common-use facilities. Install a minimum of one (1) telephone line for each field office.

1. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
3. Provide one (1) telephone line for IOR office.
4. Provide temporary electronic DSL communication service, including electronic email in each field office.
5. Provide temporary electronic DSL communication service, including electronic mail in each IOR office.

3.3 Support Facilities Installation

A. Provide construction offices, shops, and sheds; locate per construction plan. Supply and install a standalone security system which consists of, at a minimum, one electronic entry pad, three (3) motion sensors and both interior and exterior audible horns for the temporary contractor’s field office and the temporary office for the IOR.

B. Erect and install IOR office.

C. Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
2. Recondition temporary use and road areas, including removing contaminated material, regrading, proofrolling, compacting, and testing.
3. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Asphalt Paving Specifications.
4. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

D. Comply with traffic control requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
3. Provide Owner and authorities having jurisdiction with a minimum 7 day notice of traffic/street closure and re-routing. Coordinate with all parties concerned on allowable and preferred closure times.
4. Provide necessary traffic control including flag person. Coordinate with requirements of jurisdictional authority for traffic control requirements.

E. Provide temporary onsite parking areas for construction personnel.
1. Do not park on public roadways unless approved by local police authorities.
2. Maintain clear access ways and parking for emergency vehicles, as required by local police and fire authorities.
3. Keep parking areas clear of construction debris, especially debris hazardous to vehicle tires.

F. Comply with requirements for dewatering and drainage by authorities having jurisdiction. Maintain project site, excavations, and construction free of excess water.
   1. Dispose of rainwater in a lawful manner per requirements of authorities having jurisdiction that will not result in flooding project or adjoining properties nor endanger permanent work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.
   3. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
   4. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff or stormwater from heavy rains.
   5. Provide necessary temporary pumps, piping, and filters required to keep excavations dry and free of excess water.
   6. Provide necessary barriers and drainage structures to prevent any surface runoff water from reaching adjacent properties.

G. Provide project identification sign as indicated on drawings and other temporary signs that may be necessary for completion of the work. Locate temporary signs to inform public and individuals seeking entrance to project and warning signs to keep unauthorized people from entering site. Provide additional temporary signs as required by Owner and jurisdictional authorities.
   1. Provide temporary, directional signs for construction personnel and visitors.
   2. Maintain and touchup signs so they are legible at all times.

H. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Locate per construction plan.

I. Provide facilities necessary for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Use of Owner's existing elevators will be permitted, as long as elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required at no additional cost to Owner.

K. Use of Owner's existing stairs and roof access ladder will be permitted, as long as stairs and roof access ladder are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work at no additional cost to Owner.

L. Cover finished permanent stairs with protective covering of rosin paper, plywood or similar material so finishes will be undamaged at time of acceptance.
M. Provide street sweeping and clean-up to keep adjacent public ways, streets and sidewalks clean. Clean-up all trash, waste, material and soil debris trails on public ways and streets as a result of the work. Trucks hauling soil, gravel and other loose material must be wetted and covered.

3.4 Security and Protection Facilities Installation

A. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

B. Comply with Owner’s requirements for using and protecting walk-ways, loading docks, building entries and other building facilities during selective demolition operations.

C. Install temporary fencing located outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. Before deep foundation work has been completed, engage pest-control service to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

E. Before construction operations begin, furnish and install secure site enclosure fence in a manner that will prevent unauthorized people and animals from easily entering site.

1. Enclose entire project area to accommodate construction operations including office, storage and staging areas and personnel parking.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
3. Provide lockable entrances to work areas to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
4. Provide lockable gates in sizes and locations necessary to complete the work.
5. Contractor shall provide security fencing around complete perimeter of each work area, for the duration of the Contract.
6. Location(s) of security fencing shall be subject to review and approval of Owner prior to erection of fencing. Location of security fencing shall be determined at pre-installation meeting.
7. Time of removal of fencing shall be subject to approval by Owner.

F. Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting. Provide structurally adequate, protective, covered walkway for passage of individuals where hazardous operations may occur overhead.

G. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Coordinate temporary enclosures with material installation, ventilation, drying and curing procedures.

H. Provide floor-to-ceiling temporary dustproof partitions to limit dust and dirt migration and to separate in-use occupied areas from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, over 20 gage metal studs 16" on center with fire-retardant plywood on construction operations side.
2. Insulate partitions to provide noise protection.
3. Seal joints and perimeter.
I. Provide and maintain temporary fire protection facilities of types needed to protect against reasonably predictable fire losses until permanent fire-protection needs are supplied by approved operating facilities. Comply with California Fire Code during all phases of the work.

1. Maintain, at a minimum, the work in conditions to minimize fire hazards and provide adequate fire protection devices, such as suitable fire extinguishers, blankets, warning signs and storage containers.
2. During hazardous construction activities, maintain fire protection devices immediately available for use at the location of such activities.
3. Where existing fire sprinkler system is affected by demolition and re-construction activities, provide either temporary fire protection measures acceptable to governing authorities having jurisdiction or modify existing system as necessary to maintain fire protection. Include extensions and additions to standpipe system, for Fire Department connections.
4. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
5. Store combustible materials in containers in fire-safe locations.
6. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
7. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
8. At earliest feasible date in each area of project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
9. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
10. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
11. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

J. Provide guard rails along tops of embankments and excavations. Along public walkways and areas accessible by the public, adjoining excavations, provide guardrails in addition to fencing.

1. Guardrails shall be substantially and durably constructed of lumber, firmly anchored by posts embedded in concrete, and complying with Code requirements for temporary barriers.
2. Guardrails shall comply with dimensional requirements and accommodate loads as prescribed by Code for permanent guardrails.
3. Provide guardrails at horizontal openings and deck edges.

3.5 Pollution Controls

A. Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces, public ways and areas.
C. Clean adjacent existing structures, improvements and mechanical systems of dust, dirt, and debris caused by construction operations. Return adjacent areas to condition existing before construction began.

D. Erosion and sedimentation control provisions shall meet or exceed minimum requirements of authorities having jurisdiction. Contractor shall design and provide system to prevent siltation of adjacent property as required by governing authorities having jurisdiction.

1. Implement erosion and sedimentation control provisions prior to commencing site clearing, grading, backfilling and compacting and other construction activities which will expose soil to erosion and potential for sediment-laden runoff.

2. Ensure that sediment-laden water does not enter drainage systems.

3. Maintain erosion and sedimentation control provisions until Substantial Completion review is completed for landscaping, or sooner if approved by authorities having jurisdiction.

4. Implementation, maintenance, replacement and additions to erosion and sedimentation control provisions shall solely be the responsibility of the contractor. As construction progresses and seasonal conditions dictate, more erosion and sedimentation controls may be required. If so, contractor shall provide additional provisions over and above minimum requirements as necessary.

E. Grade site and other work areas to drain:

1. Provide temporary drainage ditches and diversion measures as necessary to protect construction.

2. Provide erosion control measures as necessary and as required by authorities having jurisdiction. Comply with local water quality control requirements, as applicable.

F. Surface runoff and other waters may be encountered at various times during construction. Contractor, by signing the Contract, acknowledges that risks arising from surface runoff and other waters have been investigated and considered, and Contract Sum and Contract Time include all costs associated with runoff control.

1. It shall be responsibility of contractor to protect work from detrimental effects of all waters encountered.

2. It shall be responsibility of contractor to protect work form detrimental effects of runoff.

3. Should damage to the work due to surface or other water occur prior to acceptance of the work by the Owner, contractor shall repair or replace work at no change in Contract Time or Contract Sum.

3.6 Operation, Termination, and Removal

A. Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintain facilities in good operating condition until removal. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. At earliest feasible time, when acceptable to Owner, change over from use of temporary utilities to use of permanent service.

E. Unless Owner requires temporary facilities and measures be maintained longer; remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent
construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of contractor. Owner reserves right to take possession of project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements.
3. Remove temporary underground utility installations to a depth of 2-feet. Backfill, compact and re-grade site as necessary to restore areas or to prepare for indicated paving and landscaping.

3.7 Temporary Utilities Beyond Scheduled Contract Completion Date

A. Electrical power connections and use of building services, such as lighting and HVAC, are imperative for occupancy and operation of facilities by Owner, even if work under the Contract is not completed.

B. If permanent utility services are not complete one week prior to commencement of classes, contractor or contractor’s bonding company shall obtain, connect, monitor, maintain and pay for electrical generators to provide necessary electrical power to power building facilities for Owner’s uses.

1. Electrical generators shall remain operational until permanent power service is completed and operational, in accordance with the Contract Documents and as approved by authorities having jurisdiction, at no additional cost or time to Contract.
2. No additional time will be added to the Contract Time for electrical generators and related components.
3. Contractor shall be responsible for obtaining and paying for permits from authorities having jurisdiction, for operation of electrical generators.
4. Contractor shall remove temporary power service, including generators, the cost of which shall be included in the Contract Sum. No additional time or cost will be added to the Contract for removal of electrical generators and related components.

End of Section 01 50 00
SECTION 01 57 23 – Storm Water Pollution Prevention

PART 1 - General

1.1 Related Documents

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

B. Related Sections include the following:
   1. Section 01 31 00 “Project Management and Coordination.”
   2. Section 01 32 33 “Photographic Documentation.”
   3. Section 01 40 00 “Quality Requirements.”
   4. Section 01 50 00 “Temporary Facilities and Controls.”
   5. Section 01 73 00 “Execution Requirements.”
   6. Section 01 74 19 “Construction Waste Management.”
   7. Section 01 77 00 “Closeout Procedures.”

1.2 Definitions

A. In this Section, the term “storm drain system” shall include, but not be limited to, storm water conduits and pipes, storm drain inlets, storm drain structures, street gutters, channels and culverts, drainage swales and other type watercourses.

B. Sanitary sewer discharge regulations are intended to provide protection of the sanitary sewer system from water pollution. In this Section, “sanitary sewer” shall include, but not be limited to, any sanitary sewer manhole, clean-out, side sewer or other connection to the wastewater system.

1.3 Quality Control

A. Contractor shall prepare approved Storm Water Pollution Prevention Plan (SWPPP) in place by the time of first application for payment, and follow the approved SWPPP plans during the course of the work. It is the responsibility of the contractor to be prepared for a rain event at all times, contact weather services and to be aware of weather forecasts at all times.

B. The contractor shall immediately notify Owner and the Inspector of Record (IOR) if there is a clogged storm drain.

C. Contractor shall not allow any non-storm water to enter the storm drain system. Non-storm water includes, but is not limited to, domestic supply water used to wash streets, pavements, painting and drywall equipment, construction vehicles and other site equipment.

D. Contractor shall comply with the following applicable regulations:
   2. United States Environmental Protection Agency.
   3. Regional Water Quality Control Board, having jurisdiction.
   4. State Water Resources Control Board.
   5. Governing Agencies, Jurisdictions and Control Boards with authority over project.
   6. Comply with California “Best Management Practices” (BMP’s) with regards to storm water pollution prevention.
E. Determine the required level or risk category and comply with applicable SWPPP requirements. Determine if rainfall erosivity waivers apply based on project timing and duration.

F. Determine and account for erosivity of soil conditions. Perform a site specific sediment risk analysis.

G. Determine if site water discharge will go directly or indirectly to a sediment sensitive water body or high risk water shed.

H. Perform the following:

1. Install perimeter sediment and runoff control. Provide run on controls at site entries.
2. Cover stockpiles at end of day, during rain, and when not in use.
3. Contain portable toilets.
4. Cover waste storage at end of each day and during rain.
5. Conduct BMP’s for landscape materials, vehicle storage, fueling and washing.
6. Provide soil cover and stabilization for inactive areas.
7. Provide slope stabilization for slopes that are undisturbed for 14 days or longer. Provide slope interruption at intervals not exceeding BMP requirements.
8. Provide regular inspection, monitoring and reporting of SWPPP measures and site conditions as required by authorities having jurisdiction.
9. Provide NAL and NEL numeric limit sampling and testing at a rate and location required for risk level by authorities having jurisdiction. Report all violations and exceedences as required by authorities having jurisdiction.
10. Provide personnel to perform SWPPP requirements who have documented training to perform such duties.
11. SWPPP plans must be prepared by a qualified registered professional with documented SWRCB sponsored training, taught by a trainer of record.

1.4 Submittals

A. Submit the Storm Water Pollution Prevention Plan (SWPPP) and documents for this project to the Owner.

B. Make all necessary submittal revisions to the SWPPP as requested or required by the Owner’s SWPPP Consultant.

C. Submittal documents shall have the following information clearly shown:

1. Pollution sources that may affect the quality of storm water discharges associated with construction activity from the construction site.
2. Identify storm water pollution prevention measures to reduce pollutants in storm water discharges from the construction site, both during construction and after construction is completed.
3. The plan shall include a site map and written plan that describes pollution sources for the construction activity and the methods that will be used for erosion and sediment control, materials management, and any other construction activity that are sources of storm drain pollution.
4. Submittal documents shall be provided with a map of the site that shows, at a minimum, the following data and information:
   a. Drain inlet locations.
   b. Direction of storm water flow.
   c. Sources of sediment (e.g., areas of disturbed soil, concrete work, saw cutting), or other pollutant materials.
   d. Excavations and pits.
   e. Bore hole de-watering and sediment settling or filtering areas.
f. Erosion and sediment control measures.
g. On-site soils movement and storage.
h. Site ingress and egress management to prevent mud tracking onto roadways.
i. Storm drain inlet protection.
j. Construction materials storage, including but not limited to pollutant materials such as petroleum products.
k. Concrete and mortar work.
l. Sanitary sewer discharge point identification.
m. Vehicle washing/equipment cleaning.
n. Building wash or hydro-blasting water management.
o. Inspection, monitoring and maintenance of control structures.
p. Spill prevention and control.
q. Water main break contingency plan.
r. House keeping practices.
s. Personnel training.
t. List of contractors and phone numbers.
u. Other appropriate site-specific storm drain pollution prevention methods necessary to achieve the requirements of Storm Water Pollution Prevention
v. Submit Best Management Practices and Post Construction Storm Water Management Practices and how these Practices will be performed, implemented and achieved during construction of the project.

D. SWPPP Agency and Control Board Submittals and Approvals:

1. Pay for all fees, including review and permit fees, associated with securing all agency approvals.
2. The submittal documents shall be approved by the Governing Agencies prior to any disturbance of the project site. The contractor shall make timely submittals to ensure that no project delays occur.

PART 2 - Products

2.1 General

A. Provide all necessary, appropriate and required materials for complete and total execution and compliance with the SWPPP.

B. The SWPPP program measures shall be set-up and in place prior to any disturbance of the project site. The contractor shall ensure all measures are in place in a timely manner to ensure that no project delays occur.

PART 3 - Execution

3.1 General

A. The contractor shall make amendments to, revise, update, submit for approval, and implement the Storm Water Pollution Prevention Plan (SWPPP) for this project. The contractor shall also provide a site map and written description of pollution prevention methods to be used. The contractor shall choose the best available performance based technology and methods that are acceptable to authorities having jurisdiction and meet SWPPP requirements to prevent storm water pollution for construction site activity. The method(s) chosen shall be appropriate for each specific site condition.
3.2 Site Map and Plan

A. Provide a map of the site that shows direction of storm water flow and sources of sediments. Estimate the storm water flow onto the site and groundwater flow that may enter site excavations.

B. Show location of drain inlets, materials storage areas, raw materials storage area, soil pile locations, ingress/egress, sediment settling tank or ponds, and storm water diversions, or other storm water pollution prevention devices or pollution sources as needed. The plan shall describe in detail how pollution prevention systems will be constructed and maintained. The map and plan shall be used and updated to reflect changes as the project progresses. The map and plan shall be posted onsite in a visible location.

3.3 Dewatering

A. If storm water or ground water in site excavations or drilled holes (e.g., trenches, pits, pier holes, footings), needs to be removed, it shall be made clean by filtering, settling, or other method capable of removing solids from this water prior to discharge to the storm drain system. The contractor shall ensure that this discharge complies with all applicable provisions of the SWPPP requirements.

B. If excavation water is domestic water supply, or the water is contaminated with a pollutant substance, the contractor shall notify the Owner and dispose of the pollutant materials according to requirements of the Governing Agencies having Jurisdiction.

C. For disposal authorization, the contractor shall contact the Owner to determine the discharge requirement. The Owner will establish the discharge requirements and the necessary action to be taken by the contractor.

D. If the contractor suspects the presence of contaminated ground water, or domestic supply water, the contractor shall immediately notify the Owner and the Owner’s SWPPP Consultant for the necessary action to be taken by the contractor. The contractor shall not attempt to pump out or treat any material suspected of containing a hazardous material or petroleum product.

3.4 Description of Erosion and Sediment Control Measures

A. Provide a description of erosion and sediment control measures that will be used on the site, and correlate the description with the site map (may be listed on the map in a comments section). Areas requiring erosion control measures are exposed soil, such as soil piles, bare soil, sloped soil, and any area of disturbed soil.

B. Erosion control measures shall include, but not be limited to, paving, tarp placement, soil blankets, mulching, seeding, hydro-mulching, and spreading straw. Sediment control measures include drain inlet protections, filter fabric, geo-textile silt fencing, gravel placement, gravel or sand-bag placement, and wattle placement.

C. Both erosion and sediment control practices shall be designed to be implemented as an integrated system of pollution control.

3.5 On-site Soils Movement and Storage

A. The contractor shall implement proven methods to prevent erosion from soils stored on site.

3.6 Site Ingress and Egress Management to Prevent Mud Tracking

A. The contractor shall ensure that mud is not tracked from the site onto public roads.
3.7 Storm Drain Inlet Protection

A. The contractor shall protect storm drain inlets from receiving sediment or debris from the construction site.

3.8 Construction Materials Storage

A. Storage and exposure of raw materials, byproducts, finished products, and pollutant materials and containers shall be controlled as described below:

1. All construction materials shall be stored at least ten feet away from storm drain system inlets, catch basins, and curb returns.
2. The contractor shall not allow any material to enter the storm drain system.
3. At the end of each working day, the contractor shall collect and prepare for disposal all scrap, debris, and waste material generated by project activities.
4. During wet weather or when rain is in the forecast, the contractor shall store materials that can flow or be transported by storm water inside a building or under a secured waterproof covering to prevent accidental release to the storm drain system, (e.g., use sealed debris bins in rainy weather.)
5. The contractor is responsible for ensuring that storage and disposal of all pollutant materials brought on site for this project (e.g., coatings, thinners, solvents, and fuels), and all waste generated during project activities (e.g., waste oil) is in compliance with all applicable Federal, State and Local Standards and Requirements.
6. Liquid materials shall be stored in secondary containment. The containment shall be designed to hold at least 110% of the volume of the largest stored container.

3.9 Concrete and Mortar Work

A. For concrete or mortar application to be performed on site (if any,) the contractor shall comply with the following provisions:

1. Washing sweepings of exposed aggregate concrete into the street or storm drain system is prohibited. Collect and return sweepings to aggregate base stockpile, or dispose of as construction debris.
2. Do not wash out concrete trucks and equipment into the storm drain system. Whenever possible, perform washout of concrete trucks (if any) and equipment off-site where discharge is controlled.
3. If on-site washout of trucks and equipment is necessary, then the contractor shall comply with the following procedures:
   a. Locate washout area at least 50 feet from storm drains, open ditches or water bodies, preferably in a dirt area.
   b. Do not allow storm water run-off from the washout area.
   c. Construct a temporary pit or berm area large enough to contain the wash water and surplus concrete waste.
   d. Wash out concrete waste into the temporary pit where the concrete can set, be broken up, and then disposed of as construction debris.

3.10 Vehicle Washing and Equipment Cleaning

A. The contractor shall not perform vehicle cleaning on site, unless a properly designed wash area prevents run-off from entering the storm drain system. Domestic water supply is prohibited from entering the storm drain system.

B. The contractor shall dispose of wash water from the cleaning of non-hazardous water-based coating equipment (such as latex paints or drywall compounds) and tools to the sanitary sewer. Unused latex
paint, oil based paint, used or new paint thinner and solvents are prohibited from disposal to the sanitary sewer and the storm drain system. The contractor shall dispose of these wastes in accordance with Federal, State and Local Hazardous Waste and Solid Waste Regulations.

3.11 Inspection, Monitoring and Maintenance of Pollution Control Systems

A. Inspect the site before, after, and during storm events and daily during the project work to ensure that storm drain pollution prevention controls are in place. Provide documentation to the construction manager of these inspections.

3.12 Spill Prevention and Control

A. The contractor shall take precautions to prevent accidental spills of pollutants, including hazardous materials brought onsite by the contractor. However, in the event of a spill, the contractor shall be responsible for the following:

1. Immediately contain and prevent leaks and spills of prohibited pollutants from entering the storm drain system. Clean-up the spill and label the container. Store the container in a safe place and contact the Capital Projects manager to arrange disposal of the waste. The contractor shall keep a spill kit on site at all times for this purpose.
2. Contractor shall comply with all Federal, State, and Local Hazardous Waste Requirements. Ensure that no spilled materials are washed into the streets, gutters, storm drains, or creeks.
3. Report any hazardous or unknown material spills immediately to the construction manager and Owner. If a spill occurs after hours or on a weekend, call the Local Authorities having Jurisdiction.

B. The contractor is responsible for ensuring that its employees and subcontractors (if any) working on site are aware of the location of the phone nearest the project site.

3.13 Water Main and Sanitary Sewer Line Break Contingency Plans

A. If working on or near a water main line, the contractor shall have a written emergency response plan that states procedures for responding to a break and release of supply water to the storm drain system. The contractor shall meet the following requirements:

1. Water Main Work
   a. Determine the direction of water flow if the main were to break.
   b. Build a containment berm between the work area and the storm drain inlet(s) that the water would flow into. Make the containment structure large enough to hold the water so that it can be pumped to a sanitary sewer.
   c. Build this containment structure before digging.
   d. If there is a water main break, pump the water that collects in the containment structure to a sanitary sewer.
   e. Put in place, before digging, sediment control structures upstream of drain inlets and at drain inlets.
   f. If a break occurs contact the construction manager or Inspector of Record (IOR) immediately. Include in the plan the phone numbers of the construction manager and IOR for contacting.

2. Sanitary Sewer Line Work
   a. Determine where the sewage will flow if the work could cause a blockage.
b. Build a containment structure between the work area and the storm drain inlet(s) that the sewage water would flow into. Make the containment structure large enough to hold the sewage flow so that it can be pumped to a sanitary sewer.

c. Build the containment before working on the sewer line.

d. If a sewage blockage occurs, pump it to a sanitary sewer, and do not allow it to flow into the storm drain system.

e. Put in place, before digging, sediment control structures upstream of drain inlets and at drain inlets.

f. If a sewage blockage or spill occurs contact the construction manager or Inspector of Record (IOR) immediately. The construction manager will notify the Owner’s Storm Water Pollution Prevention Plan (SWPPP) consultant for necessary action to be taken by the contractor. Include in the plan the phone numbers of the construction manager and the Owner’s SWPPP Consultant.

3. Excavation Work

a. This sub-part applies to contractors that excavate in the vicinity of sanitary sewer lines but cause or discover a sewage spill, leak or blockage.

b. Immediately notify the construction manager. The construction manager will notify the Owner’s Storm Water Pollution Prevention Plan (SWPPP) Consultant for necessary action to be taken by the contractor. Include in the plan the phone numbers of the construction manager and the Owner’s SWPPP Consultant.

3.14 Housekeeping Practices

A. The contractor shall implement the following applicable good housekeeping practices:

1. Store materials that have the potential to be transported to the storm drain system by storm runoff or spillage away from the areas of heavy traffic and under cover in a contained area or in sealed waterproof containers.

2. Use tarps on the ground to collect fallen debris or splatters that could contribute to storm water pollution.

3. Secure opened bags of powdered materials (if any) that could contribute to storm water pollution and visible dust emissions.

4. Pick up litter, construction debris, and other waste generated by project activities daily from adjacent areas, including the sidewalk area, gutter, street pavement, and storm drains impacted by the project. All wastes shall be stored in covered containers, disposed of, or recycled immediately.

5. Clean sidewalks, driveways, or other paved areas within the construction site to eliminate or prevent mud-tracking conditions. Vacuuming, power sweeping, or manual sweeping is acceptable. Dispose of sweepings in a place that will not pollute the storm drain system. Domestic water may be used but is shall be contained and directed to landscapes or the sanitary sewer. The discharge of wash-water to the storm drain system is prohibited.

6. Inspect vehicles and equipment arriving on-site for leaking fluids, and promptly repair leaking vehicles and equipment. Use drip pans to catch leaks until repairs are made.

7. Avoid spills by handling materials carefully. Keep a stockpile of appropriate spill materials, such as rags or absorbent materials, readily accessible on site. Clean up all spills of materials brought on site for project activities.

8. Train employees regularly on good housekeeping practices and procedures. Assign responsibility to specific employees for inspecting good housekeeping, and responding to spills.
3.15 Personnel Training

A. The contractor shall inform all subcontractors (if any) of the water pollution prevention requirements contained in this Specification and include appropriate subcontract provisions to ensure that these requirements are met.

B. The contractor shall train its employees working on the site on the requirements contained in this Section. The contractor shall document this training in writing. Construction manager representatives for the site will request to see the training materials and records at the onset of work.

3.16 List of Contractor’s Designated SWPPP Contacts and Phone Numbers

A. Provide a list of employees that will be responsible for revising, updating, amending, writing and implementing the SWPPP program. Make list available to the construction manager, Inspector of Record and Owner’s Maintenance Departments.

End of Section 01 57 23
SECTION 01 60 00 - Product Requirements

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 31 00 “Project Management and Coordination.”
2. Section 01 33 00 “Submittal Procedures.”
3. Section 01 40 00 “Quality Requirements.”
4. Section 01 73 00 “Execution Requirements.”
5. Section 01 73 29 “Cutting and Patching.”
6. Section 01 77 00 “Closeout Procedures.”
7. Section 01 78 23 “Operation and Maintenance Data.”
8. Section 01 78 39 “Project Record Documents.”
9. Section 01 79 00 “Demonstration and Training.”

1.2 References

A. CAL (VOC) – California Department of Health Services Standard Practice for The Testing of volatile Organic Emissions from Various Sources using Small-Scale Environmental Chambers, including 2004 Addenda.

B. GreenSeal GC-03 – Anti-Corrosive Paints; 1997.

C. GreenSeal GS-11 – Architectural Paints; 1993.


1.3 Definitions

A. Products: Items purchased for incorporating into the work. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

B. Substitutions: Are products, materials, equipment, designs and methods of construction that require a deviation from the basis of design requirements of the Contract Documents.

C. Specific manufacturer or product names noted as “or equal” “equal to” or similar language are referenced to establish minimum basis of design requirements for quality, properties, function, dimensions, operating and performance weight, performance, physical properties, appearance, maintenance, wear, warranty, material composition, finish, color and other characteristics for the purposes of evaluating comparable “or equal” products by other manufacturers. Comply with submittal requirements for submitting products on an ‘or equal” basis. Listed manufacturers are provided as a suggested guide and are not intended to limit contractor’s choices of manufacturers. Contractor is responsible for providing products that meet the basis of design in every respect and for providing all required information necessary to demonstrate compliance. Provide evidence of compliance with basis of design requirements in required submittal.
D. Descriptive, performance, and reference standard requirements in the Specifications establish “salient characteristics” of products. Where Specifications require compliance with performance requirements, provide products that comply with or exceed requirements, and are recommended by the manufacturer for application indicated. General overall performance of a product is implied where the product is specified for a specific application. Manufacturer’s recommendations may be contained in product literature, or by manufacturer’s certification of performance.

E. Where products are required to match existing in place products, products provided must match existing products in every respect including but not limited to, color, pattern, texture, finish, sheen, size, thickness, weight and attachment method.

1.4 Substitution Request Documentation

A. Read Article 30. SUBSTITUTIONS in General Conditions.

B. Submit three copies of each substitution request to the Architect for consideration. Identify product, materials, fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Type written form, acceptable to Architect, showing substitution request identification number, summarize and list each item of content. Include statement on form that contractor has reviewed contents of substitution request and has found it to be in compliance in all respects, and is equivalent to or superior with the requirements of the Contract Documents, including material and installation requirements. Contractor shall sign form stating that the substitution is suited for and can perform the purpose or application of the specified product indicated or specified in the Contract Documents.

2. Show compliance with Contract requirements by providing the following information, as applicable:

   a. Statement indicating why specified product or method cannot be provided.
   b. Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the work and to construction to be performed by the Owner and by others under separate contracts with Owner, that will be necessary if the proposed substitution is accepted.
   c. Detailed side-by-side comparison of significant qualities of proposed substitution with those of the work specified. Mark clearly affected Specification section for any differences from item specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect and specific features and requirements indicated.
   d. Provide complete product data, including drawings and descriptions of products and fabrication and installation procedures.
   e. Provide samples, where applicable.
   f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   h. Research/evaluation reports acceptable to authority handling jurisdiction, evidencing compliance with building code in effect for project.
   i. Detailed evaluation of Construction Schedule showing effect on the overall Contract Time and individual tasks. If specified products are not available from manufacturer within scheduled construction time, provide written statement on manufacturer’s letterhead stating lack of availability or timing of delivery.
   j. Cost information including a proposal of change, if any, in the Contract Sum. Substitution requests shall include detailed cost data, including a proposal for the net change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies in every respect with requirements in the Contract Documents is appropriate for applications indicated and has been coordinated with all other Contract requirements and elements of work. Contractor shall wet sign certification; certification shall identify product and specific substitution.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

m. Provide same warranty for substitution as for specified product. Warranty shall meet or exceed that for specified product.

n. Substitution requests shall include a signed waiver by the contractor for change in the Contract Time or Contract Sum because of the following:

1. Substitution failed to perform adequately.
2. Substitution required changes in other elements of the work.
3. Substitution caused problems in interfacing with other elements of the work.
4. Substitution was determined to be unacceptable by authorities having jurisdiction.

o. If, in the opinion of the Architect, the substitution request is incomplete or has insufficient data to enable a full and thorough review of the intended substitution, the substitution may be summarily refused and determined to be unacceptable.

p. Contractor’s request for substitution constitutes a representation that contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other work that may be required for the work to be complete with no additional cost or time to Contract.
4. Waives claims for additional costs or time extension that may subsequently become apparent.

3. If necessary, Architect will request additional information or documentation for evaluation of a request for substitution. Architect will notify contractor of acceptance or rejection of proposed substitution. Use product specified if Architect cannot make a decision on use of a proposed substitution. Contractor is responsible for providing all necessary information including information requested by Architect to justify substitution.

4. Do not install substituted products without acceptance from Owner and Architect.

5. Do not resubmit rejected substitutions.

6. Use of approved substitution does not alleviate contractor from complying with requirements of Contract Documents.

7. Allow for all substitution request and review times in construction schedule. Additional schedule time will not be granted for substitutions.

1.5 Quality Assurance

A. If contractor is given option of selecting between two or more products for use on project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

B. Do not incorporate products that are provided prior to satisfactorily passing testing requirements.

C. Provide all products required for a complete and proper installation, even if not specifically indicated, at no additional cost to Owner.
D. Where inter-related, multiple components are required for a complete system provide components that are completely compatible and satisfy required warranties. Provide only one brand, kind or make of product from a single source for each purpose throughout work.

E. For all products referred to in singular number, provide the quantity needed to complete the work.

F. Contractor is responsible for providing products that are equal to or better than the level of quality and basis of design specified at no additional cost to Owner.

G. Consider all project requirements when obtaining and supplying products, whether shown in the Contract Documents or not. Consider existing surrounding, neighboring uses, occupancies and functions within 1,000 feet of site before ordering products and materials. Make adjustments to order and provide complete installations compatible with neighboring uses at no additional cost to Owner.

H. Where Contract requires color, texture, or sheen selections to match specific samples or existing conditions, provide colors, textures, and sheen at no additional cost to Owner to match samples or existing conditions specified, even if the use of custom colors, formulations or procedures is necessary to obtain a match to the satisfaction of Architect.

1.6 Product Delivery, Storage, and Handling

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Exercise special care to protect products that are sensitive to light, UV exposure, heat or moisture. Deliver, store, and handle products according to manufacturer’s written recommendations as a minimum.

B. Delivery and Handling:

1. Schedule and sequence deliveries with construction schedule to minimize storage time at project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to project site in undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Promptly inspect products on delivery and prior to installation to ensure compliance with Contract Documents and to ensure that products are undamaged and properly protected. Immediately reject and return all products and materials that do not comply.
5. Provide adequate equipment and personnel to properly handle, move and store products and materials to prevent damage, disfiguring or soiling.
6. Pay all demurrage costs associated with delay of deliveries.
7. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
8. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

C. Storage and Protection:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger project structure.
3. Store products that are subject to damage by the elements, under impervious cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer’s written instructions.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, and UV exposure, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage. Comply with MSDS.
7. Protect stored products from damage and liquids from freezing.
8. Do not bring products to site until conditions match those recommended in writing by manufacturer.
9. Do not store products labeled flammable or toxic within the building.
10. Store products in a secure enclosure.
11. When approved by Owner, and when site constraints do not permit on-site storage, materials may be stored off site in a bonded warehouse approved by Owner, at no additional cost to Owner.
13. Arrange storage area to allow access for inspections and for logical sequencing with construction and so materials are placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
14. Periodically inspect to ensure products are undamaged, and are maintained under required conditions.
15. Products damaged by improper storage or protection shall be removed and replaced with new products at no change in Contract Sum or Contract Time.
16. For exterior storage of fabricated products, place products on raised blocks, pallets or other supports, above ground and in a manner to not create ponding or misdirection of runoff. Place on sloped supports above ground.
17. Store with seals and labels intact, legible and exposed to view.
18. Prevent contact with material that may cause corrosion, discoloration, or staining.
19. Provide equipment and personnel to properly deliver, store and handle products by methods to prevent soiling, disfigurement, or damage.

1.7 Product Warranties

A. Warranties specified shall be in addition to manufacturer’s standard warranties or implied warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve contractor of obligations under requirements of the Contract Documents.

B. Warranty shall be an agreement to repair or replace, without cost and undue hardship to Owner, work performed under the Contract which is found to be defective during the warranty period. Repairs and replacements due to improper maintenance or operation, or due to normal wear, usage and weathering are excluded from warranty requirements unless otherwise specified.

C. Manufacturer’s disclaimers and limitations on product warranties do not relieve the contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the contractor.

D. It is specifically required and acknowledged by this contractor that warranty periods on all work, materials, equipment and products commences from date of Substantial Completion. Therefore, start up of equipment and/or the use of equipment during construction shall not be construed as the qualifier for warranty period start.

E. For equipment and products or components thereof bearing a manufacturer’s warranty that extends for a period of time beyond the contractor’s warranty, so state in the warranty.

F. When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
G. When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation, agreed to by Owner.

H. Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefitted from use of the work through a portion of its anticipated useful service life.

I. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the contractor during the construction period, submit properly executed warranties to the Owner within fifteen days of completion of that designated portion of the work.

J. Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such duties, obligations, rights, or remedies.

K. The Owner reserves the right to reject warranties and not limit selections to products with warranties not in conflict with requirements of the Contract Documents.

L. The Owner reserves the right to refuse to accept work for the project where a special warranty, certificate, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

M. When a warranty is required to be jointly executed by contractor and a subcontractor, or contractor and supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by all required parties. Submit a draft to the Owner for approval prior to final execution.

N. Where special warranties are required prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval as submittal. Even when not specifically indicated as a submittal within a specific Specification Section.

O. All warranties shall indicate the Owner as beneficiary.

P. Provide written indication on each warranty of all requirements of Owner to maintain warranty.

Q. Submit 3 copies of all warranties, guarantees and bonds. Prepare written documents utilizing the appropriate form, ready for execution by the appropriate party(s). Submit a draft to Owner for approval prior to final execution.

1. Prepare warranty letter on appropriate letterhead, addressed to Owner.
2. Warranty letters shall be signed by all responsible parties and by contractor in every case, with modifications only as approved in advance by Owner to suit the conditions pertaining to the warranty or guarantee.
3. Signatures shall be by person authorized to sign warranties, on behalf of entity providing such warranty. All signatures on warrants shall be original wet ink and shall be notarized.

R. Unless otherwise directed or specified, commencement date of warranty periods shall be the date of Substantial Completion.

1. Warranties for Work Accepted in Advance of Date of Substantial Completion: When a designated system, equipment, component parts or other portion of the work is completed and occupied or put
to beneficial use by Owner, by separate agreement with contractor prior to Substantial Completion
date, submit properly executed warranties to Owner within ten days of completion of that
designated portion of the work. List date of commencement of warranty period as the date of
Substantial Completion.

2. Warranties for Work Not Accepted as of Date of Substantial Completion: Submit documents
within ten days after acceptance, listing date of acceptance as beginning of warranty.

S. Unless otherwise specified or prescribed by law, warranty and guarantee periods shall be not less than the
warranty period required by the Contract Documents but in no case less than one year from the date
established for Substantial Completion.

1.8 Owner Furnished Contractor Installed (OFCI) Items

A. Installation of indicated Owner Furnished Contractor Installed (OFCI) items shall be complete in every
detail.

B. Contractor shall verify exact sizes and services required for each item of equipment indicated on
Drawings or in project manual as OFCI and shall obtain from Owner, and verify information shown on
rough-in drawings, diagrams, setting templates and other necessary information to ensure proper mating
of assemblies.

C. Contractor shall receive at project site each item of equipment from Owner and from that time on shall
assume full responsibility for items and equipment until one year from date of Substantial Completion.

D. Contractor shall give Owner fifteen (15) days prior notice of requirements for delivery to site of all OFCI
equipment.

E. Contractor shall be responsible for receiving OFCI items and equipment and shall uncrate, inspect and
notify Owner in writing within one (1) day of receiving, of acceptance or rejection of items or equipment.
Owner, after receiving notice, will take appropriate action to have items or equipment made acceptable
for contractor’s use. Rejected items shall be carefully stored and protected from damage by contractor
until Owner takes appropriate action.

F. OFCI items will be delivered to the site by Owner.

G. Store OFCI items in a secured, covered, dry storage area. OFCI items damaged during storage, handling
or installation shall be repaired or replaced to the satisfaction of the Owner at the contractor’s expense.
Contractor shall open and inspect OFCI items within one day of receipt.

H. Contractor shall be responsible for final placing, installation, connection, start-up, checking, testing and
demonstrated satisfactory operation. Owner will provide names of manufacturer’s representatives, who
shall assist the contractor in checking, testing and demonstrating equipment.

I. Work under the Contract shall include all provisions necessary to fully incorporate such Owner furnished
products into the work, including, as necessary, fasteners, backing, supports, piping, conduit, conductors
and other such provisions from point of service to point of connection, and field finishing.

J. Provide installation inspections required by jurisdictional authorities for work that included Owner
provided items.

1.9 Owner Furnished Owner Installed (OFOI) Products

A. Provide access to project site for Owner's construction forces.
B. Coordinate construction and operations of the work with work performed by Owner's construction forces.

1. Inform Owner of Contractor's preferred construction schedule for Owner's portion of the work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Include Owner's construction forces at pre-installation conferences covering portions of the work that are to receive Owner's work. Attend pre-installation meetings conducted by Owner's construction forces if portions of the work depend on, or are inter-related with Owner's construction.

PART 2 - Products

2.1 Existing Material and Systems

A. Unforeseen historically significant items encountered remain the property of the Owner; notify Owner promptly upon discovery. Do not disturb; protect in place and request disposition of existing materials and systems.

2.2 Product Selection

A. Provide products that comply with the Contract Documents that are undamaged and new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, safety devices, and other items needed for a complete installation and intended use and effect.
2. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
3. ‘Or Equal’ basis-of-design: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product that is equal in all respects. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
4. Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
5. Where Specifications include the phrase "as selected from manufacturer's colors, patterns, and textures" or a similar phrase, Architect will select color, pattern, density, or texture from manufacturer’s full range of products that includes standard, premium, and custom items.
6. Where a conflict exists between two different products specified to the same piece of work, provide the more expensive product at no additional cost or time to Contract.
7. Where conflict exists between product requirements indicated and jurisdictional requirements provide for more expensive option at no additional cost or time to Contract.
8. Where conflict exists between specifications and drawings for product requirements provide more expensive product at no additional cost or time to Contract.
9. Where products are accompanied by the term “match sample,” sample to be matched is Architect’s.
10. If available, and unless custom products or nonstandard options are specified, provide standard products and types that have been produced and used successfully in similar situations on other projects.
11. All products, other than commodity products prescribed by Code, shall have a current ICBO Evaluation Service (ICBO ES) Research Report or CABO National Evaluation Report (NER).
12. To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same products and interchangeable throughout the work. When options are specified for the selection of any of two or more products, the products selected shall be compatible with products previously selected.
13. Except for required Code-compliance labels and operating and safety instructions, locate nameplates on inconspicuous, accessible surfaces. Do not attach manufacturer’s identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.

14. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as but not limited to, the following example:

   1. Name of manufacturer.
   2. Name of product.
   3. Model and serial number.
   5. Operating and power characteristics.
   6. Labels of tested compliance with Codes and Standards.

15. For each item of service-connected or power-operated equipment, provide operating and safety instructions, permanently affixed and of durable construction, with legible machine lettering. Comply with all applicable requirements of authorities having jurisdiction and listing agencies.

PART 3 - Execution

3.1 Substitution Process Requirements

A. Instructions to bidders specify time restrictions and requirements for submitting requests for substitutions during the bidding period.

B. Submit substitution requests to Architect within 10 days of bid due date.

C. Architect will consider requests for substitution if received within 30 (thirty) days after date of Notice to Proceed.

D. Requests received after that time may or may not be considered at discretion of Architect.

E. Architect will consider contractor's request for substitution only when all of the following conditions are satisfied:

   1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume, such as Architect’s evaluation, redesign efforts, plan check time, fabrication time, lead time and installation time.
   2. Substitutions must clearly be in Owner’s best interest because of quality, cost, performance, conformity to code requirements or availability.
   3. Requested substitution does not require extensive revisions to the Contract Documents.
   4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   5. Substitution request is timely, fully documented and properly submitted.
   6. Requested substitution will not adversely affect contractor's construction schedule.
   7. Requested substitution has received necessary approvals of authorities having jurisdiction.
   8. Requested substitution is compatible with other portions of the work.
   9. Requested substitution has been coordinated by contractor with other portions of the work.
  10. Requested substitution provides specified warranties.
  11. Substitutions shall, without exception, be manufactured of same basic materials and comply with or exceed all Specification requirements of dimension, non-operating weight, operating weight, function, structure and appearance, without deviation.
F. Contractor is responsible for providing all information necessary and requested to justify substitution request.

G. Substitution request, review and processing time shall in no way justify additional time or cost to the Contract. Allow time for Architect’s review of all substitution requests in construction schedule.

H. Denial of substitution requests shall in no way justify additional time or cost to the Contract.

I. Approved substitutions shall in no way relieve contractor from requirements and responsibilities of the Contract Documents.

J. Contractor assumes all costs associated with installing approved substitutions. Contractor is responsible for all professional fees, including Architect and Engineers, for time required for review and any redesign services associated with substitutions and for costs associated with re-approval by Government Authority.

1. Should a contractor-proposed substitution or alternative sequence or method of construction require revision of the Contract Drawings or Specifications, including revisions for the purposes of determining feasibility, scope or cost, or revisions for the purpose of obtaining review and approval by authorities having jurisdiction, revisions will be made by Architect or other consultant of Owner who is the responsible design professional, as approved in advance by Owner.

2. Services of Architect or other responsible design professional for document revisions, researching and reporting on proposed substitutions or alternative sequence and method of construction shall be paid by contractor.

3. Costs of services by Architect or other responsible design professional of the Owner shall be paid on a time and materials basis, based on current hourly fee schedules, with reproduction, long distance telephone, travel costs and shipping costs reimbursable at cost plus 15% mark-up for handling and billing.

4. Such fees shall be paid whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by Owner and a Change Order is executed.

5. If necessary, fees will be paid for through deductive change order to Contract.

K. Substitutions on the basis of unavailability of a product must be accompanied by letter on manufacturer’s letterhead stating lack of availability, and that contractor could not have known of unavailability at the time of bid. Substitution requests based on unavailable product that do not include required letter or language will be denied and contractor shall be responsible for providing products of equal to or better than quality level indicated at no additional cost or time to Contract.

L. Substitutions will not be considered if they are indicated or implied on shop drawing, product data or sample submittals. All requests for substitution shall be by separate written request from contractor. Contractor shall utilize Substitution Request Form provided by Owner.

M. Substitutions will not be considered if acceptance will require substantial revision of the Contract Documents or will substantially change the intent of the design, in the opinion of the Architect. The intent of the design shall include functional performance and aesthetic qualities.

N. Substitutions will not be considered when they are indicated or implied on submittals. All proposed substitutions must be requested with separate written requests.

O. Substitutions will not be considered for materials and systems indicated as Owner’s standards as defined under State Contracting Code 3400. This includes means and methods of construction, fasteners, attachments, and all other ancillary or accessory items associated with or in support of Owner’s standard material and system.
P. The contractor’s submittal and Architect’s acceptance of Shop Drawings, Product Data or Samples that indicate construction not complying with the Contract Documents, does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

Q. In the event materials are substituted and installed without proper authorization, contractor shall remove such materials and install those specified at his own expense.

R. Contractor shall determine all effects approved substitutions will have on other portions of work and so inform his subcontractors and employees of these effects.

S. Architect reserves the right to reject substitution requests for products and systems that fail to satisfy life safety requirements.

End of Section 01 60 00
SECTION 01 73 00 - Execution Requirements

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 31 00 “Project Management and Coordination.”
2. Section 01 32 00 “Construction Progress Documentation.”
3. Section 01 32 33 “Photographic Documentation.”
4. Section 01 33 00 “Submittal Requirements.”
5. Section 01 40 00 “Quality Requirements.”
6. Section 01 60 00 “Product Requirements.”
7. Section 01 73 29 “Cutting and Patching.”
8. Section 01 77 00 “Closeout Procedures.”
9. Section 01 78 23 “Operation and Maintenance Data.”
10. Section 01 78 39 “Project Record Documents.”
11. Section 01 79 00 “Demonstration and Training.”

1.2 Documentation

A. Submit certificate signed by licensed land surveyor certifying that location and elevation of improvements comply with requirements.

B. Submit 2 (two) copies of a final property survey showing the project layout work performed and record survey data, including but not limited to finish floor elevations and building location, paving locations and elevations, and utility locations and elevations.

1. Survey and layout data shall be reviewed by contractor prior to submission for Owner’s filing. Contractor shall wet sign each submittal copy certifying that:

   a. Field measurements have been determined and verified.
   b. Field construction criteria have been verified.
   c. Conformance with Drawings and Specifications requirements is confirmed.

2. Indicate clearly on survey and layout data whether the dimensions and coordinates are in compliance with Contract requirements. Contractor shall note clearly and sign each submittal certifying that reported date “conforms” to contract requirements.

3. Identify all deviations from requirements of Drawings and Specifications.

1.3 Quality Assurance

A. Obtain the services of a licensed land surveyor who is legally qualified to practice in jurisdiction where project is located and who is experienced in providing land-surveying services of the kind required.

B. Provide installers and workers practicing the best methods known to each particular trade. Use adequate numbers of skilled, experienced workers who are adequately trained and completely familiar with the requirements and methods needed for completion of the work. Provide adequate number of supervisors and foremen for each piece of work. Foreman and supervisors shall be skilled and experienced in the
particular work they are managing. Workers, installers, subcontractors, foreman and supervisors must be able to read and speak English and must be able to communicate fluently in English with other parties and individuals involved with the work.

C. Where required by warranty requirements provide approved fabricators and installers. Provide written evidence of such approval on manufacturer’s letterhead from manufacturer.

D. Comply with all Cal/OSHA required safety measures required for fulfillment of the Contract and work.

E. The utility locator contractor shall have on staff a California licensed civil engineer experienced in this type of work and experienced project managers and utility survey technicians.

PART 2 - Products

2.1 Equipment

A. The site utility location equipment and instrumentation shall include and not necessarily be limited to the following: Electromagnetic utility locator instruments, radio frequency transmitters, antenna receivers, pipeline and cable detectors, ground penetrating radar, and other such devices necessary to accurately identify and locate the various types and sizes of the underground site utilities existing on campus. The existing underground site utilities on campus include and are not necessarily limited to steel pipe, iron pipe, copper pipe, concrete carriers, transite pipe, PVC pipe/conduit, vitreous clay pipe and electrical and telecommunications duct banks both with and without concrete encasement.

PART 3 - Execution

3.1 Examination

A. The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the work. Before construction, investigate and verify the location and points of connection of utility services.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services and other necessary utilities.

2. Provide a graphic survey showing location and depth of existing utilities and points of connection prepared by a land surveyor licensed to practice in project location.

B. The existence and location of construction indicated as existing is not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the work.

C. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations with photos, video and notations.

1. If requirements of Contract Documents create conditions and conflicts, within the various elements of the work or between materials, or applications, which are detrimental to performance of the work provide an RFI to the Architect. Provide for most expensive option at no additional cost or time to Contract.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers, curing compounds and other finishes and coatings. Assure that moisture content of substrate is within acceptable written recommended limits of manufacturer of material to be applied to substrate.
3. Examine and verify rough-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine and verify suitability of walls, floors, roofs and other elements to accept application and installation of products and systems.

5. Verify that substrate conditions do not negate required warranties. Review substrate conditions with material manufacturers and obtain written statement on manufacturer’s letterhead that substrate conditions satisfy warranty requirements.

6. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the work indicates contractor’s acceptance of surfaces and conditions.

D. Investigate and document all existing uses, occupancies, and functions of neighboring properties within 1,000 feet of project site. Verify that products and systems are fully compatible with surrounding uses.

E. Survey Control and Reference Points: Contractor shall locate and protect survey control and reference points. Control datum for survey shall be as indicated on Civil Drawings.

1. Comply with the current requirements for the “Preservation of Survey Monumentation Compliance” of the “Business and Professions Code.” Prior to construction, monuments shall be referenced in the field and “Corner Records” shall be prepared for filing in the Office of the County Surveyor. These shall be performed prior to filing of the Notice of Completion of the work.

2. Comply with requirements of authorities having jurisdiction for survey monumentation preservation on capital improvement projects where monumentation points are present.

3. Contractor shall be responsible for preparing and submitting proper documentation to the Office of the County Surveyor in compliance with authorities having jurisdiction.

4. Project finalization, Notice of Completion and release of retainage shall be contingent upon obtaining documentation from contractor’s project surveyor or engineer that monuments have been set or restored and that Corner Records have been filed with and to the satisfaction of the County Surveyor.

5. All costs and actions necessary for compliance with current regulations shall be included in the Contract Sum and Contract Time.

3.2 Preparation

A. Prepare and furnish information that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with utility companies and authorities having jurisdiction. Obtain necessary approvals and permits for work in public right of way.

B. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner, in writing, not less than 5 days in advance of proposed utility interruptions. Indicate length in hours for scheduled interruption.

2. Do not proceed with utility interruptions without Owner’s written permission.

3. Schedule utility outages and shutdowns to nights, weekends, holidays or times and dates acceptable to Owner, as directed by Owner.

   a. Time and duration of outages and shutdowns shall not hinder Owner’s normal activities except as authorized in writing by Owner.

   b. Contractor shall provide temporary utilities to occupied facilities and adjacent properties when utilities must be interrupted for more than two hours, during normal occupied hours.
C. Take field measurements as required to fit the work properly. Recheck measurements before installing each product. Where portions of the work are indicated to fit to other construction, verify dimensions of other construction by field measurements before order and fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work. Immediately upon discovery of conflicts submit written RFI to Architect for clarification.

D. Verify space requirements and dimensions of items shown diagrammatically on Drawings prior to order and fabrication. Immediately upon discovery of conflicts submit written RFI to Architect for clarification.

E. Review field conditions with Contract Documents. Immediately on discovery of the need for clarification of the Contract Documents; submit a written request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

F. The utility locator shall mark out all utilities in the proposed alignment and cover a width of 20 feet. Identify on asphalt or PCC surfaces, with color-coding, painted identification of utilities.

G. Exploratory Excavations (Pilot Trench): The contractor shall excavate a “pilot trench” as indicated before excavation of a full width utility trench. Contractor shall exercise extreme caution to prevent damage to surrounding surface features and utilities.

H. If any structure or utility is damaged, take immediate action to ensure the safety of persons and property and immediately effect necessary repairs.

3.3 Construction Layout

A. Before proceeding to lay out any work, become familiar with existing and proposed conditions, verify project dimensions and locations shown on Drawings, in relation to the property survey, existing benchmarks and working points and lines established for the project. If discrepancies are discovered, provide an RFI to the Architect immediately.

B. Engage a licensed surveyor to lay out the work using accepted surveying practices.

1. Assume responsibility for furnishing all permanent and temporary stakes, pins, markers, strings, and grade markings as required to clearly mark the outlines and horizontal and to implement the work of layout and staking. Make all minor field adjustments if so directed by the Architect at no extra cost to the Owner.

2. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of project.

3. Establish dimensions within tolerances indicated. Do not scale Drawings or use means to measure or obtain required dimensions from electronic drawings, use written dimensions only.

4. Inform installers of lines and levels to which they must comply.

5. Check the location, level and plumb, of every major element as the work progresses.

6. Notify Architect with written RFI immediately when deviations from required lines and levels exceed allowable tolerances.

7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Locate and lay out all vertical and horizontal controls of all site improvements, including pavement and edges, planting areas, fixture locations, tree locations, pavement scoring lines, retaining walls, water features, curbs, gutters, parking layouts, grading, fill and topsoil placement, utility slopes, and invert elevations, and all other site features indicated.
D. Locate and lay out all horizontal and vertical control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Continuously maintain a log at project site of layout control work as work progresses. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for review by Owner, Architect and Inspector.

3.4 Field Engineering

A. Locate permanent benchmarks, control points, and similar reference points before beginning the work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points. Report in writing lost or destroyed permanent benchmarks or control points promptly.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points. Maintain necessary stakes and pins throughout project.
3. Contractor shall excavate all holes necessary for line and grade stakes.

B. Upon completion of rough grading, survey all graded areas and elevations along property lines to establish that elevations are correct and within acceptable tolerances for paving, construction and finish grading.

C. On completion of each element of work requiring field-engineering services, prepare and provide a certified survey showing dimensions, locations, angles, and elevations of construction and site work.

D. Establish a minimum of two permanent monuments on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record drawings.

1. In accordance with Professional Land Surveyor Act, Section 8772, any monument set by a licensed land surveyor or registered civil engineer to mark or reference appoint on a property or land line shall be permanently and visibly marked or tagged with the certificate number of the surveyor or civil engineer setting it, each number preceded by the letters “L.S.” or “R.C.E.” respectively, as the case may be, or, if the monument is set by a public agency, it shall be marked with the name of the agency and the political subdivision it serves.
2. Nothing in this Section shall prevent the inclusion of other information on the tag which will assist in the tracing or location of survey records which relate to the tagged monument.
3. Centerline ties filed with the County Surveyor will be checked for compliance with this law.

E. Prepare a final property survey showing significant features for project. Include on the survey a certification, signed by licensed surveyor, that principal metes, bounds, lines, and levels of project are accurately positioned as shown on the survey. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 Installation

A. Locate the work and components of the work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, conduit and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance required by building authority in spaces without a ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated. Install products in a manner that satisfies warranty requirements and is recommended in writing by manufacturer.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion. Prepare substrates and surfaces as recommended in writing by manufacturer. Perform work when existing and forecasted weather conditions are within limits recommended in writing by manufacturer. Comply with manufacturer's written temperature and humidity requirements. Allow materials to adjust to ambient conditions as recommended by manufacturer in writing prior to installation.

D. Conduct construction operations so no part of the work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Do not use tools or equipment that produce harmful noise levels to building occupants.

F. Obtain and distribute templates to parties involved for factory prepared and field installed work. Check Shop Drawings and coordinate with other work to confirm that adequate provisions are made for locating and installing fabricated products.

G. Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the work.

1. Where mounting heights are not indicated, submit an RFI to verify mounting heights.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to project site in time for installation.

H. Make joints of uniform width. Where joint locations in exposed work are not indicated, submit RFI to verify joint location. Measure, layout, plan, cut and fit exposed connections together to form hairline joints.

I. After sub-contractors and trades have completed portions of work, inspect work and adjacent areas and make any adjustments necessary.

J. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

K. Use products, cleaners, and installation materials that are not considered hazardous, and are fully compatible with installed products and finishes.

L. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

3.6 Progress Cleaning

A. Clean project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
2. Do not hold waste materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80° F.
3. Containerize unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Do not store unsanitary or unsafe waste inside building.
5. Do not store flammable, unsafe, unsanitary or odorous waste in a manner or location that would adversely affect pedestrians, building occupants, adjacent buildings and occupants, and properties.

B. Maintain project site free of loose, scattered waste materials and debris.

C. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the work, vacuum the entire work area, as needed.

D. Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Remove debris from concealed spaces before enclosing the space.

F. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Burying or burning waste materials on-site is not permitted. Washing waste materials down sewers or into waterways is not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

K. Clean sidewalks, driveways and streets frequently to maintain public thoroughfares free of dust, debris and other contaminants.

L. Keep parking areas clear of construction debris, especially debris hazardous to vehicle tires.

M. Keep site accessways, parking areas and building access and exit facilities clear of mud.

N. At a minimum, clean work areas daily.

3.7 Starting and Adjusting
A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Coordinate schedule for start-up of various equipment and systems.

C. Notify Inspector and owner prior to start-up of each item.

D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence or other conditions which may cause damage.

E. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

F. Verify wiring and support components for equipment are complete and tested.

G. Execute start-up under supervision of responsible manufacturer’s representative and/or contractor’s personnel in accordance with manufacturers’ instructions.

H. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, and check equipment or system installation prior to start-up and to supervise placing equipment or system operation.

I. Submit a written report to the Owner, Architect and Inspector that equipment or system has been properly installed and is functioning correctly.

J. Notify and assist Owner and Inspector for coordination of all utility hook-ups prior to hook-up.

K. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

L. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 Protection of Installed Construction

A. Provide final protection and maintain conditions that ensure installed work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 Correction of The Work

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 73 29 "Cutting and Patching." Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace entire area of finish materials that are exposed to view if damaged surfaces cannot be repaired without visible evidence of repair.

D. Remove and replace damaged substrates and base structure if damaged by construction operations.
E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

End of Section 01 70 00
SECTION 01 73 29 - Cutting and Patching

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 31 00 “Project Management and Coordination.”
2. Section 01 32 33 “Photographic Documentation.”
3. Section 01 40 00 “Quality Requirements.”
4. Section 01 60 00 “Product Requirements.”
5. Section 01 73 00 “Execution Requirements.”
6. Section 01 78 39 “Project Record Documents.”
7. Section 07 84 00 “Through-Penetration Firestop Systems.”

1.2 Quality Assurance

A. Provide a proposal describing procedures at least 10 (ten) days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Describe anticipated results. Include changes to structural elements and operating components as well as changes in building’s appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform the work.
4. Indicate when cutting and patching will be performed.
5. List utility services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work. Do not cut and patch structural elements without approval from Architect.

B. Do not cut, drill or notch structural elements unless detailed on structural drawings or without prior written authorization from the Structural Engineer.

C. Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance, decreased operational life or safety, or voids required or implied warranties. Such items include, but are not limited to:

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-protection systems.
4. Control systems.
5. Communication systems.
6. Electrical wiring systems.
7. Water, moisture, or vapor barriers.
8. Membranes and flashings.
10. Equipment supports.
11. Piping, ductwork, vessels, and equipment.
12. Noise- and vibration-control elements and systems.

D. Do not cut and patch elements or related components in a manner that results in reducing their load carrying capacity, capacity to perform as intended, causes increased maintenance or decreased operational life or safety, or voids required or implied warranties.

E. Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

F. sloppy, careless or avoidable cutting and patching will not be tolerated and work affected will be replaced at no cost or time to Contract. An aesthetically pleasing overall appearance of finished surfaces is a requirement of this project. Make necessary preparations, and use recommended techniques with great care to ensure that all finished surfaces are acceptable to Architect. Architect will be the sole judge of visual acceptability.

G. Before cutting and patching meet at project site with parties involved. Review areas of proposed cutting and patching, coordinate procedures and resolve conflicts before proceeding.

H. Contractor shall do all cutting, fitting, or patching of work as required to make its several parts come together properly and fit to receive or be received by work of other contractors shown upon, or reasonably implied by, the Drawings and Specifications for the completed structure as Architect may direct. In addition, the contractor shall do the following:

1. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
2. Remove and replace work not conforming to requirements of the Contract Documents.
3. Remove and replace defective work.
4. Contractor to provide all necessary cutting and patching work outside project limit line to complete the project.

I. All cost caused by defective or ill-timed work shall be borne by contractor.

J. Contractor shall not endanger any work by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with consent of Architect.

K. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, notify the Architect and Owner and secure written permission.

L. Provide firms and workers with a minimum of 10 years experience in cutting and patching the types of substrates and systems on this project.

**1.3 Warranty**

A. Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials approved in writing by manufacturer’s of affected materials, so as not to void warranties. Architect will be the sole judge of visual acceptability.

**PART 2 - Products**
2.1 Materials

A. Comply with requirements specified in other Sections.

B. Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials. Architect will be sole judge of visual acceptability.

C. Provide necessary framing, blocking and support of openings cut into existing decks, walls, roofs and other substrates. Provide support in same depths as adjacent framing.

D. At Portland cement concrete paving, use concrete mixed with maximum 3/8-inch aggregate and a minimum 3000 psi 28-day compressive strength. Provide dowels to existing paving and reinforce new paving with minimum No. 3 reinforcing steel bars at 16-inches on center each way. Welded wire fabric reinforcement will not be acceptable.

E. Restore and compact areas trenched, disturbed or damaged. Provide sod or seeded planting mix to match existing lawn or grass area.

F. Match existing products and finishes. Confirm colors, patterns and textures with Architect. Custom cut new materials to fit and to match joint patterns with existing materials.

G. Custom cut new ceramic tile and acoustical panel materials to size to match existing construction.

PART 3 - Execution

3.1 Examination

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed. After uncovering work, examine conditions affecting installation of new work.

1. Before cutting and patching, verify compatibility with and suitability of patching materials and substrates, including compatibility with in-place finishes and primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected. Proceeding with cutting and patching work constitutes acceptance of substrate and conditions by contractor.

3.2 Preparation

A. Provide temporary support of work to be cut.

B. Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of project that might be exposed during cutting and patching operations.

C. Avoid interfering with use of adjoining areas or interrupting the free passage to adjoining areas.

D. Where existing utility services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

E. Locate all utilities prior to any cutting or excavation.

3.3 Performance
A. Employ adequate number of skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cut new and existing in-place materials by sawing, drilling, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.

1. In general, use hand or small power tools designed for sawing and 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. Cut or drill from the exposed or finished side into concealed surfaces.
3. Cut concrete and masonry using a cutting machine, such as an abrasive saw or a diamond-core drill for smooth edges. Do not over cut corners. Core drill holes through concrete and masonry. Pneumatic tools will not be allowed without prior approval.
4. For excavating and backfilling comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
5. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patch new and existing in-place materials by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Test and inspect patched areas after completion to demonstrate integrity of installation.
2. Restore substrates and 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. Provide an even surface of uniform finish, color, texture, and appearance to match adjoining surfaces. Remove finishes and replace with new materials, if necessary as determined by Architect, to achieve uniform color and appearance.
4. Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Patch exterior components in a manner that restores enclosure to a weathertight condition.
6. Where patching occurs on a painted surface, apply primer and intermediate coats over patched area. Apply final coat over entire surface containing patch. Provide additional finish coats over entire surface until patch blends with adjacent surface, at no additional cost to Owner.
7. Restore substrates and finishes with products that comply with product Sections of the Specification.
8. Fit work neat and tight allowing for expansion and contraction.
9. Adjoin new finishes to in-place exposed structure, pipes, ducts, conduit, and other penetrations through surfaces, in a manner that is consistent with requirements of the Contract Documents.
10. For continuous surfaces, refinish to nearest intersection or natural break.
11. For an assembly, refinish entire unit.
12. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with material in accordance with Contract Documents to full thickness of the penetrated element.

D. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

End of Section 01 73 29
SECTION 01 74 19 - Construction Waste Management

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 02 41 19 “Selective Demolition.”

1.2 Definitions

A. Construction Waste: Materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the work.

1.3 Performance

A. The Owner has established that this project shall generate the least amount of landfill waste possible and that processes that ensure the generation of as little landfill waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized. Practices such as deconstruction, on-site crushing and reuse of concrete/asphalt as base material, salvage of fixtures, and recovering recyclable materials should be implemented.

C. Develop waste management plan that results in end-of-project rates for salvage/recycling of 50 percent by weight of total waste generated by the work.

D. Owner’s goal is to recycle as much nonhazardous demolition and construction waste as possible.

E. Field verify dimensions indicated on construction documents before confirming product orders or proceeding with work, to minimize waste due to excessive materials.

F. Contractor is responsible for full implementation of all programs involving tax credits or rebates or similar incentives related to recycling, if applicable to the project. Contractor is responsible for
researching and obtaining information packets relevant to all such programs prior to starting work on the project. Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

1.4 Submittals

A. Submit six (6) copies of waste management plan to Architect within ten (10) days of receipt of Notice to Proceed and prior to any waste removal from the site.

B. Concurrent with each Application for Payment, submit three (3) copies of waste reduction progress report. Include the following information:

1. Material categories.
2. Total quantity of each waste item in tons, cubic feet or other appropriate unit of measure.
3. Quantity of waste salvaged, both estimated and actual measured units.
4. Quantity of waste recycled, both estimated and actual measured units.
5. Total quantity of waste recovered (salvaged plus recycled).
6. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
7. Include manifests, weight tickets, receipts and invoices to justify amounts indicated.

C. Before request for Substantial Completion, submit three (3) copies of the following records:

1. Calculated end-of-project rates for salvage, recycling, and disposal as a percentage of total waste generated by the work.
2. Receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
3. Receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
4. Receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices to justify amounts indicated.
5. Receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices to justify amounts indicated.
6. LEED letter template for Credit MR 2.1 [and 2.2], signed by contractor, tabulating total waste material, quantities, diverted and means by which it is diverted, and statement that requirements for the credit have been met.
7. Qualification Data for waste management coordinator and refrigerant recovery technician.
8. Statement of Refrigerant Recovery, signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 Quality Assurance


B. Provide Refrigerant Recovery Technician certified by EPA-approved certification program.

C. Conduct Waste Management Conference at project site.

D. Comply with hauling and disposal regulations of authorities having jurisdiction.

F. Comply with the California Code of Regulations Title 14, Section 18700.

1.6 Waste Management Plan

A. Within ten (10) days of date of Notice to Proceed provide a waste management plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan. Include separate sections in plan for demolition and construction waste, include cost/revenue analysis.

B. Indicate anticipated types and quantities of waste generated by the work. Include estimated quantities and assumptions for estimates.

C. List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill. Include points of waste generation, total quantity of each type of waste and means of recovery, handling and transportation procedures.

1. Provide analysis of the proposed jobsite waste to be generated, including types and quantities. Provide a list of each material proposed to be salvaged, reused, or recycled during the course of the project, the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling (versus landflling) each material. “Net” means that the following have been subtracted from the cost of separating and recycling:

   a. Revenue from the sale of recycled or salvaged materials.
   b. Landfill tipping fees saved due to diversion of materials from the landfill.

2. For materials that will be salvaged and reused in this project, describe methods for collecting, preparing, transporting, and storing salvaged materials before incorporation into the work.

3. Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers. Indicate procedures required by recycling facilities to store, handle and transport materials for recycling.

4. Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and disposal facility, tipping fees and projected cost of disposing of all project waste in the landfill.

5. Include description of method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on project site where materials separation will be located.

D. Indicate total cost of waste disposal as if there was no waste management plan, and the net additional cost or net savings resulting from implementing waste management plan.

E. Include the following:

   1. A description of the regular meetings to be held to address waste management. Refer to Section 01 31 00 “Project Management and Coordination”
   2. A description of the means by which any waste materials, identified for salvage and recycling, will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
   3. A description of the means of sorting and transportation of the recyclable materials and destination of materials.

1.7 Delivery, Storage and Handling

A. Coordinate the schedule of product deliveries in order to minimize site storage time and potential damage to stored materials and to minimize waste due to excessive materials handling and misapplication.
B. Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

C. Store products and materials in a manner to prevent damage and contamination.

PART 2 - Products (Not Used)

PART 3 - Execution

3.1 Plan Implementation

A. Implement waste management plan as approved by Architect and Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at project site full time for duration of project.

C. Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the work occurring at project site. Distribute waste management plan to everyone concerned within 3 (three) days of submittal return. Review plan and procedures with all trades and workers. Coordinate waste management, material handling and separation requirements with all trades.

D. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Designate and label specific areas on project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

E. Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in order to prevent contamination of materials and to maximize recyclability and salvageability of identified materials.

3.2 Salvaging Demolition Items

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Store and protect items in a secure area until installation.
3. Protect items from damage during transport.
4. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
5. Keep items dry at all times.

B. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Store and protect items in a secure area until delivery to Owner.
3. Transport items to Owner's storage area designated by Owner.
4. Protect items from damage during transport.
5. Keep items dry at all times.

3.3 Recycling Waste
A. Arrange for timely pickups from the site and deliveries to recycling facility in order to prevent contamination of recyclable material. Designate specific areas for separation and storage of salvaged and recycle materials. Keep areas neat and clean, in an orderly manner, and well labeled. Contractor shall make arrangements with the waste hauler for providing source separated bins so that the contractor can keep recyclable materials separated to a level that a recycling facility can accept them. Contractor shall take materials to a Transformation Facility whenever feasible and cost effective. Each transformation will only accept limited waste streams. The contractor is responsible to determine if its specific waste stream is accepted by each facility.

B. Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at project site to the maximum extent practical.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from project site. Include list of acceptable and unacceptable materials at each container and bin.
   2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
   4. Store components off the ground and protect from the weather.
   5. Remove recyclable waste off Owner’s property and transport to recycling receiver or processor.

C. Break up asphaltic concrete paving and transport paving to asphalt-recycling facility.

D. Remove reinforcement and other metals from concrete and sort with other metals. Break-up and transport concrete to recycling facility.

E. Remove metal reinforcement, anchors, and ties from masonry and sort with other metals. Clean and stack undamaged, whole masonry units on wood pallets. Transport masonry to recycling facility.

F. Sort and stack wood members according to size, type and length. Separate lumber, engineered wood products, panel products, and treated wood materials. Grind or chip lumber cut offs into small pieces. Bag sawdust that does not contain painted or treated wood and transport to recycling facility.

G. Separate metals by type:
   1. Structural Steel: Stack members according to size, type of member and length.
   2. Remove bolts, nuts, washers and other rough hardware.
   3. Sort and pile metal reinforcing.
   4. Sort and pile anchors, ties, clips and other miscellaneous metal items.

H. Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

I. Stack large clean gypsum board pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners. Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

J. Stack large clean acoustical ceiling panels and tiles on wood pallets and store in a dry location. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

K. Roll large carpet pieces tightly after removing debris, trash, adhesive, and tack strips. Store clean, dry carpet in a closed container or trailer provided by carpet recycler.
L. Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

M. Separate plumbing fixtures by type and size.

N. Reduce piping and metallic conduit to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

O. Separate lamps by type and protect from breakage.

P. Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

Q. Sort plastic conduit and pipe by size and length.

R. Packaging:
   1. Break down packaging and cardboard into flat sheets. Bundle and store in a dry location.
   2. Separate and bag Polystyrene Packaging materials.
   3. As much as possible, require deliveries using pallets to remove pallets from project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
   4. Break down crates into component wood pieces and comply with requirements for recycling wood.
   5. Collect beverage containers and paper waste used by onsite workers and sort by material.

S. Chip removed brush, branches, and trees on site. Recycle as mulch. Remove from site if necessary.

T. Provide Owner with material and weight certificates from recycling plant.

U. Credits for recycling of materials belong to Owner. Revenue generated from recycling goes to contractor.

3.4 Disposal of Waste

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

   1. Do not allow landfill waste materials that are to be disposed of to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces, site areas, and routes of transport.
   3. Transport landfill waste materials off Owner’s property and legally dispose of them. Provide disposal certifications.

B. Do not burn waste materials.

End of Section 01 74 19
SECTION 01 77 00 - Closeout Procedures

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 29 00 “Payment Procedures.”
2. Section 01 31 00 “Project Management and Coordination.”
3. Section 01 32 00 “Construction Progress Documentation.”
4. Section 01 32 33 “Photographic Documentation.”
5. Section 01 33 00 “Submittal Procedures.”
6. Section 01 50 00 “Temporary Facilities and Controls.”
7. Section 01 73 00 “Execution Requirements.”
8. Section 01 74 19 “Construction Waste Management.”
9. Section 01 78 23 “Operation and Maintenance Data.”
10. Section 01 78 39 “Project Record Documents.”
11. Section 01 79 00 “Demonstration and Training.”

1.2 Closeout Meeting

A. Owner, Architect and contractor will attend a meeting at the project site to review Contract closeout procedures and to review items to be completed and corrected. This meeting shall be scheduled not earlier than 14 days prior to the date anticipated for Substantial Completion review.

1.3 Substantial Completion

A. When contractor determines that the work is complete in accordance with the Contract documents, contractor shall submit to Architect and Inspector of Record written certification that the Contract Documents have been reviewed, the work has been inspected by the contractor and by authorities having jurisdiction, and the facility is ready for Substantial Completion review. Before requesting review for determining date of Substantial Completion assure the following items are complete. In request for review list any items that are incomplete.

1. Prepare a list of items to be completed and corrected in a punch list format.
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, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
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. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
10. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover for utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. After review, Architect shall prepare and distribute a typewritten, comprehensive list of items to be completed and corrected (punch list) to make the work ready for acceptance by the Owner.

1. The punch list shall include all items to be completed or corrected prior to the contractor’s application for final payment.
2. Architect will review completed punch list items to verify completion.

C. Architect will prepare the Certificate of Substantial Completion or will notify contractor of items that must be completed or corrected before certificate will be issued.

1. If additional site visits are required by the Architect, Architect’s consultants and other design professionals in addition to those visits described in items 1.3 A and 1.3 B above to review completion and correction of the work, the costs of additional visits shall be reimbursed to the Owner by the contractor by deductive change order.

1.4 Final Completion

A. Before requesting final review for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment with releases.
2. Submit certified Substantial Completion punch list of items to be completed or corrected stating that each item has been completed or otherwise resolved.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Submit signed inspection reports.

B. Submit a written request for final review for acceptance. On receipt of request, Architect will either proceed with final review or notify contractor of unfulfilled requirements.

C. After review and acceptance Owner will execute a Final Completion Certificate.

1. If additional site visits are required by the Architect, Architect’s consultants and other design professionals in addition to those visits described in item 1.4 B above to review completion and correction of the work, the costs of additional visits shall be reimbursed to the Owner by the contractor by deductive change order.

1.5 Warranties

A. Assemble and organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Prior to submission, verify that documents are in proper form and contain all required information and are properly signed.
2. Organize warranty and guarantee documents into an orderly sequence based on the Table of Contents of the Project Manual.
3. Include Table of Contents for binder, neatly typed, following order and section numbers and titles as used in the Project Manual.
4. When operating and maintenance data manuals are required for warranted construction, include additional copies of each required warranty and guarantee in each required manual. Coordinate with requirements specified in Section 01 78 23 “Operation and Maintenance Data.”
5. 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 paper.
6. Provide heavy paper dividers with 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.
7. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," project name, name and address of contractor.
8. Submit fully executed copies of warranties, guarantees and bonds within ten days of date of Notice of Completion.

B. Provide 3 (three) copies of extended warranties at time of Substantial Completion.

1.6 Final Payment

A. After completion of all items listed for completion and correction, after submission of all documents and products and after final cleaning; submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due. Payment will not be made until the following are accomplished:

1. All project record documents have been transferred and accepted by Owner.
2. All extra materials and maintenance stock have been transferred and received by Owner.
3. All warranty documents and operation and maintenance data have been received and accepted by Owner.
4. All liens have been released or bonded by contractor.
5. Contractor’s surety has consented to final payment.

1.7 Post-Construction Inspection

A. In accepting final payment, contractor shall agree to perform a post-construction inspection with representatives of the Owner, and if authorized by Owner, the responsible design professionals, to review performance of the completed work and to determine what, if any, corrections shall be performed by contractor in compliance with the contractor’s warranty, as described in the Conditions of the Contract.

B. No later than 300 days after the date of Substantial Completion, after occupancy and use of the facility by the Owner, at days and times as directed by Owner.

C. Inspection Activities:

1. Contractor shall inspect, test and adjust the work, noting defects and corrective actions to be taken.
2. Contractor shall instruct Owner’s operating personnel in operational requirements needed to maintain correct appearance and function of the facility.

D. Contractor shall prepare and submit to Owner, a typewritten report to identify deficiencies and corrective actions taken. Post-construction inspection report shall note when corrective actions are unable to restore defects in the work to compliance with the requirements of the Drawings, Specifications and manufacturer’s criteria.
E. Corrections shall be governed by provisions of the Conditions of the Contract.

PART 2 - Products

2.1 Materials

A. Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

B. Provide close out documents in appropriately sized 3-ring binder with transparent vinyl insert sleeve on both front cover and binding edge. Use multiple binders if necessary.

PART 3 - Execution

3.1 Final Cleaning

A. Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Turn over project in a “like new” condition.

B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete cleaning operations before requesting inspection for certification of Substantial Completion for entire project. Cleaning operations include but are not limited to the following:

   a. Clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances. Remove and dispose all mock-ups that are not incorporated into work.

   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits. Wash all paved areas.

   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

   d. Remove tools, construction equipment, machinery, and surplus material from project site.

   e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

   f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

   g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

   h. Remove labels that are not permanent.

   i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration. Do not paint over name plates, labels, and similar identification items on parts and equipment.

   j. Wipe surfaces of mechanical, electrical, elevator and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

   k. Replace parts subject to unusual operating conditions.

   l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

o. Clean all horizontal surfaces, exposed and not exposed to view, including, but not limited to, light fixtures, ledges, plumbing fixtures, tops of door and window frames, tops of doors and interiors of cabinets and casework.

p. Clean building accessories, including toilet partitions, fire extinguisher cabinets, lockers and toilet accessories, all plumbing fixtures and all lighting fixture lenses and trim.

q. Clean and buff all metalwork, to be free of soiling and fingerprints. Mirror finished metalwork shall be buffed to high luster.

r. Thoroughly sweep and wet mop floors in enclosed spaces. At parking areas and ramps, sweep and hose off floor surface.

s. Thoroughly sweep and mop tile flooring. Comply with specific requirements in manufacturer’s tile and installation materials.

t. Thoroughly sweep all resilient flooring. Damp wash all resilient flooring. Comply with specific requirements in applicable resilient flooring Sections, and notes of the Drawings.

u. Clean and vacuum all carpeting. Clean as necessary to restore to like-new condition.

v. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from all visible interior and exterior surfaces.

w. Leave project clean and ready for occupancy.

C. Engage an experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Submit certifications that project is pest free at time of completion.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from project site and dispose of lawfully.

E. Turn over all keys to Owner.

F. Turn over additional materials and products as required by Contract Documents.

G. On occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

End of Section 01 77 00
SECTION 01 78 23 - Operation and Maintenance Data

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 01 32 33 “Photographic Documentation.”
2. Section 01 60 00 “Product Requirements.”
3. Section 01 77 00 “Closeout Procedures.”
4. Section 01 78 39 “Project Record Documents.”
5. Section 01 79 00 “Demonstration and Training.”

1.2 Copies

A. Provide three (3) draft copies of each Operation and Maintenance Manual in final form at least fifteen (15) days before Substantial Completion. Architect will return one copy with comments. Correct or modify each manual to comply with Architect’s comments. Submit three (3) copies of corrected manual to Owner prior to final acceptance of the work by Owner.

1.3 Quality Assurance

A. Preparation of data shall be done by persons:

1. Trained and experienced in maintenance and operation of the described products.
2. Familiar with requirements of this Section.
3. Skilled in technical writing to the extent required to communicate essential data.
4. Skilled as drafters competent to prepare required drawings.

1.4 Coordination

A. Where Operation and Maintenance documentation includes information on installations by more than one factory authorized service representative, assemble and coordinate information furnished by multiple representatives.

PART 2 - Products

2.1 Manuals

A. Prepare and format data in the form of an instruction manual. Organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents. Provide a manual for each building.

B. Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. List each product included in manual in a Table of Contents, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual. If manual requires multiple binders provide master table of contents in each binder and clearly identify each binder with a sequential number.

D. Organize sets into manageable size. Arrange contents alphabetically by system, subsystem, and equipment. Assemble instructions for each subsystem, equipment, and component of one system into a single binder; do not break information on an item or system into multiple binders.

1. Provide heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents; sized to hold 8-1/2-by-11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets on inside covers to hold folded oversize sheets. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets. Indicate total number of volumes. Provide a Master List of all manuals showing number and Title.

2. Provide heavy-paper dividers with tabs for each section. Use printed labels on each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Provide transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

4. Attach reinforced, punched binder tabs on drawings and bind with text.
   a. If oversize drawings are necessary, neatly fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations. Key drawings for reference by labeling envelopes.

E. Within each tabbed division, include data as published by the product manufacturer. All data shall be neatly typewritten. Strike-through information on printed literature not applicable.

F. Supplement the manufacturer’s printed data with neatly typewritten text and professionally drafted diagrams as necessary to suit the particular installation for the project and to fully explain operation and maintenance procedures. Provide logical sequence of instructions for each procedure.

G. Provide drawings and photos as needed to supplement operation and maintenance data to illustrate configurations and relationships of component parts of equipment and systems, and to show control and flow diagrams, as applicable. Do not use Project Record Documents as maintenance drawings.

H. Provide additional data as specified in individual product Specification Sections.

2.2 Emergency Manuals

A. Organize manual into a separate section for type of emergency, emergency instructions, emergency procedures and emergency contact information.
B. For each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire
2. Flood
3. Gas Leak
4. Water Leak
5. Power Failure
6. Water Outage
7. Equipment Failure
8. Chemical Release or Spill

C. Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Include stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

2.3 Operation Manuals

A. Provide operation data, equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements. Organize into a binder by system, subsystem and equipment.

B. Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

D. Describe the sequence of operation, and diagram controls as installed.

E. Diagram piping as installed, and identify color-coding where required for identification.

2.4 Product Maintenance Manual

A. Organize manual into a separate section for each product, applied materials, and finishes. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below. Include catalog numbers, size composition, color, texture and sheen designations. Provide information for re-ordering products, materials and finishes.
B. List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer and supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Include product data for waterproofing, roofing, moisture protection and weather-exposed products listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
5. Reordering information for specially manufactured products.

E. Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

F. Include lists of materials and local sources of materials and related services.

G. Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 Systems and Equipment Maintenance Manual

A. For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Provide manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance identification, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment.

D. Include test and inspection instructions, troubleshooting guide, disassembly instructions, adjusting instructions and demonstration and training DVD, if available, that detail essential maintenance procedures. Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services. Provide parts list, illustrations, assembly drawings and diagrams as necessary for service and maintenance. Include complete nomenclature and catalog numbers for consumable and replacement parts. Provide list
of spare parts, current prices, and recommended quantities to be maintained in stock by the Owner or operator.

G. Include copies of maintenance agreements with name and telephone number of service agent.

H. Provide contractor’s coordination drawings, with piping diagrams as installed. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Color code diagrams as necessary for clarity.

I. Include test and balancing reports, as applicable and as specified in individual product Specification Sections.

J. Provide electrical service characteristics of panelboard circuit directories, controls and communications.

K. Include diagrams of wiring as installed, with color coding as necessary for clarity.

L. Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds, including procedures to follow and required notifications for warranty claims.

PART 3 - Execution

3.1 Manual Preparation

A. Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the work. If data includes more than one item in a tabular format, highlight each applicable item and identify using appropriate references from the Contract Documents. Identify data applicable to the work and delete references to information not applicable.

B. Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation. Do not use Contract Documents or Record Documents as part of operation and maintenance manuals.

End of Section 01 78 23
SECTION 01 78 39 - Project Record Documents

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 01 32 00 “Construction Progress Documentation.”
   2. Section 01 32 33 “Photographic Documentation.”
   3. Section 01 33 00 “Submittal Procedures.”
   4. Section 01 60 00 “Product Requirements.”
   5. Section 01 77 00 “Closeout Procedures.”
   6. Section 01 78 23 “Operation and Maintenance Data.”

1.2 Submittals

A. Submit one (1) set of corrected Record Drawings and one (1) set of marked-up Record Prints.

B. Submit one (1) PDF copy of each Record Drawing whether or not changes and additional information were recorded.

C. Submit one (1) PDF copy of Project's Specifications, including addenda and contract modifications.

D. Submit one (1) PDF copy of each Product Data submittal.

PART 2 - Products

2.1 Record Drawings

A. Maintain one set of black-line on white record prints of the Contract Drawings.

   1. Mark Record Prints to show the actual installation where installation varies from that shown on the current Contract Documents. Designate a single individual for life of project to record information into Drawings and Specifications. Maintain that individual for life of project. Do not change record keeper without approval from Owner.
   2. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
   3. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations. Record information continuously as work progresses.
   4. Accurately record information in an understandable drawing technique. Use straight edge, circle template, and other devices as necessary to make lines, and use neat block lettering to record notes.
   5. Mark record sets with erasable, colored pencil. Use colors to distinguish between changes for different categories of the work at same location. Establish legend to clearly define colors. Colors used shall be clearly reproducible through electronic scanning process into color PDF format.
   6. Note construction field change directive numbers, alternate numbers, change order numbers, and similar identification, where applicable.
   7. Mark changes to the documents caused by RFI responses with RFI designation.
8. Mark new information that is important to Owner, but was not shown on Contract Drawings or Shop Drawings.

9. Legibly and to scale, mark a reproducible set of Contract Drawings to record actual construction, including:
   a. Measured depths of foundations and footings encountered, measured in relation to finish first floor datum.
   b. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent ground improvements.
   c. Field changes of dimension and detail.
   d. Details not on original Contract Drawings: Application of copies of details produced and provided by Architect during construction will be accepted.

B. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location on every sheet of Record Set whether all Drawings contain record marks or not.

1. Organize Record Drawings into manageable set. Include identification on cover sheets. Logically number added sheets to fit established numbering and sequence.

2. Scan each Record Drawing whether it contains marks or not and create a color PDF of each drawing. Make three sets.

3. Bind each set with durable paper cover sheets with chip board front and back binding strip and three Chicago bolts for each set.

4. Provide the following identification on each Record Drawing:
   a. Project name.
   b. Date.
   c. Designation "PROJECT RECORD DRAWINGS."
   d. Name of contractor.
   e. Name of individual who prepared record information.

2.2 Record Specifications

A. Mark Specifications to indicate the actual product or method of installation that varies from that indicated in Contract Documents, addenda, and contract modifications. Same individual marking Record Drawings shall mark Record Specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, installer, catalog numbers and other information necessary to provide a record of selections made.

4. Note related change orders.

5. Indicate product substitutions and alternates utilized.

6. Use neat block lettering to mark information. Use red pencil to mark changes. Do not write over text or on backs of pages.

7. Make 3 color copies of Record Specifications and bind with plastic covers using 3 Chicago bolts for each copy.

2.3 Record Submittal Data

A. Mark Submittal Data to indicate the actual product installation where installation varies substantially from that indicated in submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications and Record Drawings where applicable.

2.4 Miscellaneous Record Information

A. Assemble miscellaneous records required in connection with actual performance of the work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
   
   1. RFIs and RFI Log.
   2. FCDs and FCD Log.
   3. Change Orders.

PART 3 - EXECUTION

3.1 Recording and Maintenance

A. Maintain one copy of each Record Document during the construction period for. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of project.

B. Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, in a fire resistive location, protected from deterioration and loss. Provide access to Project Record Documents for Owner’s and Architect's reference during normal working hours.

End of Section 01 78 39
SECTION 01 79 00 - Demonstration and Training

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 01 31 00 “Project Management and Coordination.”
   2. Section 01 32 33 “Photographic Documentation.”
   3. Section 01 60 00 “Product Requirements.”
   4. Section 01 73 00 “Execution Requirements.”
   5. Section 01 77 00 “Closeout Procedures.”
   6. Section 01 78 23 “Operation and Maintenance Data.”
   7. Section 01 78 39 “Project Record Documents.”

1.2 Instruction Information

A. Provide instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

B. Provide demonstration and training DVD’s within 7 (seven) days of end of each training module.

1.3 Quality Assurance

A. Provide firms and individuals experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this project, and whose work has resulted in training or education with a record of successful learning performance.

B. Provide factory-authorized service representatives, complying with requirements in Section 01 40 00 “Quality Requirements,” experienced in operation and maintenance procedures and training.

C. Conduct pre-training meeting at project site. Review methods and procedures related to demonstration and training. Coordinate and arrange demonstration and training times with Owner.

D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Owner.

PART 2 - PRODUCTS

2.1 Instruction Program

A. Develop an instruction program for each system and equipment item.

B. Develop learning objectives and teaching outlines. Include a description of specific skills and knowledge that participant is expected to master. Include instruction for each system based on the following:
1. Operation.
2. Documentation.
3. Emergencies.
5. Use operations and maintenance manuals as instruction guide.
6. Adjustments.
7. Troubleshooting.
8. Maintenance.
9. Repairs.

C. Prepare and insert additional data in operation and maintenance manuals when need for such date becomes apparent during construction.

PART 3 - Execution

3.1 Instruction

A. Engage a qualified facilitator to prepare instruction program, to coordinate instructors, and to coordinate between contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with Owner with at least 7 (seven) days' advance notice.

D. At conclusion of training session, assess and document each participant's mastery of information by use of a demonstration performance-based test.

E. Assemble, produce and provide all training materials, visual aids and tools.

3.2 Demonstration and Training

A. Demonstrate operation and maintenance of products to Owner’s personnel within seven (7) calendar days of Substantial Completion and prior to occupancy.

B. For equipment or systems requiring seasonal operation, perform demonstration for other seasons within six (6) months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner’s personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at agreed-upon times at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.
G. Record demonstration and training. Record each training session separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training session, record each chart containing learning objective and lesson outline.

H. Provide high-quality video in DVD format.

I. Describe scenes on video by audio narration by microphone while video is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction and elevation or story of construction.

J. At conclusion of training, assess and document each participant’s mastery of module by use of a demonstration performance-based test.

K. Restore systems and equipment to condition existing before demonstration.

End of Section 01 79 00
SECTION 02 41 19 - Selective Demolition

PART 1 - General

1.1 Related Documents
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 Definitions
A. Remove: Detach items from existing construction in their entirety as required for new construction and legally dispose of them off-site.
B. Salvage: Detach items from existing construction and deliver them to Owner.
C. Remove and Reinstall: Detach items from existing construction in their entirety as required for new construction, prepare them for reuse, and reinstall them where indicated.
D. Existing to Remain: Existing items of construction that are not to be removed and will remain functional.
E. Abandon: Existing items of construction that are to be disconnected, shutdown and left in place.

1.3 Quality Assurance
A. Provide the services of an experienced firm that has specialized in demolition work similar in material and extent to that indicated for this project.
B. Provide a Refrigerant Recovery Technician certified by an EPA-approved certification program.
C. Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Comply with all applicable storm water, erosion and air quality regulations.
D. Standards: Comply with ANSI A10.6 and NFPA 241.
E. Conduct pre-demolition meeting at project site. Review methods and procedures related to selective demolition. Issue meeting minutes.
F. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.4 Project Conditions
A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical. Owner assumes no responsibility for condition of areas to be selectively demolished.
C. Compare existing conditions with Construction Documents before proceeding with selective demolition. Immediately provide written RFI to Architect for resolution of any conflicts found.
D. It is not expected that hazardous materials are present within the existing conditions.
   1. Known hazardous materials will be removed by Owner before start of the work under a separate
      contract.
   2. If hazardous materials are encountered or suspected, do not disturb; immediately notify Owner in
      writing. Owner will remove hazardous materials under a separate contract.

E. Maintain existing utilities indicated to remain in service and protect them against damage during selective
   demolition operations. Re-route utilities if necessary to maintain service, without disruption of service, at
   no additional cost or time to Contract. Maintain fire-protection facilities in service during selective
   demolition operations.

F. Verify depth and locations of existing utilities to remain prior to start of selective demolition.

G. Storage or sale of removed items or materials on-site will not be permitted.

1.5 Warranty

A. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by
   methods and with materials so as not to void existing warranties.

PART 2 - Products

2.1 Repair Materials

A. Provide necessary framing, blocking and support of openings cut into existing decks, walls, roofs and
   other substrates. Provide support in same depths as adjacent framing.

B. Use repair materials identical to existing materials.
   1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that
      visually match existing adjacent surfaces to the fullest extent possible.
   2. Use materials whose installed performances equal or surpass that of existing materials.

C. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - Execution

3.1 Examination

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective
   demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or
   design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a
   written RFI to Architect immediately.

E. Engage a professional engineer to survey condition of building to determine whether removing any
   element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent
structures during selective demolition operations. If such condition exists submit written RFI to Architect immediately.

F. Record existing conditions by use of measured drawings, preconstruction photographs and templates. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final work, make permanent record of measurements, materials, assembly, construction, connection and interface with other materials, as needed to make exact reproduction.

G. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

H. Proceeding with selective demolition work constitutes acceptance of substrate conditions by contractor.

3.2 Mechanical/Electrical Systems

A. Maintain systems and components indicated to remain and protect them against damage during selective demolition operations.

B. Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary systems that bypass area of selective demolition and that maintain continuity of systems to other parts of building.
   3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 Preparation

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
   2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
   3. Protect existing site improvements, appurtenances, and landscaping to remain.

C. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
D. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add supports when required to adequately support surrounding work during progress of selective demolition.

E. Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

3.4 Selective Demolition

A. Demolish and remove existing construction only to the extent indicated and as required by new construction. Use methods required to complete the work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain adequate ventilation when using cutting torches.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly. Remove decayed, infested, corroding or otherwise dangerous unsuitable materials promptly.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and prevent ground impact and dust generation.

B. Removed and Salvaged Items:

1. Clean and repair items.
2. Pack or crate items. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 Selective Demolition Procedures for Specific Materials
A. Demolish concrete in sections. Cleanly cut concrete full depth at junctures with construction to remain and at regular intervals, then remove concrete between saw cuts.

B. Demolish masonry in small sections. Cleanly cut masonry at junctures with construction to remain, and then remove masonry between saw cuts.

C. Saw-cut perimeter of slab on grade areas to be demolished, then break up and remove.

D. Remove resilient floor coverings according to recommendations in RFCI-WP and its Addendum. Remove residual adhesive and prepare substrate for new floor coverings by method recommended in writing by floor finish manufacturer.

E. Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
   1. Remove existing roof membrane, flashings, copings, and roof accessories.
   2. Remove existing roofing system down to substrate.

F. Remove air conditioning equipment without releasing refrigerants.

3.6 Disposal of Demolished Materials

A. Remove demolished materials from project site. Comply with requirements of Section 01 74 19 “Construction Waste Management.”

B. Do not burn demolished materials.

C. Do not discard or bury demolished materials.

3.7 Cleaning

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
SECTION 03 30 00 - Cast-In-Place Concrete

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 07 92 00 “Sealants.”
   2. Section 08 11 13 “Steel Doors and Frames.”
   3. Section 08 31 13 “Access Doors and Frames.”
   4. Section 09 90 00 “Painting.”

1.2 Submittals

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

B. General: Submit in accordance with Division 01.

C. Samples: Submit product samples when requested by Architect or testing laboratory.

D. Quality Assurance/Control Submittals:
   1. Certificates:
      a. Manufacturer’s certification that materials (cementitious materials, aggregates and admixtures) conform to specifications.
      b. Manufacturer’s certificate of compatibility stating that curing materials and slab surface treatments are compatible with subsequent floor finishes and adhesives.

1.3 Quality Assurance

A. Provide a qualified installer who employs on project personnel qualified as ACI-certified.

1.4 Coordination

A. Coordinate concrete work with other Sections which require placement of embedded products.

PART 2 - Products

2.1 Grouting, Bonding and Patching Materials


   1. Acceptable products:
b. Flo-Top by The Euclid Chemical Co.
c. US SPEC Self-Leveling Underlayment by US Mix Products Co.
d. Or accepted equal.

B. Repair Mortar: Exceeds ASTM C928, R1 and R2; rapid setting – minimum 1300 psi at 3 hours; 5500 psi at 7 days per ASTM C109.

1. Acceptable products:
   a. Emaco T415/430 or 1060/1061 Repair Mortars by BASF Corporation – Building Systems.
   b. Euco-Speed by The Euclid Chemical Co.
   c. US SPEC Transpatch by US Mix Products Co.

PART 3 - Execution

3.1 Examination

A. Examine and verify the following prior to concrete patching.

1. Coordination with related work is completed.

3.2 Miscellaneous Concrete Items

A. Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the work.

3.3 Concrete Surface Repairs

A. Repair and patch defective areas when approved by Architect. Remove and replace concrete elements that cannot be repaired and patched to Architect's approval.

B. Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color.

C. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than ½ inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct low areas by cutting and removing low areas in their entirety and replacing with new concrete. Finish repaired areas to blend with adjacent concrete.
4. Correct interior low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Obtain acceptance of Architect prior to performing repairs to structural concrete.

F. Repair methods not specified above may be used, subject to acceptance of Architect.

G. Achieve flat, level planes except where slopes or grades are indicated. Tolerances shall be in accordance with FF (flatness) and FL (levelness) as defined in ACI 117 for both slabs on grade and concrete fill on steel decking.
### 3.4 Floor and Slab Curing and Finishing Schedule

<table>
<thead>
<tr>
<th>Location</th>
<th>Finishing</th>
<th>Curing and Sealing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior concrete slab on grade floors, to be covered by direct application of ceramic tile.</td>
<td>Smooth trowel finish with light broom texture: F(_r)35-F(_r)25 SOV / F(_r)24-F(_r)16 MLV</td>
<td>Moist cure only. Do not apply sealer or hardener.</td>
</tr>
<tr>
<td>Interior concrete slab on grade floors to receive adhesively-applied or loose laid floor covering</td>
<td>Smooth trowel finish: F(_r)35-F(_r)25 SOV / F(_r)24-F(_r)16 MLV</td>
<td>Moist cure only; do not use curing compound. After curing is completed, clean floor with suitable cleaning agents to dustfree condition, leaving surface suitable for adhesive application of finish floor coverings. Verify moisture vapor transmission rate.</td>
</tr>
<tr>
<td>Interior concrete on metal decking, to be covered by direct application of ceramic tile.</td>
<td>Smooth trowel finish with light broom texture. Floor finish flatness, as measured by placing freestanding (unleveled) 10 foot straightedge anywhere on concrete floor and allowing it to rest upon two high spots, within 72 hours of concrete placement. Gap at any point between straightedge and floor (and between high spots) shall not exceed 5/16 inch.</td>
<td>Moist cure only. Do not apply sealer or hardener.</td>
</tr>
<tr>
<td>Interior concrete on metal decking, to receive adhesively-applied or loose laid floor covering.</td>
<td>Smooth trowel finish. Floor finish flatness, as measured by placing freestanding (unleveled) 10 foot straightedge anywhere on concrete floor and allowing it to rest upon two high spots, within 72 hours of concrete placement. Gap at any point between straightedge and floor (and between high spots) shall not exceed 5/16 inch.</td>
<td>Moist cure only; do not use curing compound. After curing is completed, clean floor with suitable cleaning agents to dustfree condition, leaving surface suitable for adhesive application of finish floor coverings. Verify moisture vapor transmission rate.</td>
</tr>
<tr>
<td>Interior floors to remain exposed, in service areas and equipment rooms.</td>
<td>Smooth trowel finish: F(_r)35-F(_r)25 SOV / F(_r)24-F(_r)16 MLV. Provide overall slope as indicated on the Drawings, within Floor Levelness FL criteria specified above.</td>
<td>Moist cure only; do not use curing compound. After curing is completed, clean floor with suitable cleaning agents and apply concrete hardening compound.</td>
</tr>
<tr>
<td>Exterior slabs (not paving)</td>
<td>Trowel finish with specified broom texture; F(_r)20-F(_r)15 SOV, sloped to drain.</td>
<td>Moist cure only; do not use curing compound. After curing, clean concrete and apply concrete hardening and sealing compound.</td>
</tr>
</tbody>
</table>

**End of Section 03 30 00**
SECTION 05 40 00 - Cold-Formed Metal Framing

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 08 11 13 “Steel Doors and Frames.”
3. Section 08 31 13 “Access Doors and Frames.”
4. Section 09 22 16 “Non-Structural Metal Framing.”
5. Section 09 29 00 “Gypsum Board.”

1.2 Performance Requirements

A. ASTM A 653, steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process.

B. ASTM A 1003, Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

C. AISI, North American Specification for the Design of Cold Formed Steel Structural Members.

D. AWS D1.3, Structural Welding Code, Sheet Steel.


F. ASTM C 645, nonstructural steel framing members.

G. ASTM C 954, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inches to 0.112 inches in thickness.

H. ASTM C 955, 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.


J. ASTM A 90, weight (mass) of coatings on iron and steel articles with zinc or zinc-alloy coatings.

K. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120° F.

L. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
M. All cold-formed structural metal framing shall be designed in accordance with American Iron and Steel Institute (AISI) North American Specification for the Design of Cold Formed Steel Structural Members.

N. Where stud sizes and connections have been indicated on drawings, do not substitute with items of lesser structural capacity.

O. Design exterior wall framing to accommodate lateral deflection without regard to contribution of sheathing materials.

P. Design the wall system to avoid introducing load eccentricities from connections to the structural steel framing. Where the wall system connections introduce load eccentricities that are unacceptable to the Engineer of Record, provide bracing to the satisfaction of the Engineer of Record. The cost of such bracing shall be the contractor’s responsibility.

1.3 Submittals

A. Product Data: For each type of cold-formed metal framing product and accessory indicated. Submit manufacturer’s specifications, descriptive literature and load tables. Submit manufacturer’s erection instructions.

B. Shop Drawings: Provide shop drawings prepared by cold-formed metal framing manufacturer. Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional Structural Engineer, registered in the state of the project, responsible for their preparation.

1.4 Quality Assurance

A. Take engineering responsibility for preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Provide professional engineer who is legally qualified to practice in jurisdiction where project is located and who is experienced in providing engineering services of the kind required. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those required for this project in material, design, and extent. Provide all services required to submit and satisfy the local governing agencies for plan check procedures and receiving all permits and approvals required for this portion of the work.


D. Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.

1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated in drawings.

2. Rated assemblies to be substantiated, from applicable testing using the proposed products, by contractor.
3. Both metal framing and wallboard manufacturers must submit written confirmation that they accept the other manufacturer’s products as a suitable component in the assembly. Acceptance is as follows:

   a. If installation of both products is proper, no adverse effect will result in the performance of one manufacturer’s product by the other’s products.
   b. Combining products can be substantiated by required assembly tests.

E. AISI Specifications and Standards: Comply with AISI’s "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI’s "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI’s "Standard for Cold-Formed Steel Framing - Header Design."

F. Conduct pre-installation meeting at project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

G. Engage an experienced fabricator/installer who has at least 5 years cold-formed metal framing experience similar in material, design, and extent to that indicated. Installer to provide workers and supervision that is experienced in the installation of cold-formed metal framing.

H. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

I. Coordinate and participate in fabrication of mockups required by other sections of work.

1.5 Delivery, Storage, and Handling

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI’s “Code of Standard Practice.”

B. Store cold-formed metal framing off ground in a dry location, protect with a waterproof covering, and ventilate to avoid condensation in accordance with AISI’s “Code of Standard Practice.”

1.6 Coordination

A. Verify and coordinate work of trades before and during framing to assure adequate wall framing and backing is installed for all wall and ceiling attached such as but not limited to:

1. Handrails.
2. Chalkboards and marker-boards.
3. Other similar architectural features and accessories.
4. Projection screens.
5. Light fixtures.
7. Wall mounted door bumpers and stops.
8. Acoustical panels.
10. Doors.
11. Wall-mounted hangers for plumbing, mechanical and electrical equipment and brackets.

B. Coordinate with other Sections to determine mockup requirements requiring framing.
C. Coordinate with other Sections to determine blocking and backing requirements.

D. Coordinate erection of studs/joists with installation of service utilities to minimize discontinuity in framing. Align stud web openings.

E. Provide framed openings for all recessed components. Coordinate erection of framing with installation of service utilities to minimize discontinuity in framing. Align stud web openings.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide cold-formed metal framing by one of, or equal to, the following:

1. CEMCO.
2. Clark Western Building Systems
3. Consolidated Fabrication Corporation.
4. Dietrich Metal Framing; a Worthington Industries Company.
5. United Metal Products, Inc.

2.2 Materials

A. Studs: ASTM A 653-08 SS Grade 33, types, sizes and gages as indicated on Drawings, punched web unless otherwise indicated, with screw-type flanges.

B. Studs, 16 Gage and Heavier: ASTM A 653-08 SS Grade 50, Class 1, types, sizes and gages as indicated on Drawings, punched web unless otherwise indicated, with screw-type flanges.

C. Joists: ASTM A 653-08 SS Grade 50, Class 1, types, sizes and gages as indicated on Drawings, punched web unless otherwise indicated, configured to permit nesting.

D. Top Track:

1. Dietrich Metal Framing SLP-TRK by Brady Construction Innovations, Inc., ICC Report No. ESR-1042, or approved equal, same gage and material as wall framing or 16 gage, whichever is more restrictive, slotted leg width to suit stud width.
2. Slotted Track CST by CEMCO, ICC Report No. ESR-1042, or approved equal, same gage and material as wall framing or 16 gage, whichever is more restrictive.

E. Bottom Track: Same gage and material as wall framing or 20 gage, whichever is more restrictive, 1 inch leg unless noted otherwise, width to suit stud width.

F. Sills and Headers: Unpunched channels sized for stud flanges, gage the same as studs unless otherwise noted. Provide extended leg tracks at ceiling tracks under structural framing members and at sill tracks where flooring underlayment will be placed (poured) after wall framing.

G. Connector Devices: As indicated on Drawings.

H. Bridging: 20 gage, unless noted otherwise. Subject to requirements, provide:

1. Dietrich Metal Framing; Spazzer® 5400 Bridging and Bracing Bar (SPZS) or approved equal.
2. Dietrich Metal Framing; EasyClip™ U-Series™ Clip Angle or approved equal.

2.3 Framing Accessories

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.

C. Provide specified, indicated and necessary clips, plates, bent plates, angles, channels, and similar components to secure materials, equipment and items of work specified in other Sections. This Section is not intended to specify each and every item of cold-formed structural metal framing required to complete the work. Coordinate with various trades and Sections of work for specific requirements.

2.4 Anchors, Clips, and Fasteners

A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.


F. Welding Electrodes: Comply with AWS standards.

2.5 Miscellaneous Materials

A. Galvanizing Repair Paint: SSPC-Paint 20.

B. Provide premixed, nonmetallic, noncorrosive, nonstaining exterior grade grout containing selected silica sands, Portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

C. Provide load bearing, high-density multimonomer plastic, nonleaching shims.
D. Provide closed-cell neoprene foam, 1/4 inch thick sealing gaskets in widths to match width of bottom track or rim track members.

2.6 Fabrication

A. Cold-formed metal framing may be shop or field fabricated. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI’s specifications and standards, manufacturer’s written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing; do not shear torch cut.
3. Fasten cold-formed metal framing members by welding, bolting, or screw fastening. Wire tying, riveting or clinch fastening of framing members is not permitted.
   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate screws and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet. Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch. Space individual framing members as indicated and no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheeting or other finish materials.

PART 3 - Execution

3.1 Examination

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation constitutes acceptance of conditions by contractor.

3.2 Preparation

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Grout bearing surfaces to ensure full contact between the underside of bottom track or rim track and the top of foundation wall or slab to ensure a uniform and level bearing surface on supporting concrete or masonry construction.
D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 General Installation

A. Conform to ASTM C 955 for bracing and bridging for screw application of gypsum board, gypsum sheathing and plaster lath.

B. Place and align tracks and install framing to configurations and spacings shown on Drawings.

C. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

D. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

E. Securely anchor cold-formed framing to supporting structure. Screw, bolt, or weld wall framing at horizontal and vertical junctures to produce flush, even, true-to-line joints with minimum variation in plane and true position not exceeding 1/16 inch.

F. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened. Coordinate framing with adjoining work.

1. Cut framing members by sawing; do not shear torch cut.
2. Fasten cold-formed metal framing members by welding, bolting, or screw fastening. Wire tying, clinch fastening, or riveting of framing members is not permitted.
   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate screws and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
3. Drill holes; do not punch or use cutting torch.
4. Cut framing components squarely for attachment to perpendicular members or, as required, for an angular fit against abutting members.

G. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

H. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

I. Install insulation in framed walls and give particular consideration to framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work and areas that will receive pre-boarding prior to being concealed.

J. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

K. Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
L. Install framing members in one-piece lengths. Splice connections for tracks may be used only if indicated.

M. Install temporary bracing and supports to secure and support framing. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

N. Install insulation in framing work that will be inaccessible on completion of framing work and areas that will receive pre-boarding prior to being concealed. Give particular consideration to framing members, such as headers, sills, boxed joists, and multiple studs at openings.

O. Control joints for expansion and contraction in the walls shall be constructed with double studs separated as indicated on drawings. Control joint spacing shall not exceed 30-feet. Ceiling-height door frames may be used as vertical control joints. Door frames of less than ceiling height may be used as control joints only if standard control joints extend to ceiling from both corners of top of door frame. Control joints between studs shall be filled with firesafing insulation in fire rated partitions.

P. Install all supplementary framing, blocking, and backing required to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

3.4 Joist Installation

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated.

C. Space joists not more than 2 inches from abutting walls, and as indicated.

D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.

E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at intervals indicated. Fasten bridging at each joist intersection as indicated.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.5 Sound Insulated Walls and Partitions

A. Embed floor runner tracks in two beads of acoustical sealant or two strips of compressed tape seal. Install the top track in same manner for full-height insulated walls. Where wall ends abut concrete, masonry, or steel, set end studs in two beads of acoustical sealant or two tape seals and secure at 4-foot centers vertically. At irregularities in surfaces, provide additional layers of sealant or tape as required to obtain compression.
3.6 **Backing Plates and Anchorage**

A. Install plates of lengths to span over at least three stud supports, equipped with two countersunk machine screws at each support except plates may be welded to supports 16 gage or heavier. Wall-mounted items requiring backing plates include but are not limited to items in this Section.

3.7 **Field Quality Control**

A. Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to continuous inspection and subsequent testing.

C. Testing agency will report test results promptly and in writing to contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 **Repairs and Protection**

A. Prepare and repair damaged galvanized coatings on installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

**END OF SECTION 05 40 00**
SECTION 06 20 00 – Finish Carpentry

PART 1 - General

1.1 Section Includes

A. Finish carpentry items, other than shop fabricated casework.

B. Hardware and attachment accessories.

1.2 References

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Division 01 for definitions, acronyms, and abbreviations.

B. Unless otherwise noted, standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes.

C. Referenced Standards:

1. PS 51-71- Hardwood and Decorative Plywood.
2. WI/AWI Architectural Woodwork Standards, including WI Supplemental Text.

1.3 Submittals

A. Submit under provisions of Division 01.

B. Shop Drawings: Shop drawings shall include details and erection data associated with the work of other trades; location; materials, species of wood; quality grade; type of finish; profiles, dimensions; fastenings and clearances. Detail drawings shall be either full size or 3” = 1’.

1. The mill shall take and be responsible for all field measurements required for the proper fabrication and installation of the work. Show all field dimensions beyond control of mill.
2. Coordinate dimensions and installation requirements of Owner furnished equipment.

C. Certification:

1. Submit WI Compliance certification covering all work of this Section prior to delivery of any materials to the job site.
2. Grade mark and mill identification of the association having jurisdiction shall appear distinctly legible on the back of each piece of lumber and plywood. No marks shall appear on exposed faces of work to receive transparent or semi-transparent finish.

D. Samples: Submit samples of all interior and exterior trim materials. Samples shall be finished as specified and submitted for color and material approval prior to delivery and installation.

1.4 Quality Assurance

A. Standards of Construction: All work shall be manufactured in accordance with WI/AWI Architectural Woodwork Standards, all supplements, and in the grades hereinafter specified.
B. Installer's Qualifications: Use only journeymen finish carpenters who are thoroughly trained and experienced in the skills required for the cutting and fitting of trim and finish materials.

C. Installation Acceptance: All rejected work shall be removed and replaced with no additional cost to the Owner.

1.5 Delivery, Storage and Handling

A. Delivery: Do not deliver to the job site until suitable storage space is available.

B. Storage, Handling and Protection: Provide all work or materials necessary to store, cover and protect all materials specified to be furnished and installed under this Section. Store all materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Avoid any marring and keep the materials clean during handling and installation operations. Protect exposed finish work and materials after their erection from damage of any character. Work damaged shall be repaired or replaced by the Design-Build Entity without additional cost to the Owner.

PART 2 - Products

2.1 Materials

A. All Material Grades and Construction shall be WI Custom Grade, including all supplements, unless specified or indicated otherwise. Semi-exposed and other components shall be as permitted by WI/AWI Architectural Woodwork Standards for construction quality specified herein except as otherwise detailed or specified. Moisture content shall be in accordance with WI/AWI Architectural Woodwork Standards.

B. Interior Trim and Handrails, Opaque Finish: Birch, solid stock, S4S.

C. Interior Hardwood Trim and Handrails, Transparent Finish: WI custom grade birch, S4S, solid stock.

D. Adhesives:

   1. For Interior Work: CS 35-61 Type II (water-resistant). Shall withstand cold-soak tests specified in PS 51-71.

2.2 Fabrication, General

A. Moisture content for all finish carpentry shall be between 6 percent and 12 percent, consistent with the average atmospheric conditions at the project.

B. Scribing Allowance: Provide at walls, ceilings, etc., in accordance with WI/AWI Architectural Woodwork Standards.

C. Trim Members shall have the reverse side "backed out" when they are 5/8 inch thick or more, or 1-5/8 inch or more wide.

D. Surfaces: Machine sanded on all flat top face areas, smoothly machine run in all depressed flat surfaces and on molded contours. Sander marks shall be fine enough to be completely concealed by the painter's applied finish work. All members shall be finished true and straight, with all edges clean cut and all exposed surfaces free from all working defects.

E. Lengths shall be those usually available in the species specified.
F. Milling: All finish carpentry and millwork members shall be milled to dimensions and profiles indicated. Provide surface applied or plowed stops of the profile and dimension shown. Except where exact lengths can be determined, all members and materials shall be provided "long" for cutting and fitting in the field. Built-up members shall be fabricated as detailed and shall be carefully assembled to provide a finished product that is free from warp and defects and is true to line.

1. Assemble in the mill in as large units as practicable to minimize field cutting and fitting. Where necessary to fit at the site, provide ample allowance for cutting and fitting.

PART 3 - Execution

3.1 Conditions of Surfaces

A. Examine all framing, grounds, stripping and blocking to secure finish carpentry and trim. Do not install finish carpentry and trim until all defects are corrected.

3.2 Installation

A. Workmanship Quality: All wood finish shall be installed level, plumb and true, with members neatly and accurately scribed in place. All trim shall be applied in lengths as long as practicable. Butt joints shall be beveled together, exterior angles mitered and interior angles coped, unless shown otherwise. All exposed nails and screws shall be set for putty unless indicated or specified otherwise.

B. Wood Trim: Set plumb and square. Verify wall thickness for proper trim width. Anchor trim securely to structure to prevent rotation or damage. All wood trim installed in the field shall be carefully cut to length and all joints neatly made to provide for tight, rigid connections.

C. Architectural Wall Surfacing System: System shall be installed per manufacturer’s recommendations and as follows:

1. Provide a smooth, straight, solid and clean wall surface.
2. Install system level, plumb and true.
3. Install trim as shown and as required for a complete, finished system.

D. Plywood back boards for electrical, telephone, and similar types of wall mounted equipment shall be provided as indicated and as required by design conditions. Plywood back boards may be installed either horizontally or vertically.

3.3 Miscellaneous

A. Provide and install all miscellaneous finish carpentry items to conform to the workmanship quality specified above and shown on the Drawings. Millwork shall be installed in a neat, workmanlike manner, free of hammer marks and surface defects. Pieces shall fit together neatly with all corners mitered. Where items are indicated to be painted, do not install finish carpentry until it has been backprimed as specified in Section 09 91 00.

B. Design-Build Entity is responsible for all required backing for cabinets or other work prior to applied finishes to rough framing

3.4 Clean-up

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free of accumulations of sawdust, cut-ends and debris.
B. Clean-up: Upon completion of the work of this Section, remove all surplus materials, rubbish and debris from the premises and leave "broom clean."

End of Section 06 20 00
SECTION 07 21 00 – Insulation

PART 1 - General

1.1 General

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 05 40 00 “Cold-Formed Metal Framing.”
2. Section 06 20 00 “Finish Carpentry.”
3. Section 07 92 00 “Sealants.”
4. Section 08 11 13 “Steel Doors and Frames.”
5. Section 09 22 16 “Non-Structural Metal Framing.”
6. Section 10 44 00 “Fire-Protection Specialties.”
7. Division 23 Heating, Ventilating, and Air Conditioning Sections.
8. Division 26 Electrical Sections.
9. Division 27 Communications Sections.

1.2 Performance Requirements

A. Provide insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181.

1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 25000-fpm air velocity.
2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with Chaetomium globosium on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

B. Provide insulation materials with non-combustible components with a flame spread of 25.

1.3 Submittals

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

B. Samples:

1. Submit one 12 x 12 sample of each type of insulation specified.
2. Submit samples of required fasteners.

1.4 Quality Assurance

A. Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics. Identify materials with appropriate markings of applicable testing and inspecting agency.

B. Certification:
1. Submit certification that insulation material and installation conform to requirements of CBC Title 24 Energy Compliance Regulations.

C. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

D. Coordinate with other Sections of work with regards to providing materials and installation for mockups.

E. Do not install insulation products of any kind when any water is present or substrates are damp or wet.

F. Kraft and standard foil facings will burn and must not be left exposed. Protect facing from any open flame or heat source.

G. Provide materials, not specifically specified but required for a complete and proper installation of the work in this Section.

1.5 Delivery, Storage and Handling

A. Deliver materials to site in manufacturer’s unopened and undamaged original commercial containers bearing the following legible information:

   1. Name of manufacturer.
   2. Brand designation.
   3. Specification number, type, and class, as applicable, where materials are covered by a referenced specification.
   4. Asphalt flashpoint (FP), equiviscous temperature (EVT), and finished blowing temperature (FBT).
   5. R value, if applicable.
   6. Production date or product code.

B. Store and handle materials in a manner to protect from damage, exposure to open flame or other ignition sources, and from wetting, condensation or moisture absorption. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Store materials off ground. Protect against weather, condensation, and damage. Replace damaged material with new material. Store board materials flat on pallets. Cover materials with waterproof tarp.

1.6 Scheduling

A. Coordinate installation with placement and fitting with work specified in other Sections.

B. Do not install insulation until construction has progressed to the point that inclement weather will not damage or wet the insulation material.

C. Install insulation after electric wiring, plumbing, and other concealed work is in place.

D. Insulation shall not be closed in until it has been inspected and approved.

PART 2 - Products

2.1 Glass-Fiber Blanket Insulation

A. Subject to requirements, provide products by one of, or equal to the following:

   1. CertainTeed Corporation.
2. Johns Manville.
3. Owens Corning.

B. Batt Insulation: Preformed glass fiber batt in accordance with 2010 CBC Section 719, California Referenced Standards Code Chapter 12-13, ASTM E84, and UL 723, conforming to the following:

1. Facings:
   a. Faced on one side with foil reinforced kraft (FSK) face at exposed locations (facing not covered by finish materials); Type III, Class A per ASTM C665; flame spread 25 and smoke developed 50 per ASTM E84.
   b. Kraft facing at locations where insulation will be covered by finish materials; Type II, Class C per ASTM C665. In concealed locations, facings shall be installed behind and in substantial contact with the unexposed surface of the ceiling, floor or wall finish.
   c. Unfaced insulation not allowed.

2. Provide formaldehyde-free thermal insulation

C. In addition to locations indicated on Drawings, provide at all interior walls and partitions including shaft walls, utility rooms, electrical rooms, toilet rooms and mechanical rooms. Provide above all restroom ceilings.

D. Provide blankets in batt or roll form with thermal resistances indicated.

2.2 Insulation Fasteners

A. Provide all necessary staples, tape, wires and other needed fasteners necessary and needed to fasten and support insulation as recommended in writing by insulation manufacturer.

B. Staples: Stainless steel, monel, or copper-coated steel, size directed by batt manufacturer or required by Code.

PART 3 - Execution

3.1 Examination and Preparation

A. Surfaces and cavities shall be clean, smooth, and dry. Check surfaces, including surfaces sloped to drains and outlets, for defects before starting work. Inspect the surfaces immediately before starting installation.

B. Verify mechanical, plumbing and electrical systems within the above ceiling space have been tested and inspected.

C. Correct defects and inaccuracies in existing surfaces prior to proceeding with insulation work. Proceeding with insulation work constitutes acceptance of substrate conditions by contractor.

3.2 Installation, General

A. Comply with insulation manufacturer's written instructions applicable to products, conditions and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement. Place insulation so voids are completely filled and so insulation makes full contact with surfaces on all sides of void. Place insulation so insulation facings make substantial contact with finish board or panel.

D. If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and so that insulation encapsulates and surrounds piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

F. Install batts with close fit, free of gaps, holes, or sagging. Supplement the installation with wire ties, adhesive, spindle anchors, or staples where required by manufacturer’s written requirements to prevent sagging. Provide spindle anchors where shown or necessary in accordance with manufacturer’s instructions, spaced at maximum 12-inch centers both ways.

G. Insert batts between ceiling joints and fill entire cavity, so that top of insulation is level with top of framing members and face is snug with finish material. Do not install insulation over recessed lighting fixtures, speakers, or other heat producing elements in the ceilings. At junction boxes, access panels and other items requiring access above or below the ceiling, cut insulation on each side to fit the item and install loosely on top. Fit insulation snugly around ducts, conduits, pipes and other items projecting through the ceiling construction.

H. Install acoustic insulation continuously between studs from finish floor to top of wall. Where cutouts are made for J-boxes, conduit, piping, and like items, back wall insulation with insulation so that one additional layer of insulation at least 24 inches wide and high is placed in back of cutout. Snugly fit in place free of gaps or holes.

I. Fill around all penetrations with insulation.

J. Fit insulation around ducting, piping, wiring and other obstructions.

K. Stagger end joints between studs and between planes of multi-layer insulation.

L. Fill entire width of cavity between framing members with insulation.

M. Trim insulation neatly to fit non-standard framing cavity widths.

3.3 Installation of Building Insulation

A. Apply insulation units to substrates by method complying with manufacturer's written instructions.

B. Install glass-fiber insulation in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends. Place insulation so that voids are completely filled and so insulation makes full contact with surfaces on all sides of insulation

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members. If cavity is less than 96 inches in height or length, cut insulation to friction-fit.
3. Maintain 3-inch clearance between insulation and recessed lighting fixtures.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall provide friction-fit batts tightly fitted to stud webs and to metal furring after cover material has been installed on one side of the cavity. When unfaced insulation is used, and in applications without a cover material or where the stud depth is larger than the insulation thickness, use wire or metal straps to hold insulation in place. When faced insulation is used, the attachment flanges may be taped to the face of metal stud prior to applying the interior finish.
6. For wood-framed construction, install glass-fiber blankets according to ASTM C 1320 by lapping and stapling flanges, over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it. Friction-fit unfaced insulation between studs after cover material has been installed on one side of the cavity. When unfaced insulation is used, and in applications without a cover material, use wire or metal straps to hold insulation in place. When faced insulation is used staple attachment flanges to face or side of stud every 8 to 12 inches to prevent gaps along the edge of the vapor retarding facing.
7. Carefully cut to fit insulation around outlets, junction boxes and other irregularities and penetrations.
8. Where walls are not finished on both sides or insulation does not fill the cavity depth, supplementary support as recommended by insulation manufacturer must be provided to hold product in place.
9. Where insulation extends longer than 8 feet provide temporary support to hold product in place until the finish material is applied.

3.4 Protection

A. Remove work and materials that become damaged or wet during construction. Replace with new materials.

END OF SECTION 07 21 00
SECTION 07 84 00 - Through-Penetration Firestop Systems

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section “03 30 00” Cast-in-Place Concrete.”
2. Section 05 40 00 “Cold-Formed Metal Framing.”
3. Section 07 21 00 “Insulation.”
4. Section 07 92 00 “Sealants.”
5. Section 09 22 16 “Non-Structural Metal Framing.”
6. Section 09 29 00 “Gypsum Board.”
7. Division 23 Sections specifying duct and piping.
8. Division 26 Sections specifying cable and conduit.

1.2 Performance Requirements

A. For penetrations through fire-resistance-rated constructions, including both blank openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.

1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers, and smoke barriers.
2. Fire-resistance-rated horizontal assemblies including floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.

B. Provide through-penetration firestop systems with the following ratings determined per UL 1479.

1. Where applicable provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
2. Where applicable provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas.
3. Where applicable provide through-penetration firestop systems with L-ratings indicated of not more than 3.0 cfm/sq. ft. at both ambient temperatures and 400° F.
4. Where applicable provide products that meet the intent of the W-rating classification for passage of water per ANSI/UL 1479 for through-penetrations.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. Conform with the following Standards:

2. ASTM E 814 and UL 1479, Fire Tests of Through-Penetration Fire Stops.
3. ASTM C 719, Adhesion and Cohesion of Elastomeric Joint Sealant under Cyclic Movements.

F. Association: Manufacturer shall be a member or be approved by the “International Firestop Council.”

G. Provide firestop products that are flexible enough to allow for pipe vibration in a through-penetration application.

H. Provide products that bear classification marking of qualified independent testing agency.

I. Where firestop system is not listed by any listing agency as required due to project conditions, submit a substitution proposal with evidence specified.

J. Use only products specifically listed for use in listed systems.

K. Provide products that meet the intent of the state or local regulations on volatile organic compounds (VOC).

1.3 Submittals

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

1. Manufacturer’s product description and specifications.
2. Building Authority approvals or approval references.
3. Test reports indicating system compliance with requirements of this Section.
4. Manufacturer’s mixing, installation instructions and details.
5. Manufacturer’s storage and handling requirements.

B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction and type of penetrating item. Include firestop design designation of qualified testing agency that evidences compliance with requirements for each condition indicated.

1. Listing agency’s detailed drawing showing opening, penetrating item(s), and firestopping materials, identified with listing agency’s name and number or designation and fire rating achieved.
2. Where project conditions require modification to a particular through-penetration firestop condition, submit engineering judgment drawings, with modifications marked, based on International Firestop Council practices, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Submit and obtain approval by authority having jurisdiction.

C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
1. Types of penetrating items.
2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.

D. Samples: 12-inch by 12-inch for sheet goods, 12-inches-long for rolled and sealant products and actual product samples for all others.

1.4 Quality Assurance

A. Provide an installer who specializes in the installation of firestopping systems and that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors," and 5 years minimum documented experience installing through-penetration firestop systems similar in material, design, and extent to that indicated for this project, and whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to contractor or to installer engaged by contractor does not in itself confer qualification on buyer.

1. Installer shall meet all certification and qualification requirements of manufacturer of firestopping material and be certified by manufacturer.
2. Installer is acceptable to authorities having jurisdiction.
3. Installer has completed the manufacturer’s certified product installation training.

B. Assign installation responsibility of through-penetration firestop systems and fire-resistive joint systems in project to a single qualified installer.

C. All firestopping and smokestopping products shall be from a single manufacturer throughout the project, regardless of system or trade responsible for the penetrating components through the fire or smoke barrier. Manufacturer shall have a minimum 10 years documented experience in the manufacture and distribution of through-penetration firestopping products.

1. Products shall be manufactured in a facility that follows ISO 9001 best practices.
2. Products shall have undergone a formal life cycle assessment evaluating environmental impact.


E. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

F. Firestopping manufacturer’s representative shall be onsite during installation of firestop systems. Representative to issue report stating that firestopping installation meets manufacturer’s written requirements and requirements of UL Fire Resistance Directory requirements.

G. Firestopping systems do not re-establish structural integrity of an assembly.

H. Conform to building Code requirements for fire penetration seals and smokestopping. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by authorities having jurisdiction. All firestopping and smokestopping products shall be governed by current ICC Evaluation Service (ICC ES) Evaluation Report, as acceptable to authorities having jurisdiction. Where
manufacturer’s application procedures are in conflict with requirements of authorities having jurisdiction, the more strict requirements apply.

1.5 Delivery, Storage, and Handling

A. Deliver through-penetration firestop system products to project site in original, unopened containers or packages with intact and legible manufacturers’ labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, listing agency's classification marking applicable to project, curing time, and mixing instructions for multicomponent materials. Coordinate delivery of products to minimize storage time at site.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, direct sunlight and UV exposure or other causes. Follow manufacturer’s instructions.

C. Dispose of through-penetration firestop materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.6 Project Conditions

A. Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturer’s written recommendations, or when substrates are wet due to rain, frost, condensation, or other causes. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install firestopping under environmental conditions outside manufacturer’s absolute limits.

B. Provide ventilation of through-penetration firestop systems per manufacturer's written instructions.

1.7 Coordination

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements and required ratings. Coordinate with other trades to assure that firestop penetration materials and assemblies are installed at a time and manner that fits with sequence of work and does not delay work of other trades. Perform firestopping and smokestopping work after completion of work which penetrates fire and smoke barriers, but prior to covering up or eliminating access to the penetration.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

C. Notify Owner's inspector at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by Owner’s inspector, and building inspector, if required by authorities having jurisdiction.

1.8 Warranty

A. Provide written warranty for a period of 2 years that through-penetration firestopping will not fail or become displaced under operating conditions normal to the building.
PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

2. Hilti, Inc.
3. 3M; Fire Protection Products Division.
4. Tremco; Sealant/Weatherproofing Division.
5. USG Corporation.

2.2 Firestopping, General

A. Provide through-penetration firestop systems and components that are compatible with one another; compatible with the substrates forming openings; and compatible with penetrants, if any, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience. Provide firestop systems that are unaffected by water. Do not use firestop materials that contain solvents.

B. Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials.
2. Temporary forming materials.
5. Steel sleeves.

C. All firestopping and smokestopping materials, assemblies and installation details shall comply with all applicable codes and requirements of authorities having jurisdiction, including the Building Official and the Fire Marshal having jurisdiction over the facility.

D. It shall be the contractor’s responsibility to determine the types of penetrations and gaps to be sealed and to select appropriate firestopping and smokestopping system designs.

E. Provide products which:

1. Allow normal expansion and contraction movement of the penetrating or adjoining elements without failure of the penetration or gap seal.
2. Emit no hazardous, combustible, or irritating by-products during installation or curing period.
3. Do not require special tools for installation or maintenance, including removal and reinstallation of firestopping or smokestopping products to accommodate addition or deletion of penetrating components.

F. Where gunnable or pourable sealant is used, provide only fully-curting types of sealant where penetration accessible in the finished work.

G. Provide firestopping materials and assemblies to seal all penetrations at all fire barriers. Firestopping assemblies shall be listed in the UL Fire Resistance Directory under categories XHCR and XHEZ, providing that such assemblies conform to the construction type, penetration type, annular space...
requirements and fire rating requirement for each distinct condition, and that the system shall be symmetrical for wall applications.

1. Fire resistance ratings of each firestopping assembly shall be determined by testing in the configurations necessary for project conditions and fire resistance ratings shall be at least as high as that of the fire barrier in which the firestopping assembly is installed.

2. If a tested assembly is not available for a particular penetration configuration, modify the penetration configuration to suit available assemblies, as acceptable to authorities having jurisdiction. Do not modify assembly configuration except as specifically stated in the test report or as approved by authorities having jurisdiction.

H. Provide firestopping materials and assemblies to seal all gaps between building elements at all fire barriers. Firestopping assemblies shall be listed in the UL Fire Resistance Directory and shall conform to the construction type, type of gap and fire rating requirement for each distinct condition.

I. Provide firestopping assemblies to seal all penetrations at all smoke barriers. Sealing materials shall be any firestopping assembly using the same materials as used for firestopping in fire rated construction, specified above, provided that such assembly includes rating as a smoke seal and is acceptable to authorities having jurisdiction. Fire resistance time may be disregarded.

2.3 Fill Materials

A. Provide through-penetration firestop systems containing the types of fill materials required for Through-Penetration Firestop Systems indicated on drawings. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

L. For cast-in-place concrete applications, provide Presealed Systems Hydroflame or approved equal.

M. Prefabricated Cable Penetration Seal: Hilti CP 653 speed sleeve.

2.4 Warning Labels

A. Provide mechanically fastened warning labels indicating that penetration or gap has been sealed with firestopping or smokestopping and providing pertinent information about such firestopping or smokestopping.

1. Label shall be as acceptable by authorities having jurisdiction, including size of label, size of lettering and color of lettering.
2. At a minimum, label shall include:
   b. Product used for sealing penetration gap.
   c. Listing agency’s system number or designation.
   d. UL classification number.
   e. Hour rating, if fire barrier.
   f. Date of installation.
   g. Firestop system manufacturer’s name, address and phone number.
   h. Installer’s name, address and phone number.
   i. General contractor’s name, address and phone number.

2.5 Fire Safing Insulation

A. USG Interiors, Inc., or approved equal.

B. ASTM E 119 and E 136, semi-rigid mineral fiber (paperless), USG Thermafiber Fire Safing Insulation.

C. Thickness: As required for fire safing rating.

1. Density: 4 pcf.

D. Fire Hazard Clarifications:

1. Fire Spread: 15.
2. Fuel Contributed: 0.
3. Smoke Developed: 0.

E. Fire Resistance: 3 hours at 2000°F.

F. Provide clip fasteners, split-prong galvanized steel accessories, as recommended by insulation manufacturer.
2.6 Mixing

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - Execution

3.1 Examination

A. Examine substrates and conditions, with installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work. Verify that penetration openings comply with listing requirements.

B. Conduct inspection jointly with authorized representative of authority having jurisdiction.

C. Verify substrates have been properly prepared.

D. Conduct tests according to manufacturer’s written requirements to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt and other foreign substances capable of impairing bond of firestopping.

E. Verify that items penetrating fire rated assemblies are securely attached, including sleeves, supports, hangers, and clips.

F. Verify that openings and adjacent areas are not obstructed by construction that would interfere with installation of firestopping, including ducts, piping, equipment, and other suspended construction.

G. Verify that environmental conditions are safe and suitable for installation of firestopping.

H. If the configuration of a particular penetration or opening does not conform to the configuration necessary for the required firestopping or smokestopping design, notify the installer of the penetration for modification of the configuration to suit the assembly.

I. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation of firestopping materials indicates acceptance of substrates.

3.2 Preparation

A. Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.
4. Remove construction markings.
B. Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

D. Test for staining and leaching of exposed surfaces by fire stopping materials, including but not limited to sealants, primers, fill materials, or masking tapes will not be acceptable. Test materials and surfaces for staining prior to installation of firestopping materials.

3.3 Through-Penetration Firestop System Installation

A. Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and in strict conformance with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and securely adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

D. Remove combustible forming materials, unless they are a required component of the tested assembly.

3.4 Firesafing Insulation Installation

A. Provide firesafing insulation at locations where FIRE SAFING INSULATION or similar notation or graphic indication is shown on Drawings.

1. Provide firesafing insulation to fill cavities at penetrations through time-rated fire resistive concrete, masonry, steel and wood frame construction to provide smoke seal, except where intumescent firestopping system is sued.
2. Provide firesafing insulation to fill voids too large to be filled by endothermic firestopping sealant.

B. Fill cavities of frame construction at building area separation and seismic joints, using 16 inch wide firesafing insulation, to fire stop cavities. Install firesafing insulation at intervals not to exceed ten feet vertically and horizontally.

C. Seal top of firesafing insulation-filled joints expected to receive traffic loads and requiring finishing, except separation joints intended to experience seismic movement, with 2 inches of non-shrink grout.
3.5 Identification

A. Identify through-penetration firestop systems with preprinted metal labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners.

3.6 Field Quality Control

A. Owner will engage a qualified, independent inspector to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports. Notify testing agency at least 7 days prior to the date when firestopping installation will be ready for inspection; coordinate installation and inspection timing with work of other trades and obtain testing approvals in advance as required to allow subsequent construction to proceed on schedule.

B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

D. Obtain the approval of the authority having jurisdiction and manufacturer of firestopping materials. Notify authorities having jurisdiction when firestopping installation is ready for inspection; coordinate installation and inspection timing with work of other trades and obtain approvals in advance as required to allow subsequent construction to proceed on schedule.

3.7 Cleaning and Protecting

A. Clean up excess materials adjacent to openings as work progresses by methods and cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur. Remove left over material and debris from work area.

B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.8 Through-Penetration Firestop System Schedule

A. UL-classified systems are indicated and scheduled on the drawings; they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

END OF SECTION 07 84 00
SECTION 07 92 00 - Sealants

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 08 11 13 “Steel Doors and Frames.”
3. Section 08 31 13 “Access Doors and Frames.”
4. Section 09 29 00 “Gypsum Board.”
5. Section 09 65 00 “Resilient Flooring.”
6. Section 09 90 00 “Painting.”
7. Section 10 11 00 “Visual Display Units.”
8. Section 10 14 00 “Signage.”
9. Section 10 44 00 “Fire-Protection Specialties.”
10. Division 22 Plumbing Sections.
11. Division 23 Heating, Ventilating, and Air Conditioning Sections.
12. Section 32 13 16 “Asphalt Paving.”

1.2 Definitions

A. Type S: Products finished prepackaged which no job-site mixing is required.

B. Grade P: Products having sufficient flow to fill joints in horizontal surfaces and remain level and smooth at temperatures as low as 40° F.

C. Grade NS: Nonsag sealant that permits application in joints on vertical surfaces without sagging or slumping when applied at temperatures between 40° F and 122° F.

D. Use T: Classifies sealants designed for joints in surfaces subject to pedestrian and vehicular traffic.

E. Use NT: Classifies sealants designed for nontraffic exposure.

F. Use M, G, A: Refers to sealants which remain adhered, within given parameters, to various standard specimens.

G. Use O: Refers to substrate materials other than M, G, and A.

1.3 References


1.4 Performance Requirements

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates, where indicated and specified.
B. Staining of adjacent and surrounding materials and leaching by sealant or primer is not acceptable. All stained materials must be cleaned to show no visible evidence of sealant or primer staining or leaching, or removed and replaced. Where doubt about staining exists, test a sample of material in question.

C. Provide sealants that are compatible with all building underlayments, paints, coatings, and waterproofing. Coordinate with work of other sections to determine compatibility with all materials that sealants contact. Assure compatibility where multiple types of sealants come in contact with each other.

D. Each sealant shall be validated by SWRI’s Sealant Validation Program.

1.5 Submittals

A. Product Data: For each sealant product indicated, include instructions for joint preparation and joint sealer application. Note all deviations from SWRI recommendations.

B. Shop Drawings: Indicate detailing of each type of sealant joint, indicating joint dimensions, materials, sealant profile, and size limitations.

C. Samples: For each type and color of joint sealant required, provide samples with actual joint sealants in 1/2 inch wide joints formed between two 6-inch-long by 6-inch-wide squares of material identical to the exposed surfaces adjacent to joint sealants. Include backing material.

1.6 Quality Assurance

A. Provide installer who is approved or licensed by sealant manufacturer for installation of elastomeric sealants required for this project, and who has completed 5 years minimum continuous, documented joint sealant application similar in materials, scope and extent to the work indicated.

B. Obtain each type of joint sealant through one source from a single manufacturer. Provide sealant from a manufacturer with a minimum of 10 years of experience in the manufacturing and distribution of sealant materials similar in type to sealants required.

C. Comply with the following:

1. ASTM C 919 – Practice for use of sealants in acoustical applications.

D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates as follows:

1. Locate test joints on project as directed by sealant manufacturer.
2. Conduct field tests for each type of sealant and application indicated.
3. Notify Architect and inspector seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with sealant manufacturer's technical representative present. Test joint sealants according to Method A, Field- Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193. Prepare substrates and apply primers as recommended in writing by sealant manufacturer for each type of substrate to be tested. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively,
retest until satisfactory adhesion is obtained. Submit written report of testing to Owner, Architect and Inspector of Record.

6. Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing. Remove failing sealants in their entirety.

E. Coordinate sealant requirements for mock-ups required for work of other sections. Participate in construction of mockups of other sections. Provide all necessary materials and labor for sealant joints required for mockups. Test sealant joints in mockups for weatherproofing, sealant adhesion, joint movement and durability. Do not proceed with sealant work until mockup is approved by Architect. Rework mockups as necessary to obtain approval.

F. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract. Discuss at least the following items:

1. Submittals and sealant application schedule.
2. Surface condition, weather conditions and substrate preparation.
3. Sequencing of installation and coordination with work of other trades.
4. Installation methods and requirements.
5. Protection of work.
6. Installation of elements to be sealed and substrate preparation.
7. Application of curing agents, sealers, coatings, paint, and other materials to substrates and sealants.
8. Approved mockup to be used as a measure of acceptance.
9. Weather conditions forecast.
10. Other items related to successful execution of work.


1.7 Delivery, Storage and Handling

A. Deliver materials in original, tightly sealed unopened containers or packages with manufacturer’s name, labels, product identification, lot numbers, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer’s instructions and recommendations, to prevent their deterioration or damage due to moisture, high and low temperatures, contaminants, or other causes. Store materials out of weather in original containers or unopened packages as recommended by manufacturer.

C. Store materials off ground and under cover to prevent damage or contamination to materials by water, freezing, foreign matter or other causes. Promptly remove from site any materials which show evidence of damage or which shelf life has expired, and immediately make all replacements necessary at no additional cost or time to Contract.

D. Handle, store, and apply materials in compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), volatile organic compound (VOC), and other regulations and manufacturer’s safety data sheets (MSDS).

1.8 Project Conditions

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40° F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
5. When cementitious substrates are not thoroughly cured and dry.

B. Do not install solvent curing sealant in enclosed building spaces.

C. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

D. Sequence installation of joint sealers to occur not less than 21 or more than 30 days after completion of waterproofing, unless otherwise indicated.

E. Use silicone sealants only in applications recommended by manufacturer. Unless otherwise indicated in submitted product data, do not use silicone sealant for:
   1. Materials bleeding oils, plasticizers, and solvents.
   2. Surfaces subject to abrasion and abuse.

F. When applied to brass, copper, and zinc-containing metal substrates, verify that sealant will not cause corrosion prior to application.

G. Do not apply in totally confined spaces without ventilation for curing.

1.9 Warranty

A. Provide warranty in which sealant installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section and when sealants fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure for a period of 10 (ten) years.
   1. Adhesive or cohesive failure of sealant.
   2. Staining of adjacent surfaces caused by migration of sealant or primer.
   4. Chalking or visible color changes of cured sealants.

B. Provide warranty in which sealant manufacturer agrees to furnish and replace sealant materials that fail to comply with performance and other requirements specified in this Section for a period of 10 (ten) years.
   1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

Sealants
07 92 00 -4
2.2 Materials, General

A. Provide sealants and sealant primers that comply with VOC content requirements by authorities having jurisdiction.

B. Colors of exposed sealants will be as selected by Architect from manufacturer’s full range including custom colors. Multiple colors will be required, to suit various finish materials.

C. Elastomeric sealants shall be nonstaining to all substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained joint substrates indicated for project.

D. Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 1.77.2600.

E. In wet areas provide mildew resistant sealants.

F. Provide products that are permanently flexible.

G. Provide heat resistant sealant in areas affected by a rise in temperature.

H. Furnish sealants that remain durable when subjected to intense actinic (ultraviolet) radiation.

I. Furnish sealants that are color fast and resist color change.

J. Comply with ASTM C 920, including those references for type, grade, class and uses.

2.3 Backing

A. Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Provide ASTM C 1330, Type C closed-cell, mildew resistant, non-migratory, non-outgassing, non-staining cylindrical sealant backings with a surface skin as recommended in writing by sealant manufacturer, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Provide polyethylene tape for joints too shallow to allow use of foam rod.

C. Provide polyethylene bond breaker adhesive tape or other plastic tape recommended in writing by sealant manufacturer to prevent sealant from adhering to joint surfaces where such adhesion would result in sealant failure.

2.4 Miscellaneous Materials

A. Provide primers recommended in writing by sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction sealant-substrate tests and field tests.

B. Provide cleaners for surfaces, acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent
nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Provide nonstaining, nonabsorbent masking tape compatible with joint sealants and surfaces adjacent to joints.

D. Cleaning Cloths: Clean soft absorbent, lint free, cloths.

PART 3 - Execution

3.1 Examination

A. Examine joints indicated to receive joint sealants, with contractor, installer and sealant manufacturer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting sealant performance and warranty requirements.

B. Inspect substrates to receive silicone sealant. Ensure surfaces are clean, dry, and free of frost, dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, and mildew. Metal surfaces should be smooth without pits, serrations, slots and other irregularities.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation constitutes acceptance of substrates and conditions by contractor, installer and manufacturer.

3.2 General

A. Prepare substrates and apply sealant in accordance with manufacturer’s written instructions.

B. Handle and apply sealant materials in a manner that complies with regulations of jurisdictions having authority.

C. Do not use sealants in below grade applications, in areas of water immersion or on materials bleeding oils, plasticizers and solvents.

D. When applying sealants to metal and zinc coated substrates verify that sealant will not cause discoloration or corrosion.

E. Allow sealants to fully cure before concealing within elements of construction.

F. Complete horizontal joints prior to vertical joints. Lap vertical joint sealant over and onto horizontal sealant.

G. Do not install silicone sealants during inclement weather or when such conditions are expected; or when conditions are outside sealant manufacturer’s written recommended temperature and humidity ranges.

3.3 Preparation

A. Rake, brush and thoroughly clean substrates immediately before installing joint sealants to comply with sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), curing compounds, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, frost, soap residue, soil or other sealing compounds.
2. Clean porous joint substrate surfaces by bead or water blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Make sure that apparently clean surfaces are not covered with a thin film of dust. Clean alkaline from surface of concrete and CMU.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Do not flood surfaces with cleaners and solvents. Do not allow solvent film to accumulate on surfaces.

5. Conform to written instructions from sealant manufacturer where sealants are required to be applied over painted, lacquered, or waterproofed surfaces, or surfaces which have been treated with water-repellant or other coatings.

B. Prime joint substrates, where recommended in writing by sealant manufacturer and based on preconstruction sealant-substrate tests or prior experience. Apply and dry primer to comply with sealant manufacturer's written instructions. Confine primers to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces. Apply sealant same day surfaces are primed. Do not apply primer to sealant joint backing.

C. Use masking tape to create neat sealant lines and where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Do not allow masking tape to touch clean surfaces to which sealant will adhere. Remove tape immediately after tooling without disturbing joint seal.

D. Joint spaces and surfaces shall be thoroughly clean and dry at the time of installation of sealant materials. Do not install sealant material during or after rain or fog.

3.4 Installation of Sealants

A. Comply with sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. For general sealant installation comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. For acoustical sealant application standards, comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove sealant backings that have become wet before sealant application and replace them with dry materials.
4. Install joint backing so that joint depth is 50 percent of joint width, but a minimum of 1/4 inch deep, and a maximum of 1/2 inch. Use gage to ensure uniform depth to achieve correct profile, coverage and performance.
5. Install backer in straight sections, from corner to corner. Do not bend backer around corners, miter backer material at corners. Compress backer sections at ends to avoid pull back.
6. Install bond breaker on back side of joint where backing is not feasible.
E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates in continuous ribbons without gaps or air pockets. Use sealant dispensing equipment to push sealant bead into openings.
2. Completely fill recesses in each joint to full and proper configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Do not allow sealants to overflow confines of joint or onto adjoining work.
4. Sealant shall be bonded to the 2 opposite sides of joint only.
5. Apply sealant under sufficient pressure to fill voids.
6. Install each sealant bead in one continuous operation to provide uniform, continuous ribbons without gaps or air pockets, and with complete wetting of the joint surfaces equally on opposite sides. Fill joints to slightly concave surface just below adjacent surfaces.
7. Parapet copings shall be double caulked at all joints exposed to weather.
8. Do not allow sealants or other compounds to overflow, spill or migrate into voids of adjacent construction.

F. Immediately after sealant application and before skinning or curing begins, tool sealants with metal spatula according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor or damage sealants or adjacent surfaces.
3. Tool sealant within time limits recommended in writing by sealant manufacturer in one continuous stroke to a slightly concave joint configuration slightly below adjoining surfaces per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Where sealant joints occur between horizontal and vertical surfaces fill joint to form a slight cove so that joint will not trap and pool moisture and dirt. Tool horizontal joints prior to vertical joints. Lap vertical sealant over horizontal sealant.
5. Use masking tape to protect surfaces adjacent to recessed tooled joints.
6. Remove masking tape immediately after tooling and before sealant skin forms (within 5 – 10 minutes.)
7. Remove excess uncured sealant within 10 minutes of application, remove uncured excess sealant with solvent-dampened cloth, wearing solvent resistant gloves. Carefully cut or scrape away completely cured excess sealant.

G. Coordinate with other trades to ensure installed sealant is not painted as part of other construction operations unless type is specifically formulated for paint.

3.5 Curing

A. Cure sealants in accordance with sealant manufacturer’s printed instructions to obtain high early bond strength, internal cohesive strength and durability.

3.6 Cleaning

A. Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and that do not adversely affect substrates. Do not allow cleaning materials or solutions to come in contact with joint sealant proper. Restore all finishes to original condition. If surfaces adjoining joints are stained and cleaning is not acceptable, remove the affected work and provide new work as directed and approved, at no additional cost to Owner.
3.7  Protection

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.8  Sealant Schedule

<table>
<thead>
<tr>
<th>Application</th>
<th>Sealant Description</th>
<th>Type</th>
<th>Grade</th>
<th>Class</th>
<th>Exposure Use</th>
<th>Substrate Use</th>
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</thead>
<tbody>
<tr>
<td>Interior perimeter joints of exterior openings</td>
<td>Single component neutral curing silicone sealant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior joints between plumbing fixtures, walls, floors and counters</td>
<td>Single component mildew resistant neutral curing silicone sealant</td>
<td>S</td>
<td>NS</td>
<td>25</td>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>Vertical joints on exposed surface of interior masonry, concrete and gypsum board walls</td>
<td>Single component neutral curing silicone sealant</td>
<td>S</td>
<td>NS</td>
<td>25</td>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>Perimeter joints between interior wall surfaces and door and window frames</td>
<td>Latex sealant comply with ASTM C 834</td>
<td>P</td>
<td>NF</td>
<td>-</td>
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</tr>
</tbody>
</table>

END OF SECTION 07 92 00
SECTION 08 11 13 - Steel Doors and Frames

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 05 40 00 “Cold-Formed Metal Framing.”
3. Section 06 20 00 “Finish Carpentry.”
4. Section 07 21 00 “Insulation.”
5. Section 07 92 00 “Sealants.”
6. Section 08 71 00 “Door Hardware.”
7. Section 09 22 16 “Non-Structural Metal Framing.”
8. Section 09 29 00 “Gypsum Board.”
9. Section 09 90 00 “Painting.”
10. Section 10 14 00 “Signage.”
11. Division 26 Electrical Sections for electrical connections including conduit and wiring for door controls and operators.

1.2 Quality Requirements

A. Comply with SDI, ASTM, HMMA, UL, ANSI, NAAMM requirements.

1.3 Submittals

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, technical data, and finish information.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples:

1. For each type of exposed finish required, prepared on samples of not less than 3 by 5 inches.
2. For the following items, prepared to demonstrate compliance with requirements for quality of materials and construction:
Steel Doors and Frames
08 11 13 - 2

a. Doors: Show door panel, vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing louvers and glazing if applicable. 12 inches by 12 inches.
b. Frames: Show profile, corner joint construction, floor and wall anchors, and silencers. Include separate sections for fixed hollow metal panels and glazing if applicable. 24 inches long.

D. Schedule:

1. Provide a schedule of metal doors and frames prepared by or under the supervision of door supplier, using same reference numbers for openings as those on Drawings. Coordinate with door hardware schedule. Coordinate and indicate glazing of frames with glass requirements.

1.4 Quality Assurance

A. Obtain metal doors and frames from single source from single manufacturer.

B. Steel doors and frames, and their installation, shall conform to the following requirements of the Steel Door Institute:

1. ANSI A250.8, “Recommended Specifications for Standard Steel Doors and Frames” (formerly SDI 100).
2. ANSI A250.6, “Hardware on Standard Steel Doors.”
3. ANSI A250.11, “Recommended Erection Instructions for Steel Frames.

C. Provide fire rated door assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to NFPA 252, UL 10B and UL 10C.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450°F above ambient after 30 minutes of standard fire-test exposure.
2. Comply with CBC Chapter 7.
3. Provide steel doors which are identical in materials and construction to units tested in door and frame assemblies in accordance with ASTM E 152 and which are physically labeled and listed for ratings indicated by UL, Warnock Hersey or other testing and inspection agency acceptable to authorities having jurisdiction. Label shall be applied by an authorized facility in accordance with the procedure set forth by an independent certification agency.

D. Smoke-Control Door Assemblies: Comply with NFPA 105.

E. Before beginning actual work, install mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each type of steel frame and door installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:

   a. Finishes and finish substrates.
   b. Door frame.
   c. Door.
   d. Frame anchors and fasteners.
   e. Finishes.
   f. Hardware.
   g. Sealants.
h. Sheathing, framing and substrates.

2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.

4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.

5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.

6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

F. Conduct pre-installation meeting to comply with Section 01 31 00 “Project Management and Coordination.” Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

G. Comply with SDI-100 for details not specified herein.

H. Doors required to meet specific acoustical rating shall have the Sound Transmission Classification (STC) rating indicated and be tested in accordance with ASTM E 90-87, “Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.”

1.5 Delivery, Storage, and Handling

A. Deliver hollow metal work palletized, wrapped, and crated to provide protection during transit and project-site storage. Do not use non-vented plastic. Provide additional protection to prevent damage to finish of factory-finished units. Inspect doors and frames upon delivery. Remove and replace damaged units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect, otherwise remove and replace damaged items as directed.

C. Store hollow metal work off floor, under cover at project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch-high wood blocking. Do not store in a manner that traps excess humidity. Avoid the use of non-vented plastic or canvas shelters to prevent forming of pockets of humidity and causing rust. Provide minimum 1/4 inch space between each stacked door and frame to permit air circulation. Do not store frames laid flat. If packaging on door becomes wet, remove immediately and dry doors and frames thoroughly.

1.6 Project Conditions

A. Verify actual dimensions of openings by field measurements before fabrication.

B. Verify actual finished wall thickness and required frame throat dimension prior to fabrication.
1.7 Coordination

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to project site in time for installation.

B. Coordinate with electrical and access control requirements for wiring, conduit and control hardware requirements. Furnish doors and frames complete with necessary wire conduit and accommodations to satisfy electrical and access control requirements.

C. Coordinate with Section 08 71 00 “Door Hardware.” Furnish doors and frames fully prepped, mortised, drilled and otherwise ready for complete hardware installation.

D. Coordinate with mechanical ventilation design requirements for door louver and door undercut requirements.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Steelcraft; an Ingersoll-Rand company.

2.2 Materials

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 metallic coating.

C. Interior Frame Anchors: ASTM A 591, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

D. For anchors built into exterior walls and anchors in masonry walls, steel sheet complying with ASTM A 1008, hot-dip galvanized according to ASTM A 153.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6 to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities, compounded for 15-mil dry film thickness per coat.

2.3 Standard Metal Doors

A. Provide doors in configurations indicated, not less than thickness indicated; fabricated with smooth surfaces, seamless type with 1-piece face panels, all parts welded and finished flush and smooth. Honeycomb or foamed-in-place insulation cores are not acceptable. Fill doors with mineral fiber insulation or equivalent fire retardant insulation to eliminate all metallic ring noise.

1. Design: Flush panel.
2. Core Construction:
   a. Fire Door Core: As required to provide fire-protection indicated and code required temperature-rise ratings.
   b. Interior Doors: Kraft paper honeycomb.
   c. Provide doors that meet STC ratings indicated. ASTM E 336.
   d. Reinforce face panels with internal welded steel stiffeners.

4. Top and Bottom Edges: Closed with 16 gage channels of same material as face sheets. Provide flush channel on top and inverted channel on bottom. Reinforce all edges.

B. General: Fabricate to sizes shown, providing necessary clearances and bevels to permit operation without binding. Doors shall be free from warp, wave, buckle or other defect. Doors shall be 1-3/4 inches thick.

C. Flush Door Construction: Door shall be Grade III, Model 2, fabricated with face sheets of 16 gauge steel at exterior doors and 18 gauge steel at interior doors in accordance with ANSI/SDI A250.8. Exterior doors shall be galvanized to ASTM A653/A653M A60. Door shall be flush with edge seams, weld filled and ground smooth. Bevel lock edge 1/8 inch in 2 inches. Door shall be provided with top flush cap and bottom inverted 14 gauge steel channels welded within the door. Door shall be reinforced, stiffened and sound deadened with impregnated kraft honeycomb core completely filling door cavity, and laminated to the inside faces of panels.

1. Doors shall be insulated with an expanded polystyrene or polyurethane core, or as standard with manufacturer. Completely fill door cavity with insulation. Expanded polystyrene to be ASTM C578, Type 1 or 2, with one pound per cubic foot density.

D. Preparation of Hardware: Door shall be mortised, reinforced, drilled and tapped at the factory from templates for all mortise hardware listed in the Hardware Schedule. Door shall be reinforced for surface applied hardware such as closer, checks, escutcheons and kick plates; drilling and tapping to be done in the field by door installer. Reinforcement to be 12 gauge for locksets and latchsets, and 14 gauge for surface applied hardware, except use 3/16-inch thick plate for butt hinges. Door shall be provided with reinforcing unit as recommended by lock manufacturer. All door frames shall receive conduit for future electronic access controls.
2.4 Metal Frames

A. General:

1. Provide fully-welded frames.
2. Hollow metal frames shall be formed to shapes and sizes shown.
3. Exterior frames shall be galvanized to ASTM A653/A653M A60.

B. Fully-Welded Frames: Head and jamb splices shall be fabricated with mitered, coped and continuously welded inside and outside corners and be finished on the outside face to present a smooth surface for painting.

C. Frames shall be fabricated from 16 gauge steel, and shall be designed with integral stop and trim. All corners shall be reinforced with 18 gauge “L” shaped reinforcements welded on the inside face of the frame.

D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

1. Preparation for Hardware: Frame shall be prepared at the factory for all hardware using templates furnished by hardware supplier. Locations of miscellaneous hardware shall conform to the recommendations for the Door & Hardware Institute. Mortise, reinforce, drill and tap for mortise type hardware. Reinforce frames for surface applied hardware; drilling and tapping to be done in the field by door installer.

2. Hardware cutouts shall have steel plate reinforcements with tapped holes fillet welded to frame on all four sides of the plate. Fillet welds shall be minimum 1 inch long. Reinforcement shall include 3/16 inch butt reinforcement; 12 gauge lock strike; 14 gauge for surface applied items.

3. Provide strike stops at frames to receive metal doors with holes for three rubber door silencers. On double door frames, provide for two silencers per door at head. Omit holes at frames to receive unitized gasketing; refer to Section 08 71 00.

E. Frames shall be grouted solid at exterior locations and foamed solid at interior locations. Provide top openings and jamb to mullion openings to facilitate the solid grouting and foaming of frames.

2.5 Frame Anchors

A. Provide anchors in accordance with ANSI A250.8. Anchors at fire rated frames shall also conform to UL Standard 10B.

B. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 16 gage.
2. Universal type anchor for existing stud walls 16 gage.

C. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.
2.6 Stops and Moldings

A. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8-inch-high unless otherwise indicated. Miter and weld at corners. Grind all welds smooth.

B. Terminated Stops: Where indicated on schedule, terminate door stops 6 inches above finish floor with a 45-degree angle cut, and close open end of stop with fully welded steel filler plate. Grind all welds smooth and flush with frame.

2.7 Hollow Metal Accessories

A. Ceiling Struts: Minimum ¼-inch-thick by 1-inch-wide steel.

2.8 Fabrication

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Fit and assemble units in manufacturer’s plant to greatest extent possible. To ensure proper assembly at project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:


D. Hollow Metal Frames: Fabricate frames as one piece. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

4. Jamb Anchors: Provide number and spacing of anchors as follows:

   a. Stud-Wall Type: Locate anchors not more than 12 inches from top and bottom of frame. Space anchors as follows:

      1) Four anchors per jamb from 60 to 90 inches high
      2) Five anchors per jamb from 90 to 96 inches high.
      3) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
      4) Two anchors per head.

5. Except on frames to receive weather-stripping or smoke seals, drill stops to receive door silencers as follows. Keep holes clear during construction.

   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Factory prepare hollow metal work to receive mortised hardware; including but not limited to cutouts, reinforcements, mortising, drilling, and tapping required for door hardware as specified in Section 08 71 00 “Door Hardware.”

1. Locate hardware, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive all mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate requirements for conduit, wiring, and boxes for electrical and access control connections with Division 16 Sections and access control requirements. Prepare doors and frames to include and accommodate conduit and wiring.
5. Provide doors and frames pre-wired as required for electrical locking and access control.

G. Coordinate fabrication of doors and frames with smoke and draft, temperature rise, fire rating and STC requirements as indicated and required by reference standards and applicable building codes. Provide for all supplementary gaskets, tapes, seals, hardware and related devices to provide a complete compliant assembly.

2.9 Finishes, General

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Variations in appearance of abutting or adjacent frame pieces are not acceptable. Noticeable variations in the same frame piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide removable stops and exposed fasteners with finish matching appearance, including color and texture of frames.

2.10 Shop Prime – Field Paint

A. Ferrous Metal Surfaces:

1. Prepare uncoated ferrous metal surfaces to comply with SSPC 6/NACE No. 3 “Commercial Blast Cleaning.”
2. Shop spray-apply Zinc Rich Primer to all prepared surfaces, in compliance with SSPC-PA 1 “Paint Application Specification No. 1.” Primer need not be applied to surfaces embedded in concrete or masonry. Primer must extend past interface point of embedment.
3. Stripe prime corners, crevices, bolts, welds and sharp edges.
4. After erection sand and smooth damaged areas of primer coat and spray-apply identical primer.

B. Apply finish paint coats in field with sprayer only, refer to Section 09 90 00 for finish coat requirements.

C. Color and finish as selected by Architect from manufacturer’s full range.
2.11 **Shop Prime – Shop Paint**

A. **Ferrous Metal Surfaces:**

1. Prepare uncoated ferrous metal surfaces to comply with SSPC 6/NACE No. 3 “Commercial Blast Cleaning.”
2. Shop spray-apply acid etch type primer recommended by baked enamel manufacturer to all prepared surfaces, in compliance with SSPC-PA 1 “Paint Application Specification No. 1.” Primer need not be applied to surfaces embedded in concrete or masonry. Primer must extend past interface point of embedment. Apply primer within 3 hours of blast cleaning.
3. Stripe prime corners, crevices, bolts, welds and sharp edges.

B. Color and finish as selected by Architect from manufacturer’s full range.

**PART 3 - Execution**

3.1 **Examination**

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of the work.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation of doors and frames constitutes acceptance of substrate conditions by contractor.

3.2 **Preparation**

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3.3 **Installation**

A. Install metal doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions. Comply with ANSI/SDI A250.11, and ANSI A115.16. Fasten frames to structure to retain their position and stability.

B. For fire rated doors and frames installation comply with NFPA 80 and CBC Chapter 7.
C. Metal Frames: Install metal frames of size and profile indicated.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint. Use wood spreaders at bottom of frame if the shipping spreader is removed. Protect frame from accidental abuse. Where construction will permit concealment, leave the shipping spreaders in place after installation otherwise remove the spreaders after the frames are set and anchored. Remove wood spreaders and braces only after the walls are built and jamb anchors are secured. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
   a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   c. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   d. Coordinate with installation of all conduit and wire for door control and power.

2. Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
4. In-Place or Existing Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces. Pack interior and exterior frames with mineral fiber insulation.
5. Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
   e. Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance.

D. Fit hollow metal doors accurately in frames, within clearances specified below. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved.

1. Non-Fire-Rated Standard Steel Doors:
   a. Jambs and Head: 1/8 inch plus or minus 1/32 inch.
   b. Between Meeting Edges of Pairs of Doors Non-Fire Rated: 3/16 inch plus or minus 1/16 inch; fire rated 1/8 inch plus or minus 1/16 inch.
   c. Between Bottom of Door and Top of Threshold: Maximum 1/4 to 1/2 inch unless otherwise required for specified door bottom.
   d. Between Bottom of Door and Top of Floor Finish (No Threshold): Maximum 3/4 inch. Verify finish and transition materials prior to fabrication.
e. Between Face of Door and Door Stop: 1/16 inch and 1/8 inch plus or minus 1/32 inch without stops, silencers and seals.

2. Install fire-rated doors with clearances according to NFPA 80.
3. Install smoke-control doors according to NFPA 105.

E. Installation of hardware items shall be in accordance with the hardware manufacturer’s recommendations and templates. ANSI A115.IG, “Installation Guide for Doors and Hardware” shall be consulted for other pertinent information. Comply with requirements of Section 08 71 00.

3.4 Adjusting and Cleaning

A. Metal Repairs:
1. Make repairs only if permitted by Architect. Otherwise, replace damaged components.
2. Fill surface depressions with metallic paste filler, allow to thoroughly cure, sand flush, and smooth for an invisible appearance with adjacent metal surfaces.
3. Sand smooth all corroded areas.
4. Apply touch up paint using air drying primer compatible with shop applied finish.

B. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air drying primer.

C. Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

D. Remove grout and other bonding material from hollow metal work immediately after installation.

E. Adjust all doors and hardware after building HVAC system has been turned on and balanced and test reports have been submitted to and accepted by Owner.

F. Adjust doors to accommodate thermal movement and expansion of frame and door.

G. Provide additional adjustment as required by Architect to assure all doors function properly at no additional cost or time to Owner.

H. Immediately prior to final inspection, remove protective covering from prefinished doors. Clean doors and frames of surface contaminants detrimental to bonding of field applied finishes.

END OF SECTION 08 11 13
SECTION 08 31 13 - Access Doors and Frames

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:
   1. Section 03 30 00 “Cast-in-Place Concrete.”
   2. Section 05 40 00 “Cold-Formed Metal Framing.”
   3. Section 06 20 00 “Finish Carpentry.”
   4. Section 07 21 00 “Insulation.”
   5. Section 07 92 00 “Sealants.”
   6. Section 08 11 13 “Steel Doors and Frames.”
   7. Section 09 29 00 “Gypsum Board.”
   8. Section 09 90 00 “Painting.”
   9. Section 10 14 00 “Signage.”
  10. Division 23 Heating, Ventilating, and Air Conditioning Sections.
  11. Division 26 Electrical Sections.
  12. Division 27 Communications Sections.

1.2 Submittals

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each door frame and face material, at least 6 by 6 inches for each style and specified finish.

D. Schedule: Provide complete access door and frame schedule, including all types, materials, locations, sizes, latching or locking provisions, finish at each location, and other data pertinent to installation.

1.3 Quality Assurance

A. Source Limitations: Obtain each type of access door and frame through one source from a single manufacturer.

B. Fire-Rated Access Doors and Frames: Provide complete access doors assembly with door, frame, hinge and latch complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. UL 10B for vertical access doors and frames.
   2. UL 263 for horizontal access doors and frames.

C. Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

Access Doors and Frames

08 31 13 - 1
D. Coordinate with other trades and provide work and materials required by mockups for other Sections.

1.4 Coordination

A. Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

B. Whether or not specifically indicated, provide access doors in sizes in locations giving personnel access to each inaccessible space enclosed by floors, walls and/or ceilings. Provide specified panel types unless otherwise indicated.

C. Provide access panels for electrical or mechanical controls, valves, fixtures and equipment which occur in concealed spaces. Locate panels where directed and install level with adjacent construction.

D. Refer to the mechanical and electrical drawings and specifications for additional requirements.

E. Furnish inserts and anchoring devices which must be built into other work for installation of access doors.

F. Coordinate delivery with other work to avoid delay.

1.5 Delivery, Storage and Handling

A. Deliver access doors to site in manufacturer’s unopened labeled packaging to protect units.

B. Inspect access panels for damage. Immediately remove and replace damaged doors.

C. Store access doors under cover and protect from moisture. Do not store under non-venting cover or in high humidity conditions.

1.6 Warranty

A. Provide written warranty from manufacturer and installer to replace access doors that fail in material and installation for a period of 5 years.

PART 2 - Products

2.1 General

A. Provide all access panels where indicated on the Drawings, and wherever required but not indicated on the Drawings, for access to all concealed mechanical, electrical, fire protection alarm, telecommunications, process and service piping systems and equipment. Provide access panels in sizes indicated, or if not indicated in size and location adequate to access and service concealed equipment including allowance for removal and replacement, at no additional cost to Owner. Provide finishes indicated or if not indicated provide access panel made of stainless steel, No. 4 Satin finish.

B. Provide access doors and panels where necessary for access to concealed spaces, equipment, system components, valves, cleanouts and reset devices. Size shall be as necessary for proper access to concealed components.

C. Access doors and panels indicated and required for mechanical, plumbing and electrical work shall be of a type matching those specified in this Section.
D. Provide access doors and panels as required to service building systems and as required by governing authorities having jurisdiction, although not shown on Drawings.

E. Locate access doors and panels, where practical, in building service areas and not in public view.

F. Submit proposed locations for access doors and panels, not indicated on Drawings, to Architect for review prior to rough-in.

G. Access doors and panels in time-rated fire-resistive walls, partitions and ceilings shall carry same rating as required by California Building Code (CBC) for the wall, partition or ceiling.

2.2 Steel Materials


B. Rolled-Steel Floor Plate: ASTM A 786 rolled from plate complying with ASTM A 36. Comply with ASTM A 123 and ASTM A 153 for galvanizing steel products and hardware.

C. Steel Sheet: Uncoated cold-rolled steel sheet substrate complying with ASTM A 1008, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS) with A60 mill-phosphatized hot dip zinc coating; stretcher-leveled standard of flatness.

2.3 Finishes, General

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Variations in appearance of abutting or adjacent frame pieces are not acceptable. Noticeable variations in the same frame piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide removable stops and exposed fasteners with finish matching appearance, including color and texture of frames.

2.4 Shop Prime – Field Paint

A. Galvanized Surfaces:

1. Chemically clean all surfaces with solvent complying with VOC regulations.
2. Wash all surfaces with etching solution such as Jasco Prep and Prime. Thoroughly rinse and dry surface.
3. Shop spray-apply an acid etch type primer such as Frazee 561 or approved equal to a dry film thickness recommended in writing by primer manufacturer. Apply primer within 3 hours of etching solution.
4. Stripe prime corners, crevices, bolts, welds and sharp edges.
5. After installation clean abraded areas and repair with galvanizing repair paint.

B. Apply finish paint coats in field with sprayer only, refer to Section 09 90 00 for finish coat requirements.
C. Color and finish as selected by Architect from manufacturer’s full range.

2.5 Shop Prime – Shop Paint

A. Galvanized Surfaces:

1. Chemically clean all surfaces with etching solution such as Jasco Prep and Prime. Thoroughly rinse and dry surface.
2. Shop spray-apply an acid etch type primer recommended in writing by baked enamel finish coat manufacturer, to a dry film thickness recommended in writing by primer manufacturer. Apply primer within 3 hours of etching solution.
3. Stripe prime corners, crevices, bolts, welds and sharp edges.

B. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.6 Access Doors and Frames for Walls and Ceilings

A. Subject to requirements, provide products by one of, or equal to, the following:

1. Nystrom Building Products.
2. Acudor Products, Inc.
3. Babcock-Davis; a Cierra Products Co.
5. J. L. Industries, Inc.


1. Locations: Wall surfaces.
2. Door: Minimum 14 gauge sheet metal, set flush with exposed face flange of frame.
4. Hinges: Continuous piano.
5. Latch: Screw driver operated, stainless steel cam and stud.

PART 3 - Execution

3.1 Examination

A. Verify that openings are correctly sized and framed to receive doors.

B. Correct deficiencies prior to installation. Proceeding with installation constitutes contractor’s acceptance of substrate conditions.

3.2 Installation

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces. Install panels plumb and level and properly set for an architectural appearance.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.
D. Provide for correct termination of adjoining finish materials.

E. Remove protective coverings and clean access doors and panels.

F. At stainless steel access doors and panels in wet areas, seal perimeter of frame with clear sanitary silicone sealant.

3.3 Adjusting and Cleaning

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

C. Finish touch-up panels blemished during installation as directed by the Architect at no additional cost to the Owner.

END OF SECTION 08 31 13
SECTION 08 71 00 - Door Hardware

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 08 11 13 “Steel Doors and Frames.”
3. Section 08 31 13 “Access Doors and Frames.”
4. Section 09 90 00 “Painting.”
5. Division 26 Electrical Sections.

1.2 References

A. Use date of standard in effect as of bid date:

4. BHMA – Builders Hardware Manufacturers Association.
5. DHI – Door and Hardware Institute – Recommended Locations for Builder’s Hardware for Standard Steel Doors and Frames.
6. NFPA – National Fire Protection Association:
   b. NFPA 105 – Smoke and Draft Control Door Assemblies.
7. UL – Underwriters Laboratories:
   a. UL 10C – Positive Pressure Fire Tests of Door Assemblies.
   b. UL 305 – Panic Hardware.
9. Local applicable codes.
10. SDI – Steel Door Institute.
11. WI – Woodwork Institute.
12. AWI – Architectural Woodwork Institute

1.3 Submittals

A. Door Hardware Sets: Prepared by installer and a certified Architectural Hardware Consultant (AHC). Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. Indicate complete designations at every item for each door.
1. Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page. Only submittals that are 8-1/2 x 11 one-sided will be accepted and reviewed. Organize vertically formatted schedule with door designation headings and complete designation of every item required for each door opening.

2. Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

3. Content: Include the following information:
   a. Identification number, location, hand, fire rating and material of each door and frame.
   b. Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device. Use BHMA finish codes per ANSI A156.18.
   c. Provide complete designations of every item required for each door or opening including name, part number and manufacturer.
   d. Fastenings and other pertinent information.
   e. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   f. Explanation of abbreviations, symbols, and codes contained in schedule.
   g. Door and frame sizes and materials.
   h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems. Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
   i. Explanation and legend for all abbreviations.
   j. Graphic illustration(s) showing mounting locations and dimensions for all hardware items.
   k. Provide keying schedule prepared by installer and hardware expert, detailing Owner’s final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
   l. Indicate hardware mounting locations.

4. Submit door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in project construction schedule. Coordinate with all work to determine critical path timing. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

B. Product Data: Manufacturer’s catalog cuts showing construction and installation details, material descriptions, functions, dimensions of individual components and profiles, and finishes. Indicate mounting heights for each type of hardware.

C. Shop Drawings: Details of electrified door hardware, indicating the following:
   1. Wiring Diagrams: Power, signal, and control wiring diagrams. Include the following:
      a. System schematic.
      b. Point-to-point wiring diagram.
      c. Riser diagram.
      d. Elevation of each door.
   2. Detail interface between electrified door hardware and fire alarm, access control and security system.
   3. Describe the operation of doors controlled by electrified door hardware.
4. Submittals prepared without thorough jobsite visit by qualified hardware expert will be rejected as non-compliant. Submit written statement from hardware expert indicating that jobsite visit has been completed.

D. Finish Samples: Submit minimum 2-by-4-inch plate samples of each type of finish required, except primed finish.

E. Hardware Samples: For exposed door hardware of each type, in specified finish, full size. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets. Samples will be returned to contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the work, within limitations of keying requirements.

F. Provide letter on installer’s letterhead certifying that door hardware supplied for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

G. Provide keying schedule prepared by installer and Architectural Hardware Consultant (AHC), detailing Owner’s final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1. After completion of door hardware schedule review and prior to ordering hardware, schedule and conduct a keying meeting to determine keying requirements and develop a keying schedule.
2. Meeting shall be between AHC employed by hardware supplier, Owner’s representative, Architect and other involved parties to ensure that locksets are functionally correct and that keying fulfills project requirements.
3. Prepare and submit keying schedule for record purposes only. Include in keying schedule all doors with locks, all padlocks and all lock cylinders using building keying system.

1.4 Quality Assurance

A. Provide installer/supplier who is a direct factory contract supplier and employer of workers trained and approved by lock manufacturer, with a minimum 5 years experience specializing in providing institutional hardware.

1. Installer/supplier responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant (AHC) available during the course of the work to consult with contractor, Architect, and Owner about door hardware and keying.
2. Installer/supplier shall have warehousing facilities in project's vicinity.
3. Responsible for preparation of door hardware and keying schedules.
4. Responsible for preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
5. Installer / supplier shall be or shall employ a certified Architectural Hardware Consultant (AHC) certified by the Door and Hardware Institute (DHI) to prepare the door hardware schedule utilizing products specified in this Section and complying with applicable Code requirements and requirements of the manufacturers.

B. Obtain each type of door hardware from a single manufacturer, unless otherwise indicated. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

C. Provide fire-rated door assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing...
according to NFPA 252. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill.

D. Provide electrified door hardware listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Before beginning actual installation, install mockups for each typical type of door frame and hardware to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:
   a. Door finishes.
   b. Frame – finished and with boxes and backing plates.
   c. Wall finish and trim.
   d. All hardware seals and trim.
   e. Sealant joints.
   f. Sheathing, framing and substrates.

2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.

4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.

5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.

6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

F. Conduct pre-installation meeting at project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Include supplier, manufacturer’s representative, installer, and Owner. Discuss installation techniques, sequence of installation and interface with other trades. Adjust installation strategy to meet all project requirements at no additional cost or time to Owner.

G. If discrepancy between drawings and scheduled material in this section is discovered during bidding or should have been known by contractor, provide written RFI to Architect and provide for the more expensive of the two choices, at no additional cost to Owner. Note the discrepancy in submittals. When determining the more expensive option consider all aspects of the work including but not limited to supervision, delivery time, sequencing installation, coordination with other trades, submittal processing time, overhead consideration and all other aspects affecting cost of installing option provided.

H. Provide hardware free of defects, blemishes and excessive play. Obtain each type of hardware and associated devices from one manufacturer.

I. Exit doors shall be operable from inside with single motion without the use of a key or special knowledge or effort.
J. Furnish hardware items and materials required for a complete functional installation in accordance with specified performance level and design intent, complying with manufacturers’ written instructions.

K. Where scheduled hardware items are obsolete, bid and provide manufacturer’s updated item at no additional cost to Owner. Coordinate requirements of updated items with door and frame fabrication.

L. Providing undocumented, false and fraudulent imitations of specified hardware items will not be acceptable and all such items must be removed from the site. Such items will not be paid for by Owner. All hardware items must be originally produced by specified manufacturer or approved equal, with full documentation, part, make and model numbers and packaged in manufacturer’s original unopened, labeled containers and packaging, and provided with manufacturer’s warranties.

M. Furnish all items of hardware even if not specifically identified or indicated to provide complete installation in accordance with the Contract Documents and the manufacturer’s written requirements. All hardware items shall be of equal quality and type.

N. Where the hardware items specified are not adaptable to the finished shape or size of the door and framing members requiring hardware, submit for Architect’s written approval, suitable alternative types having as nearly as practicable the same operation and quality as the type specified.

O. The use of one manufacturer’s numeric designation system in schedule does not imply that another manufacturer’s products will not be acceptable, unless they are not equal in design, size, weight, finish, function, or other quality of significance.

P. Provide hardware for fire-rated openings in compliance with NFPA 80. This requirement takes precedence over other requirements for such hardware. Provide only such hardware that has been tested and listed by UL for the type and size of each door required, and complies with the requirements of the door and door frame. Latching hardware, door closers, ball bearing hinges, and seals are required whether listed in the hardware schedule or not. Confirm hardware provided conforms to fire testes assembly ratings indicated.

1. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating “Fire Door to be Equipped with Fire Exit Hardware” and provide UL label on exit device indicating “Fire Exit Hardware.”

   a. Provide a readable, durable sign on or adjacent to door stating, “This Door to Remain Unlocked Whenever the Building is Occupied.”

      1) Sign letters shall not be less than one inch high on contrasting background.

2. Install hardware for smoke-control door assemblies in accordance with NFPA 105.
3. Hinges at fire rated assemblies: Steel base material only.
4. Closers: Bolted (not screwed) to door reinforcement or through-bolted with sex-nut fasteners.
5. Latchbolts: 3/4 inch minimum throw or as required for fire rated assembly label.

Q. Provide door hardware on building perimeter doors with constructions cores and keying, to secure the project at the earliest date possible after close-in of the building. Provide permanent cores and keying to Owner. Replace construction cores with permanent cores just prior to Substantial Completion.

1.5 Delivery, Storage, and Handling

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to project site.
B. Tag each item and package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers. Package hardware items into sets by doors. Maintain factory shipping cartons and packaging where feasible.

C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

D. Provide securely locked storage area for hardware to protect from theft, moisture, sunlight, paint, chemicals, dust, excessive heat and cold.

1.6 Coordination

A. Provide templates and coordinate layout and installation of recessed hardware items with floor construction. Cast anchoring inserts into concrete. Coordinate with concrete, reinforcement, and formwork prior to placement of each to assure proper placement and function of hardware. Coordinate backing and blocking requirements in stud framed walls prior to framing being enclosed. Verify that blocking and backing are securely fastened, adequately located, and is of sufficient quantity.

B. Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with requirements.

C. Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system. Provide hardware as necessary to accommodate wiring. Coordinate security card readers and security door contacts with Owner’s representative. Refer to door schedule and electrical drawings for doors requiring security hardware. Provide installation and technical data for security and access control hardware to other related Sections. Upon completion of electronic security and access control hardware installation, verify that all components are working properly, and state in the required guarantee that this inspection has been performed.

D. Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

E. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for a complete and proper installation and function. Furnish trades with the following information:

1. Location of embedded and attached items to concrete.
2. Location of wall-mounted hardware, including wall stops.
3. Location of finish floor materials and floor-mounted hardware.
4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety alarm and access control system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
5. Manufacturer templates to door and frame fabricators.

F. Coordinate with glass and framed entrances to confirm that adequate provisions will be made for proper hardware installation. Do not order hardware until coordination with frame and door suppliers for compatibility with their products. Coordinate with glass and framed entrances suppliers to determine extent of hardware being provided for entrances. Review storefront and entrances submittals to confirm that adequate provisions are being made for proper hardware installation.
G. Prior to submittal, carefully inspect actual conditions at each opening to verify finish hardware required to complete work, including sizes, quantities, existing hardware schedule for re-use, and sill condition material. If conflict or incompatibility between the specified/scheduled hardware and actual conditions, submit request for direction from Architect. Include date of jobsite visit in the submittal.

H. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect’s approval.

I. Coordinate hardware requirements with concrete work. Provide templates and inserts to concrete trades for inclusion in form work.

J. Reinforce walls for wall-mounted hardware, including wall stops and stainless steel guard rails.

K. Coordinate finish floor materials and floor-mounted hardware.

L. Furnish manufacturer templates to door and frame fabricators.
   1. Ensure proper blocking in wood doors to support wood screws for panic hardware and door closers.
   2. Ensure proper reinforcement in metal doors and frames to support machine screws for panic hardware and door closers.

1.7 Warranty

A. Contractor and installer/supplier jointly agree to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of operators and door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period:
   a. Locksets: Five years.
   b. Extra Heavy Duty Cylindrical Lock: Seven years.
   c. Exit Devices: Three years mechanical, one year electrical.
   d. Closers: Ten years mechanical, two years electrical.
   e. Hinges: Life of building.
   f. Other Hardware: Two years.

1.8 Maintenance Service

A. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware. Tools shall be as supplied or recommended by door hardware manufacturer.

B. Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.
1. Check and readjust every item of hardware.
2. Consult with and instruct Owner’s personnel in recommended additions to maintenance procedures.
3. Replace hardware items which have deteriorated or failed due to other than misuse or abuse.
4. Prepare a written report of current and predictable problems of substantial nature in the performance of door hardware.

1.9 Extra Materials

A. Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Door Hardware: 1 each.
2. Electrical Parts: 1 each.

1.10 Commissioning

A. Conduct these tests prior to request for certificate of Substantial Completion:

1. With installer present, test all door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.11 Regulatory Requirements

A. Locate latching hardware between 34” to 44” above the finished floor, per California Building Code. Locate panic hardware between 36” and 44” above the finished floor.

B. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. The allowable pressure for fire doors to achieve positive latching shall not exceed 5.0 lbs.

C. Adjust door closer sweep periods so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door per California Building Code. Door closing speed shall be as follows:

1. Closer shall be adjusted so that the required time to move a door from an open position of 90° to a position of 12° from the latch is 5 seconds minimum.
2. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70° to the closed position is 1.5 seconds minimum

D. Do not locate floor stops in path of travel and locate floor stops no more than 4 inches from walls.

E. Provide UL labels on all exiting devices in fire-rated openings.

F. Provide permanent labels on all hardware required to achieve specified ratings on fire rated doors, indicating the listing agency and conditions of the listing.

G. Exit doors shall be openable at all times from the inside without use of key or special knowledge or effort.
PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following. Unless specifically indicated otherwise due to campus standards, manufacturers and products indicated are intended to determine quality and performance level only.

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2.2 Door Hardware, General

A. Provide door hardware as scheduled in DOOR HARDWARE SCHEDULE herein.

B. Do not use products which have manufacturer’s name or trade name displayed in a visible location.

1. Exception: Required fire labels.
2. Exception: As directed by or acceptable to the Architect.
3. Exception: Manufacturer’s identification on rim of lock cylinders.

C. Fire rated doors and exit doors.

1. Provide all hardware necessary to meet the requirements of CBC for fire doors and exit doors, as well as to other requirements specified, even if such hardware is not specifically mentioned under “Hardware Schedule” of this Section.
2. Hardware on fire rated doors shall bear the UL label and be listed in the UL Building Materials Directory complying with CBC Chapter 7. Use same hardware on 20 minute fire rated doors as on 45 minute fire rated doors.

D. Catalog numbers are indicated in the DOOR HARDWARE SCHEDULE to establish operation, function, quality, weight, size, pattern, design, material, and finish required.

E. Provide hardware manufactured to conform to published templates.
F. All hardware applied to metal doors or jambs shall be made to template and secured by machine screws. Furnish templates to the metal door and frame manufacturer for application at the factory, unless otherwise requested.

G. Provide all hardware necessary to complete work. Products not specifically identified but necessary shall be provided of type and quality generally recognized in door hardware industry for service duty of project type, location and usage, as selected by contractor and subject to acceptance by Owner and Architect.

H. Should specified hardware conflict with configuration of doors, frames and surrounding construction, provide comparable alternative hardware which maintains intended function of door, as selected by contractor and subject to review and acceptance by Owner’s Representative and Architect.

2.3 Hardware Template

A. Make templates for hardware to be applied to metal or to pre-finished doors.

B. Hinge templates shall conform to ANSI A156.7.

C. Promptly furnish template information or templates to door and frame manufacturers.

D. Coordinate hardware items to prevent interference with each other.

2.4 Locksets, Latchsets, Deadbolts

A. Locksets, Latchsets, and Deadbolts:

1. Manufacturer:
   a. Schlage Lock Co.
   b. Corbin Russwin.

2. Locksets and Latchsets: ANSI A 156.2, Series 4000 Grade 1; UL Listed.
   a. Corbin Russwin CL33 series NZD lever C26 1/c prep. Do not use Schlage ND series locksets.
   b. Schlage L9000 series mortise locksets, Rhodes (RHO) lever.
   c. Provide tactile warning (knurling) lever at electrical rooms and closets. Corbin Russwin.

3. Chassis: Cold-rolled steel, handing field-changeable without disassembly.


5. Lever Trim: Through-bolted, accessible design, cast lever or solid extruded bar type levers. Filled hollow tube design is unacceptable. Provide security design with independent breakaway. Breakage of outside lever does not allow access to inside lever’s hubworks to gain wrongful entry.

6. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.

7. Thumbturns: Accessible design not requiring pinching or twisting motions to operate.

8. Deadbolts: Stainless steel 1 inch throw.


10. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.


12. Certifications:
   a. ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
   b. ANSI/ASTM F 476-84 Grade 31 UL Listed.
B. Extra Heavy Duty Cylindrical Locks and Latches:

1. Chassis: Cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
2. Locking Spindle: Stainless steel, integrated spring and spindle design.
4. Latchbolt: Solid steel.
5. Backset: 2-3/4” typically, more or less as needed to accommodate frame, door or other hardware.
6. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2” clearance from lever mid-point to door face.
7. Electric Operation: Manufacturer-installed continuous duty solenoid.
8. Strikes: 16 gage curved steel, bronze or brass with 1” deep box construction, lips of sufficient length to clear trim and protect clothing.
10. Certifications:
    a. ANSI A 156.2, 1994, Series 4000, Grade 1.
    b. UL listed for A label and lesser class single doors up to 4 ft. x 8 ft.

C. Standard Duty Cylindrical Locks and Latches:

1. Chassis: Cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.
2. Locking Spindle: Stainless steel, interlocking design.
4. Backset: 2-3/4” typically, more or less as needed to accommodate frame, door or other hardware.
5. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2” clearance from lever mid-point to face of door.
7. Certification:
    a. ANSI A 156.2, 1994, Series 4000, Grade 2.
    b. UL listed for A label and lesser class single doors up to 4 ft. x 8 ft.

2.5 Exit Devices / Panic Hardware

A. General Features:

1. Independent lab tested 1,000,000 cycles.
3. 0.075-inch throw deadlocking latchbolts.
4. End Caps: Impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 5-lb. maximum operating force.
8. Panic hardware shall not require the ability to grasp to activate hardware and open door.
10. Locate closers inside buildings and rooms.
11. Provide screw spacers as necessary for parallel arm brackets.
12. Provide metal covers and exposed arms painted to approximate plated finish.
B. Specific Features:

1. **Lever Trim:** Breakaway type, forged brass or bronze escutcheon minimum .130” thickness, compression spring drive, match lockset lever design.
2. **Rod and latch guards with sloped full width kickplates:** for doors fitted with surface vertical rod devices with bottom latches.
3. **Fire Labeled Devices:** UL label indicating “Fire Exit Hardware.” Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
4. **Impact Recessed Devices:** 1-1/4-inch projection when push-pad is depressed. Sloped metal end caps to deflect carts, etc. No pinch points to catch skin between touchbar and door.
5. **Emergency exit and panic hardware shall comply with SFM Standard 12-10-3, Section 12-10-302.**
   a. The cross-bar shall extend across not less than one-half the width of the door/gate.
   b. The ends of the cross-bar shall be curved, guarded or otherwise designed to prevent catching on the clothing of persons during egress.

2.6 **Closers**

A. **Closers:** ANSI A 156.4, Grade 1; UL Listed; meets UL 10C and SFM Standard 12-7-4 for positive pressure fire test.

1. **Manufacturer:**
   a. LCN Model 4041.
2. **Provide EDA arms at high traffic doors.**
3. **Furnish drop plates at narrow top rail doors and parallel-arm closers at reverse bevel doors, and at doors with full 180 degrees swing.**
4. **Provide non-handed and non-sized closers with 1-1/2-inch minimum bore.**
5. **Fasteners:** Four sex bolts per closer.

B. **Surface Closers:**

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date of manufacture code.
3. Independent lab tested 10,000,000 cycles.
4. **Provide closers that are non-handed, non-sized and adjustable.**
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. **Advanced Variable Backcheck (AVB):** Where scheduled, these units commence backcheck at approximately 45 degrees.
7. **Adjustable to open with not more than 5.0 lbs. pressure to open at exterior doors and 5.0 lbs. at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.**
8. **Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.**
9. **Extra duty arms (EDA) at exterior doors scheduled with parallel arm units. EDA Arms:** Rigid main and forearm, reinforced elbow.
10. **Exterior Door Closers:** Testes to 100 hours of ASTM B117 salt spray test, furnish date on request.
11. **Exterior Doors:** Seasonal adjustments not required for temperatures from 120° F to -30° F, furnish checking fluid data on request.
12. **Non-flaming fluid, will not fuel door of floor covering fires.**
13. **Pressure Relief Valves (PRV) not permitted.**
14. Provide sex bolts and grommets at all wood doors.
15. Provide size 2 through 6 unless otherwise specified at exterior and interior fire rated doors.
16. Provide size 1 through 4 at interior non-rated doors.
17. Flush transom offset brackets shall be used where parallel arm closers are listed for doors with fixed panels over.
18. Drop brackets are required at narrow head rails.

C. High Security Closers: Removable heavy gage metal case. Cylinders independent test lab certified to exceed 10,000,000 cycles. Vandal and tamper resistant forged steel arm. Exposed Fasteners: Pinned TORX type. Advanced Variable Backcheck (AVB): These units commence backcheck at approximately 45 degrees.

D. Electromagnet Hold Open Closers: Integrate with UL listed fire/life-safety alarm systems.

1. Multi-Point Units: Hold-open bypass at 80 degree or 140 degree. Swing-free/no-drift arms at pull-side-mounted units.

2.7 Other Hardware

A. Hanging Hardware

1. Butt Hinges:
   a. Manufacturer: Hagar.
   b. Manufacturer: Stanley.

2. Steel based at interior locations and stainless steel based at exterior locations.

3. Unless otherwise noted or specified, provide butt hinges as follows:
   a. Doors 1-3/4 inch thick and up to 36 inch wide: 4-1/2 inch height.
   b. Doors 1-3/4 inch thick and 37 to 48 inch wide: 5 inch height.
   c. Provide widths sufficient to clear trim projection when door swings 180 degrees.
   d. Provide non-removable pins at exterior doors and where required by Owner for security reasons.
   e. Provide two butts for doors up to 60 inches high and one additional butt for each 30 inches of height or fraction thereof.
   f. Furnish three butts for doors up to 36 inches wide.
   g. Furnish four butts for doors over 36 inches wide.
   h. Provide ball-bearing hinges on all sound rated doors and doors with closers.

B. Floor and Wall Door Stops/holders and Bumpers:

1. Manufacturer: Ives.

2. Coordinate with Sections 05 40 00 and 09 29 00; provide all backing.
3. Floor stops shall not be located in the path of travel and 4-inch maximum from walls.
4. Install floor stops where it will not pose as a tripping hazard. If this is not possible use overhead stops.
5. Allow for maximum door swing.
6. Field-verify actual site conditions prior to ordering materials.
7. Do not install manual holders on fire-rated doors.
C. Smoke Seals and Sound Seals:
   1. Manufacturer: Pemko Manufacturing, Inc.
   2. Manufacturer: National Guard Products.

D. Power Supplies:
   1. Manufacturer: Von-Duprin.

E. Strikes:
   1. Provide ANSI 4-7/8-inch standard strike.
   2. Provide curved lip-type strike at all locations if possible to prevent catching clothing or other objects on strike. Where required provide detail and provide flat strike where requires.
   3. Where required provide open back strike and protected to allow practical and secure operation.

F. Door Stops: Provide stops to protect walls, casework or other hardware.
   1. Unless otherwise noted in Hardware Sets, provide wall type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type. Coordinate location and assure backing in wall.

G. Seals: Finished to match adjacent frame color. Provide solid neoprene seal material. Do not furnish vinyl seal material. Provide UL rated seals on rated doors to comply with fire rated assembly requirements.
   1. Non-corroding fasteners at in-swinging exterior doors.
   2. Fire-Rated Doors, Resilient Seals: UL 10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers’ and selected frame manufacturers’ requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacture only required an adhesive-mounted resilient seal, furnish rigid housed seal at minimum. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.

H. Thresholds: As per details.
   1. Fire-Rated Openings, 90 Minutes or Less Duration: Use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253.
   2. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

2.8 Keying

A. Key Systems (Cylinders and Keys):
   1. Manufacturer:
      a. Corbin Russwin.
   2. Key System:
      a. 6 pin full size interchangeable core.
b. Exit Device: Rim type, 6 pin full size interchangeable core.
c. Keyed Mullions at Pairs of Doors: Provide 1-1/4 inch mortise cylinder with 6 pin full size interchangeable core.

3. Keyway: Provide as instructed by Owner.

B. Keying Requirements:

1. Key as directed by Owner. Door hardware Supplier shall meet with Owner to assist in creating detailed keying schedule. Provide the following:
   a. Keying schedule: Submit three copies of separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
   b. Grand Master Key System: Key to Owner's existing Grand Master Key System; six cut Master Keys per set; allow for four Master Key sets. Key to existing key charts, on file with the manufacturer; all keying to be performed by the lock manufacturer.

2. Construction Keys:
   a. Provide temporary construction cores and keys during the construction period.
   b. Construction keys shall not be part of the Owner's permanent keying system or furnished on the same keyway (or key section) as the Owner's permanent keying system.

3. Permanent keys and cylinders:
   a. Stamp with the applicable key mark for identification.
   b. These visual key control marks or codes shall not include the actual key cuts.
   c. Permanent keys shall be stamped "DO NOT DUPLICATE".
   d. Ship permanent keys and cylinders directly from the factory to the Owner prior to occupancy.

4. Transmit Grand Masterkeys, Masterkeys and other Security keys to the Owner by Registered Mail – return receipt requested.

5. Furnish keys in the following quantities:
   a. 6 each Masterkeys per set.
   b. 3 each Change keys each lock, or cylinder.
   c. 9 each Construction Masterkeys.
   d. 2 each Extractor keys.

6. The Design-Build Entity shall remove construction cores and install permanent cores in the presence of an Owner’s representative.

2.9 Key Control System

A. Key Control System:

1. Provide visual key control system: Stamp keys with key sets symbols.
2. Provide key control identification system, including a wall mounted steel cabinet of standard gray color with capacity to contain all keys, plus approximately 50 percent, key envelopes, key tags, indexing and register system.
3. Manufacturers:
b. Telkee, Inc.

4. Components: Provide following:
   a. Set up and installation of key control system.
   b. Instruction of Owner’s personnel in operation of key control system.
   c. Periodic checks to maintain functional efficiency of system.

2.10 Miscellaneous Door Hardware

A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosures; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

B. Auxiliary Hardware: BHMA A156.16, Grade 1. Stanley Commercial Hardware; Division of The Stanley Works (STH), or approved equal.

2.11 Fasteners

A. Screws, Bolts, and Fastening Devices:
   1. Exposed head oval Phillips type screws in countersunk holes unless otherwise specified. Use screws, bolts, washers, grommets, nuts, and other fastening devices of appropriate length, type, head, metal and finish as necessary for proper match and application of hardware.
   2. Threshold anchors shall be Flat Sleeve Anchors (FHSL 25 ¼ - 20 2 inch) cadmium plated expansion anchor screw in one unit.

B. Furnish type, quality, size and quantity for long-life installation under hard usage. Conform to manufacturer’s instructions and recommendations for fasteners and installation and the following minimum requirements. Provide fasteners which are suitable for the substrate.

C. Provide expansion shields, hex bolts and other anchors and fasteners as recommended by hardware manufacturer. Do not use toggle anchors or powder-actuated driven fasteners.

D. Provide fastener finish that match hardware item. Provide stainless steel fasteners at aluminum and stainless steel hardware. Provide corrosion-resistant stainless steel at exterior exposure, unheated spaces and damp atmospheres.

E. Provide fasteners at fire doors that conform to labeling requirements of door, frame and hardware. At wood doors, provide sex-nut through-bolts for operating hardware unless permitted otherwise by hardware listing.

F. Do not use toggle or wing-type anchors. Do not use powder-actuated driven fasteners.

G. Provide door hardware fasteners manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Conceal fasteners to greatest extent possible. Where exposed fasteners are needed, provide Phillips flat head screws countersunk with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where
bolt head or nut on opposite face is exposed. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Steel Machine or Wood Screws: For the following fire-rated applications:
   a. Mortise hinges to doors.
   b. Strike plates to frames.
   c. Closers to doors and frames.

3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
   a. Surface hinges to doors.
   b. Closers to doors and frames.
   c. Surface-mounted exit devices.

4. Spacers or Sex Bolts: For through bolting of hollow metal doors.

5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

6. Install screws with silicone sealant applied to tip of screw to prevent screw from working loose.

2.12 Fabrication

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels.

B. Produce door hardware units of base metal, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

2.13 Finishes

A. Standard: BHMA A156.18, as indicated in door hardware sets.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Variations in appearance of abutting or adjacent pieces are not acceptable. Noticeable variations in the same piece are not acceptable.

D. At contractor’s option, stainless steel may be provided instead of satin chrome plating. Where stainless steel is indicated, substitution of satin chrome plating will not be acceptable.

E. Color shall be selected by Architect from manufacturer’s full range of colors including custom colors.

F. Finish. Unless otherwise specified, finishes shall be as follow:

1. BHMA 626 – satin chromium plated brass or bronze.
2. BHMA 628 – satin or dull aluminum, clear anodized (uncoated).
3. BHMA 630 – satin stainless steel.
4. BHMA 652 – satin or dull chromium plated steel.
5. BHMA 689 – sprayed aluminum paint finish.

G. Primer Coat:
1. Primer on steel: BHMA 600(PC).
2. Primer on brass or bronze: BHMA 163(PC).

H. Mill Finish: For brass and aluminum, as noted, MILL.

I. Colored Finishes:
   1. Factory colored coatings: Color code as indicated, corresponding to specified manufacturer’s coating type and color.
   2. Surface door closers: Factory powder coated on exposed metal components, to match door hardware finish colors, unless otherwise noted.

2.14 Automatic Door Operators

A. The operator system shall consist of a 120 VAC surface mounted electric operator with connecting arm and aluminum cover as well as wall-mounted push plate switches.

B. The System shall be completely engineered, manufactured and assembled in the factory. All operator components shall be factory assembled, adjusted and tested. No field wiring or operator adjustment shall be required other than the connection to job-site power.

2.15 Materials and Fabrication

A. Electric Operator:
   1. The operator shall be a low-energy, self-contained, electromechanical design. The operator shall be powered open with a DC motor working through six reduction gears. Closing shall be by spring force. The motor shall be off when the door is in the closing mode. The door shall be capable of being manually operated with power on or off without damage to the operator.
   2. The control shall be furnished with a selection switch that provides for two methods of actuating the automatic door. The selection switch shall enable the Owner to select the desired operation and adapt to changing conditions.

B. Switch:
   1. Switch shall be 6-inch diameter stainless steel battery operated switch push plate engraved with the international accessibility insignia and marked “Press to Open”.

PART 3 - Execution

3.1 Installer Requirements

A. Acceptable installers:
   1. Can read and understand manufacturers’ templates, suppliers’ hardware schedules and printed installation instructions.
   2. Can readily distinguish drywall screws from manufacturers’ furnished fasteners.
   3. Available to meet with manufacturers’ representatives and related trades to discuss installation of hardware and can explain and discuss the correct operation and installation of each hardware item.
   4. Thoroughly trained and experienced in the installation of the type of hardware required for this project.
3.2 Examination

A. Examine doors and frames, with hardware installer and hardware expert present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance. Verify that doors and frames are ready to receive work and that dimensions are as indicated on shop drawings.

1. Conform to the mounting locations required, except where otherwise shown on Drawings, otherwise indicated in reference standards or otherwise required by governing authorities having jurisdiction.
2. In case of conflict or variance with mounting methods or locations, submit RFI in writing to Architect listing all conflicts or variances, along with recommended mounting methods and locations for clarification and direction.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation. Verify that power supply is available to power operated devices.

C. Examine roughing-in for alarm and access control system to verify wiring locations and connection points.

D. Ensure that walls and frames are square and plumb before hardware installation.

E. Examine all hardware sets and packages:

1. Verify that each opening has the appropriate and correct hardware. Verify with hardware schedule.
2. Verify that appropriate fasteners have been provided.
3. Ensure that all hardware on fire and exit doors bears appropriate UL label.

F. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation indicates acceptance of substrates and conditions by contractor.

3.3 Preparation

A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames according to ANSI A250.6.

B. Before installing stops, determine proposed locations of furniture items, fixtures, and other items to be protected by the stop’s action.

C. Existing frames and doors to be retrofitted with new hardware:

1. Carefully remove existing hardware, tag and bag, and turn over to Owner.
2. Field verify conditions and dimensions prior to ordering hardware. Fill existing hardware cut outs not being reused by the new hardware. Remove existing hardware not being reused, return to Owner unless directed otherwise.
3. Remove existing floor closers not scheduled for reuse, fill cavities with concrete and finish smooth.
4. Cut and weld existing steel frames currently prepared with 2-3/4” height strikes. Cut an approximate 8-inch section from the strike jamb and weld in a reinforced section to accommodate specified hardware’s strike.
5. Patch and weld flush filler pieces into existing door hardware preparations in steel doors and frames, grind and leave surfaces smooth and invisible to modifications.
6. Patch and fill wood frames and doors with solid wood dutchments before cutting for new hardware. Do not reuse existing screw holes, fill with dowel plugs and re-pilot.

3.4 Installation

A. Mount door hardware units at heights to comply with all fire, life safety, security and accessibility requirements and the following:

1. Locate hardware per SDI-100.
3. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
4. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
5. Hardware installation at fire doors and exit doors:
   a. Install fire door hardware in conformance to NFPA 80.
   b. Install exit door hardware in conformance to NFPA 101.
   c. Ensure that all hardware on fire and exit doors bears appropriate UL label.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved. Use templates provided by hardware item manufacturer.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
3. Gaskets: Install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
4. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
5. Use suitable fasteners of same material and finish as hardware items, or submit Request for Substitution with Architect.
6. Replace fasteners damaged by power-driven tools.

C. Boxed Power Supplies: Locate power supplies above ceilings. Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

D. Locate floor stops no more than 4 inches from walls and not within paths of travel. See Part 2.2 Hinging Methods regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

E. Lubricate and adjust existing hardware to remain. Carefully remove and turn over to Owner items to be salvaged.

F. Fill existing hardware cut outs not being used by the new hardware. Remove existing hardware not being reused.
G. Disable or remove existing floor closers where they exist. If disabled cut or remove spindle.

H. Where existing wall conditions will not allow door to swing using the scheduled hinges, provide wide-throw hinges and if needed extended arms or closers.

I. After fitting hardware to doors, remove all finish hardware, carefully replace in properly marked boxes, and place in storage until painting and finishing is completed. After painting and finishing is completed, permanently install finish hardware. Comply with DHI-02 for installation of hardware.

J. For steel door surfaces fasten light hardware to door face with sheet metal screws. Fasten heavy and operating hardware to threaded internal reinforcement with machine screws.

3.5 **Field Quality Control**

A. Submit written confirmation by door hardware supplier and Architectural Hardware Consultant on letterhead that hardware is complete and correctly installed and adjusted. If corrections are necessary, perform adjustments and replacement of hardware prior to demonstration at no change in Contract Time or Contract Sum.

3.6 **Adjusting**

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment after balancing of HVAC system is complete, and to comply with referenced accessibility requirements. Measure door opening force with a mechanical force gauge Wagoner Instruments FDK40.

1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

2. Hardware damaged by improper installation or adjustment methods; repair or replace to Owner’s satisfaction.

3. Adjust doors to fully latch with no more than 1 pound of pressure.

4. Adjust door closers to comply with all regulatory requirements.

5. Make final adjustment to door operating hardware after mechanical/ventilation system is running balanced and balancing reports are submitted to and accepted by Owner.

B. Approximately six months after date of Substantial Completion, installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware. Installer to provide letter to Owner that upon completion installer has visited the project and has accomplished the following:

1. Re-adjusted hardware.

2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner’s personnel.

3. Identify items that have deteriorated or failed and replaced parts.


3.7 **Cleaning and Protection**

A. Clean adjacent wall, frame, door and other surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.
C. Provide factory or field applied protective coverings as necessary to prevent marring and soiling. Maintain factory protective coverings until ready for final cleaning.

D. Remove construction keying and install permanent keying immediately prior to hardware demonstration; provide key control as directed by Owner through Owner’s Representative.

E. Adjust and check each item of hardware at each door, to ensure proper operation or function of every component. Replace components, which cannot be adjusted, to operate freely and smoothly. Where door hardware is installed more than 30 days prior to Substantial Completion review, re-inspect and adjust hardware immediately prior to demonstration.

F. Clean hardware for Substantial Completion review.

3.8 Demonstration

A. In the presence of project inspector, demonstrate proper operation of all doors.

B. Demonstrate that permanent keys operate applicable locks and deliver keys immediately to Owner.

C. Demonstrate that all fire and exist doors operate improper sequence and with no greater than specified maximum force on operating hardware.

D. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Section 01 79 00 "Demonstration and Training." Demonstrate all electrical, electronic and control systems. Include demonstration for adjustment and maintenance procedures.

E. Furnish as-builts/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

3.9 Door Hardware Schedule

A. Hardware is described generally. Select and order door hardware according to manufacturer’s full catalog number, providing all features specified and necessary for project conditions.

B. Provide sub-groups of hardware as necessary.

C. Application of door hardware sets is indicated on the door schedule on the Drawings.

Hardware Sets

SET #01

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Catalog Number</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Hinges</td>
<td>CB179 4 1/2 X 4 1/2</td>
<td>US10A STA</td>
<td></td>
</tr>
<tr>
<td>1 Classroom Lockset</td>
<td>ND70PD RHO 10-025</td>
<td>613 SCH</td>
<td></td>
</tr>
<tr>
<td>1 Closer</td>
<td>4040 XP REG</td>
<td>DKBZ LCN</td>
<td></td>
</tr>
<tr>
<td>1 Door Stop</td>
<td>1270 or 1211 (as required)</td>
<td>613 TRM</td>
<td></td>
</tr>
<tr>
<td>1 Gasketing</td>
<td>5050 @ Head &amp; Jambs</td>
<td>613 NGP</td>
<td></td>
</tr>
<tr>
<td>1 Saddle Threshold</td>
<td>Per Detail</td>
<td>BRZ NGP</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Verify and provide keys and keying into existing system.
SET #02
3 Hinges
1 Fire Exit Device
1 Rim Cylinder
1 Closer
1 Door Stop
1 Gasketing
1 Saddle Threshold

<table>
<thead>
<tr>
<th>Hdw Set</th>
<th>Opening Label</th>
<th>Door Type</th>
<th>Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB168 4 1/2 X 4 1/2 NRP</td>
<td>US10A</td>
<td>STA</td>
<td></td>
</tr>
<tr>
<td>FL2108 x R4908A</td>
<td>613</td>
<td>PRE</td>
<td></td>
</tr>
<tr>
<td>Match Existing</td>
<td>613</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>4040 XP EDA</td>
<td>DKBRZ</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>1270 or 1211 (as required)</td>
<td>613</td>
<td>TRM</td>
<td></td>
</tr>
<tr>
<td>5050 @ Head &amp; Jambs</td>
<td>613</td>
<td>NGP</td>
<td></td>
</tr>
<tr>
<td>Per Detail</td>
<td>613</td>
<td>BRZ</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Verify new hardware will accommodate existing conditions.

SET #02A
3 Hinges
1 Fire Exit Device
1 Rim Cylinder
1 Electric Strike
1 Auto Operators
4 Push Plate Actuator
1 Key Switch
1 Mortise Cylinder
1 Door Stop
1 Gasketing
1 Saddle Threshold
1 Wiring & Riser Diagrams

<table>
<thead>
<tr>
<th>Hdw Set</th>
<th>Opening Label</th>
<th>Door Type</th>
<th>Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB168 4 1/2 X 4 1/2 NRP</td>
<td>US10A</td>
<td>STA</td>
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<tr>
<td>FL2108 x R4908A</td>
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<td>PRE</td>
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<td>SCH</td>
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<tr>
<td>6140 Series</td>
<td>10B</td>
<td>VON</td>
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<tr>
<td>8310-3852TWS</td>
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<td>700 Series x L1</td>
<td>SDC</td>
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<tr>
<td>1270 or 1211 (as required)</td>
<td>613</td>
<td>TRM</td>
<td></td>
</tr>
<tr>
<td>5050 @ Head &amp; Jambs</td>
<td>613</td>
<td>NGP</td>
<td></td>
</tr>
<tr>
<td>Per Detail</td>
<td>613</td>
<td>BRZ</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Push button actuators to signal operator to release electric strike then power open door. Auxiliary key switch to enable or disable exterior actuator to secure room as required.

NOTE: Verify new hardware will accommodate existing conditions.

SET #03
1 Classroom Lockset
1 Closer
1 Saddle Threshold

<table>
<thead>
<tr>
<th>Hdw Set</th>
<th>Opening Label</th>
<th>Door Type</th>
<th>Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND70PD RHO 10-025</td>
<td>613</td>
<td>SCH</td>
<td></td>
</tr>
<tr>
<td>4040 XP PA</td>
<td>DKBRZ</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>Per Detail</td>
<td>613</td>
<td>NGP</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Re-use balance of existing hardware. Verify new hardware will accommodate existing conditions.

SET #04
1 Electric Strike
1 Auto Operators
4 Push Plate Actuator
1 Wiring & Riser Diagrams

<table>
<thead>
<tr>
<th>Hdw Set</th>
<th>Opening Label</th>
<th>Door Type</th>
<th>Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>8300 Series x 2005M</td>
<td>HES</td>
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</tr>
<tr>
<td>9140 Series</td>
<td>LCN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8310-3852TWS</td>
<td>LCN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Re-use balance of existing hardware. Integrate new electric strike into existing conditions. Push button actuators to signal operator to release electric strike then power open door.

Opening List

<table>
<thead>
<tr>
<th>Opening</th>
<th>Hdw Set</th>
<th>Opening Label</th>
<th>Door Type</th>
<th>Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>335-1</td>
<td>04</td>
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<td>(E)</td>
<td>(E)</td>
</tr>
<tr>
<td>335-2</td>
<td>04</td>
<td>Rated</td>
<td>(E)</td>
<td>(E)</td>
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Door Hardware
08 71 00 - 23
<p>| | | |</p>
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<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
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<td>01</td>
<td>Rated</td>
</tr>
<tr>
<td>356-2</td>
<td>02A</td>
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<tr>
<td>356-3</td>
<td>02</td>
<td>Rated</td>
</tr>
<tr>
<td>358-1</td>
<td>03</td>
<td>(E)</td>
</tr>
</tbody>
</table>

END OF SECTION **08 71 00**
SECTION 09 22 16 - Non-Structural Metal Framing

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:
   1. Section 03 30 00 “Cast-in-Place Concrete.”
   2. Section 06 20 00 “Finish Carpentry.”
   3. Section 07 21 00 “Insulation.”
   4. Section 07 92 00 “Sealants.”
   5. Section 08 11 13 “Steel Doors and Frames.”
   6. Section 09 29 00 “Gypsum Board.”

1.2 Performance Requirements

A. ASTM C 645, nonstructural steel framing members.

B. ASTM C 954, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inches to 0.112 inches in thickness.

C. ASTM A 1003, Standard Specification for Steel Sheet, Carbon, metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

D. Provide framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120° F.

E. Provide framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.

F. Where stud sizes and connections have been indicated on Drawings, do not substitute with items of lesser size or capacity.

1.3 Submittals

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

B. Shop Drawings: Submit showing details for each typical wall, partition and ceiling system. Show all conditions of closures at and connections to, metal roof decking. Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4 Quality Assurance

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated in drawings.
2. Rated assemblies to be substantiated, from applicable testing using the proposed products, by contractor.
3. Both metal framing and wallboard manufacturers must submit written confirmation that they accept the other manufacturer’s products as a suitable component in the assembly. Acceptance is as follows:
   a. If installation of both products is proper, no adverse effect will result in the performance of one manufacturer’s product by the other’s products.
   b. Combining products can be substantiated by required assembly tests.

B. Install suspension systems in accordance with ASTM C 754.

C. Nonstructural components that are permanently attached to structures and their support attachments shall be designed and constructed to resist the effects of earthquake motions in accordance to local jurisdiction. Contractor shall determine appropriate gage of metal framing components based on loading, depths, and spacings indicated. In no case shall spans of metal framing elements exceed the limits indicated. Provide vertical studs with the following deflection limits:

   2. Opening Framing: L/360.
   3. All other Applications: L/240.

D. Except as modified herein or required by code; conform metal support systems for plaster to the CLPCA Plaster/Metal Framing/Lath Manual and to MLSFA Metal Lathing and Furring.

E. Coordinate with other Sections for mockup requirements.

F. Conduct pre-installation meeting at project site to comply with requirements in Section 01 31 00 “Project Management and Coordination.”

G. Engage an experienced fabricator/installer who has at least 5 years metal framing experience similar in material, design, and extent to that indicated. Installer to provide workers and supervision that is experienced in the installation of metal framing.

1.5 Delivery, Storage and Handling

A. Deliver materials to the job site and store in ventilated dry locations. Storage area shall permit easy access for handling. If materials are stored outdoors, stack materials off the ground, supported on a level platform, and fully protected from the weather. Handle materials carefully to prevent damage. Promptly inspect delivered or defective materials, and order replacement materials as required. Any damaged or defective materials shall be promptly removed from the job site. Remove damaged items and provide new items at no additional cost to Owner.

1.6 Coordination

A. Verify and coordinate work of trades before and during framing to assure adequate wall framing and backing is installed for all wall and ceiling attached such as but not limited to:

   1. Handrails.
   2. Marker-boards.
   3. Other similar architectural features and accessories.
4. Projection screens.
5. Light fixtures.
7. Wall mounted door bumpers and stops.
8. Doors.
9. Wall mounted hangers for plumbing, mechanical and electrical equipment, hangars and brackets.

B. Coordinate with other Sections to determine blocking and backing requirements.

PART 2 - Products

2.1 Non-Load-Bearing Steel Framing, General

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: ASTM C 645.
2. Protective Coating: Meeting requirements of ASTM C 645 C-channel, roll-formed from hot-dipped galvanized steel; complying with ASTM A 1003 or ASTM A 653, G40. A40 galvannealed products are not acceptable.
3. Dimpled components are acceptable.

B. Framing and support member gages specified herein are minimum. Use heavier stud gages where noted on the Drawings. Where required stud height exceeds code approvals or manufacturer’s recommendations, provide heavier gage studs and/or decrease stud spacing as necessary to conform to code approvals, at no additional cost to Owner.

2.2 Ceiling/Soffit Suspension System

A. Suspended ceiling framing system shall have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. The suspension system shall have a maximum deflection of L/360.

B. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 12 gage wire.

C. Hanger Attachments to Concrete: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency. Cast-in-place anchor, designed for attachment to concrete forms.

D. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 6 gage.

E. Carrying Channels: Cold-rolled, commercial-steel sheet 18 gage minimum thickness and minimum 1/2-inch-wide flanges. Depth: 2-1/2 inches.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep. 24 gage minimum.

G. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission. Configuration: Asymmetrical.

2.3 Steel Framing for Framed Assemblies

A. Steel Studs and Runners: ASTM C 645. Determine base metal thickness based on design loads, size of framing span and spacing indicated on Drawings.
1. Dimpled Steel Studs and Runners:
   a. Gage: As indicated on Drawings.
   b. Depth: As indicated on Drawings.

2. Traditional Flat Material:
   a. Gage: As indicated on Drawings.
   b. Depth: As indicated on Drawings.

B. Slip-Type Head Joints: Where indicated, provide steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs. Subject to requirements, provide products by one of, or equal to, the following:

1. Dietrich Metal Framing.
2. Steel Network, Inc.
3. Superior Metal Trim; Superior Flex Track System (SFT).

C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs. Subject to requirements, provide products by one of, or equal to, the following:

1. Dietrich Metal Framing; SLP-TRK.
2. Fire Trak Corp.; Fire Trak.


E. Cold-Formed Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.

1. Subject to requirements, provide Dietrich Metal Framing; Spazzer® 9200 Bridging and Bracing Bar or approved equal.
2. U-Channel Depth: 1-1/2 inches.
3. Dietrich Metal Framing; EasyClip™ U-Series™ Clip Angle or approved equal.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0296 inch.
2. Depth: As indicated on Drawings.

G. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission. Configuration: Asymmetrical.

H. Cold-Formed Furring Channels: 18 gage minimum thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness 22 gage minimum.
3. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 14 gage minimum.
I. Z-Shaped Furring: With slotted web, face flange of 1-1/4-inches, wall attachment flange of 7/8 inch, 24 gage minimum, and depth required to fit insulation thickness indicated.

J. Radius Framing: Steel sheet runner for non-load-bearing curves, bends, variable radii and arches.
   2. Depth: As indicated on Drawings.

K. Headers and Jambs: Manufacturer’s proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, Unpunched, with stiffened flanges.

L. Flat Strap and Backing Plate: Sheet for blocking and bracing in length and width indicated.

2.4 Auxiliary Materials

A. Provide auxiliary materials that comply with referenced installation standards. Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Fasteners: Code approved and manufacturer recommended, wafer head screws, self drilling type, for metal to metal fastening complying with ASTM C 1002 or ASTM C 954.

C. Acoustical Foam Tape: Compressible, closed cell polyvinyl chloride foam with pressure sensitive adhesive, in rolls with protective release liner on non-adhesive face, 6 pcf density 1-inch-wide by not less than 1/4-inch thick, Norseal V370, manufactured by Norton Performance Plastics Corporation, or approved equal.

D. Acoustical Sealant: Permanently resilient single component silicone acoustical sealant.


PART 3 - Execution

3.1 Examination

A. Examine areas and substrates, with installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation indicated acceptance of substrate and conditions by contractor.

3.2 Preparation

A. Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the work and that hangers will develop their full strength. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
B. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches on center.

C. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage. Repair areas where sprayed fire resistive materials are damaged or reduced below minimum thickness required.

3.3 General Installation

A. Installation Standard: ASTM C 754 and ASTM C 841, except comply with framing sizes and spacing indicated and comply with more stringent requirements of the Contract Documents.

1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install all supplementary framing, blocking, and backing required to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently. Leave required gap to accommodate finish and joint systems.

E. Control joints for expansion and contraction in the walls shall be constructed with double studs separated as indicated on Drawings. Control joint spacing shall not exceed 30-feet. Ceiling-height door frames may be used as vertical control joints. Door frames of less than ceiling height may be used as control joints only if standard control joints extend to ceiling from both corners of top of door frame. Control joints between studs shall be filled with firesafing insulation in fire rated partitions.

F. Install 16 gage studs at equipment, and elsewhere as shown.

G. Securely anchor metal framing to supporting structure. Screw, bolt, or weld wall framing at horizontal and vertical junctures to produce flush, true-to-line joints with minimum variation in plane and true position.

H. Install metal framing and accessories level, plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing; do not shear torch cut.
2. Fasten wall and joist metal framing members by welding, bolting, or screw fastening. Fasten suspended ceiling framing by screw and wire tie. Clinch fastening, or riveting of framing members is not permitted.

   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate screws and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

I. Install framing members in one-piece lengths. Splice connections for tracks may be used only if indicated.
J. Install temporary bracing and supports to secure and support framing. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

K. Install insulation in framed walls and give particular consideration to framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work and areas that will receive pre-boarding prior to being concealed.

L. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer’s standard punched openings.

M. Install metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet along framing member and perpendicular to framing member. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

N. Coordinate erection of studs/joists with installation of service utilities to minimize discontinuity in framing. Align stud web openings.

O. Provide double studs/joists at all openings. Provide 1 inch long by 1/8 inch welds at 16 inches on center on both sides of double framing.

P. Provide framed openings for all recessed components.

Q. Install bracing at studs/joists to make rigid. Do not install cross-bracing at double stud walls and partitions unless acceptable to Architect to preserve acoustical quality of assembly.

R. Install interlocking bridging member through stud web openings at stud 7 feet 6 inches in length or greater.

3.4 Installing Suspension Systems

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system. Splay hangers only where required to miss obstructions and to offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standard.

3. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Do not attach hangers to steel roof deck.

Non-Structural Metal Framing
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
8. Do not attach hangers to bottom chord of trusses or intermediate members.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Support members shall be provided as required at ceiling openings for access panels, recessed light fixtures, and air supply or exhaust. Support members shall be not less than 1-1/2-inch main runner channels and vertically installed suspension wires or straps shall be located to provide at least the minimum support specified herein for furring and wallboard attachment. Intermediate structural members not a part of the structural system, shall be provided for attachment or suspension of support members.

G. Light fixtures and air diffusers shall be supported directly from suspended ceiling runners. Wires shall be provided at appropriate locations to carry the weight of recessed or surface mounted light fixtures and air diffusers.

H. Ceiling control joints for expansion and contraction shall be located at 30 foot intervals. Intermediate blocking shall be installed where ceiling framing members change direction.

I. Install splay wires and compression struts as detailed and as required to prevent upward and sideward motion under seismic conditions, as required by code.

J. Suspension under Ducts: For hangers spaced at 4 to 5-1/2 foot centers, provide 6 gage hanger wires with minimum 2-inch runner channels spaced at maximum 48-inch centers. For greater spans, design system for live load of 10 pounds per square foot of area plus dead load and detail in shop drawings.

K. Provide framing for horizontal furring as shown and required. Conform to above requirements as applicable.

3.5 Installing Framed Assemblies

A. Install studs so flanges within framing system point in same direction. Provide studs at spacings indicated, or if not indicated 16-inches on center. Provide studs using minimum gages specified herein unless heavier gages are indicated otherwise on the Drawings. Cut studs 1/2-inch short and secure to top track in manner that allows for deflection of structure above. Steel framing and furring members shall be installed in accordance with ASTM C 754 and as specified herein. Members shall be in alignment. Tracks shall be aligned accurately at the floor and ceiling and securely anchored.

B. Bolt or screw fasten framing and tracks to metal and concrete with bolts and expansion shields, sleeved “dryvins,” cinch anchors, screws and lead plugs, drilled and bolted steel shells, or other approved device. Concrete nails are not acceptable. Abutting lengths of track shall be securely anchored to a common structural element, butt-welded or spliced. Secure all tracks within 6-inches of ends and as indicated, or if not indicated, 24-inch centers maximum. Provide concrete anchors with a minimum 1-1/4-inch embedment.

C. The framing system shall provide for the installation and anchorage of the required sub-frames or finish frames for wall openings at doors, pass-through openings, and access panels. Partitions abutting continuous suspended ceilings shall be strengthened for rigidity at rough openings of more than 30-inches wide. Studs at openings shall be 16 gage minimum thickness and spot grouted at jamb anchor inserts.
Double studs shall be fastened together with screws and secured to floor and overhead runners. Form heads and sills of openings with track sections screwed or bolted to jamb studs, unless otherwise shown.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
   a. Install two studs at each jamb, unless otherwise indicated.
   b. Install cripple studs at head adjacent to each jamb stud, with a minimum ½-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
   c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure. Install firestop track to maintain continuity of fire-resistance-rated assembly indicated.
5. Install sound-rated partition framing to comply with sound-rated assembly indicated.
6. Curved Partitions:
   a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
   b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches on center.

7. Provide column and pilaster furring in overall dimensions indicated. Provide attachment clips and supports as necessary. Connect and support framing to structure within span limits.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.6 Sound Insulated Walls and Partitions

A. Embed floor runner tracks in two beads of acoustical sealant or two strips of compressed tape seal. Install the top track in same manner for full-height insulated walls. Where wall ends abut concrete, masonry, or steel, set end studs in two beads of acoustical sealant or two tape seals and secure at 4-foot centers vertically. At irregularities in surfaces, provide additional layers of sealant or tape as required to obtain compression.

B. Embed floor runner tracks in two beads of acoustical sealant or two runs of compressed tape seal. Install the top track in same manner for full-height insulated walls.

3.7 Backing Plates and Anchorage

A. Install plates of lengths to span over at least three stud supports, equipped with two countersunk machine screws at each support except plates may be welded to supports 16 gage or heavier. Wall-mounted items requiring backing plates include but are not limited to items in this Section.
3.8 Framed Ceilings

A. Securely weld or screw attach flanges of horizontal studs to stud tracks for walls. Spacing of studs shall not exceed 16-inches for walls and for ceilings. Provide bridging in ceilings where width exceeds 8-feet.

B. The assembly shall be rigidly braced to structure above by means of diagonal braces or taut wires as applicable. Provide additional diagonal braces for ceilings wider than 8-feet.

3.9 Connections to Metal Decking

A. Provide premolded neoprene filler strips matching the flute profile for walls and partitions covered on one or both sides up to metal decking. If proprietary fire-rated top tracks are used, the installation shall be in accordance with manufacturer’s written recommendations.

3.10 Repairs and Protection

A. Prepare and repair damaged coatings on fabricated and installed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer’s written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure that metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16
SECTION 09 29 00 - Gypsum Board

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 05 40 00 “Cold-Formed Metal Framing.”
2. Section 06 20 00 “Finish Carpentry.”
3. Section 07 21 00 “Insulation.”
4. Section 07 92 00 “Sealants.”
5. Section 08 11 13 “Steel Doors and Frames.”
6. Section 09 22 16 “Non-Structural Metal Framing.”
7. Section 09 90 00 “Painting.”
8. Section 10 14 00 “Signage.”
9. Section 10 44 00 “Fire-Protection Specialties.”

1.2 Submittals

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

B. Samples: For the following products:

1. Trim Accessories: Full-size sample in 12-inch-long length for each trim accessory indicated.
2. Textured Finishes: 12-inch by 12-inch for each gypsum board finish indicated and on same backing indicated for Work.

1.3 Quality Assurance

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. Before gypsum board installation provide mockups of at least 8’ x 8’ in surface area to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each type of gypsum board texture, finish and installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:

   a. Inside and outside corners.
   b. Door openings.
   c. Transitions to other finish materials.
   d. Joints, casings and other accessories.
   e. Sealant joints.
   f. Each type of finish texture.
   g. Joint treatment and each finish level.
2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.
3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.
4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.
5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.
6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

C. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

D. Applicator of gypsum board products and finishes to have a minimum of 10 years experience with similar installations and applications.

E. Comply with Gypsum Association:
   1. GA-201 Gypsum Board for Walls and Ceilings.
   2. GA-216 recommended specifications for the Application and Finishing of Gypsum Panel Products.

F. Comply with USG Specification and Technical Bulletins No. SA-922, No. SA-923, and No. SA-924, as applicable for materials location, installation and condition of construction.

G. Coordinate gypsum board work with work specified in other Sections to properly locate framing members and to provide additional framing and backing as necessary for recessed and built-in components. Verify that framing and furring are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board.

1.4 Storage and Handling

A. Comply with GA-801.

B. Delivery gypsum products and related materials in original packages bearing brand name and identification of manufacturer.

C. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Neatly stack panels flat off ground to prevent sagging.

D. Handle gypsum products to prevent damaging edges, ends, backs or faces.
1.5 Project Conditions

A. Comply with ASTM C 840 for environmental requirements or gypsum board manufacturer's written recommendations, whichever are more stringent. Provide for more expensive condition at no additional cost to Owner.

B. Do not install interior gypsum board products until installation areas are enclosed and weathertight.

C. Do not install gypsum board products that are wet, those that are moisture damaged, and those that are mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

D. Do not install gypsum board products over wet or damp concrete or masonry surfaces or concrete which has cured for less than 28 days.

1.6 Coordination

A. Coordinate with mechanical, electrical and other trades in the location and installation of their work. Provide bridging, bracing and backing to support their work installed in or on sheathing construction.

B. Coordinate final location of necessary access panels.

C. Coordinate requirements for preboarding areas that will be covered by subsequent construction.

D. Coordinate compatibility of sealing compounds, high solids primer and skim coat materials with finish system requirements.

E. Contractor is aware of a condition known as critical lighting. This condition causes shadows that accentuate even the slightest surface variations. A base sealer will provide tooth for succeeding paint coatings but does not equalize smoothness or suction of surface. Any corrective action must be done by gypsum board finisher / installer prior to painting. Coordinate with paint installer to achieve desired results.

PART 2 - Products

2.1 General

A. Provide gypsum products in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. For each type of product use products of a single manufacturer from a single source.

C. For corridor walls and high traffic areas provide high impact form of product.

D. Gypsum board, joint treatment and finishing materials shall be manufactured from asbestos-free materials.
2.2 Interior Gypsum Board

A. Complying with ASTM C 36 or ASTM C 1396, as applicable to type of gypsum board indicated and whichever is more stringent. Provide in thickness and types indicated.

1. Subject to requirements, provide products by one of, or equal to, the following:

   a. G-P Gypsum.
   c. PABCO Gypsum.
   d. USG Corporation.

B. Type X: Long Edges: Tapered.

C. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness. Apply additional layers to flush surface with adjacent surfaces. Long Edges: Tapered. Thickness: 1/4-inch.

D. Ceiling Type: Manufactured with sag resistance greater than regular-type gypsum board. Long Edges: Tapered.

2.3 Trim Accessories

A. Interior Trim: ASTM C 1047.

1. Galvanized steel sheet:

   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   d. Control joint.
   e. Curved-Edge Cornerbead: With notched or flexible flanges.

2.4 Fasteners

A. Screws for Metal Framing 20 Gage and Lighter: ASTM C 954, corrosion-resistant self-tapping bugle-head spiral-threaded type, minimum 1-1/4" long except 1-3/4" for double layer walls, lengths to penetrate all supporting metal at least 3/8". Furnish specially hardened type screws for supports heavier than 25 gage.

B. Screws for Metal Framing Heavier than 20 Gage: 1-1/4” bugle-head with S-12 point, with self embedding head specially designed for use with board. Fasteners shall be stainless steel or shall have non-corrosive finish.

C. Screws for Wood Substrate: ASTM C 646, USG Durock Flat Wafer Headscrews, Type W, steel self-drilling screws, low profile head, length in accordance with manufacturer’s recommendations and ML/SFA specifications.

D. Gypsum Sheathing Fasteners: Self-tapping steel drill screws 1-1/4” long, with organic-polymer coating or other corrosion-protective coating having a salt-spray resistance of more than 800 hours per ASTM B 117. Provide type S-12 bugle-head self-tapping steel drill screws complying with ASTM C 954 to attach sheathing to steel framing from 0.033- to 0.112-inch thick.

E. Nails are not acceptable.
2.5 Joint Treatment Materials

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Exterior Applications: Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. High Solids Primer: USG Sheetrock “First Coat,” or approved equal. Coordinate with finish materials to assure compatibility.

F. Skim Coat: USG “Sheetrock All Purpose Joint Compound,” or approved equal.

G. Acoustical Sealant: Comply with Section 07 29 00.

2.6 Texture Finishes

A. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

1. Subject to requirements, provide products by one of, or equal to, the following:
   a. G-P Gypsum; Georgia-Pacific Ceiling Textures/Vermiculite.
   b. USG Corporation; Sheetrock Wall and Ceiling Spray Texture (Aggregated).

2. Texture: Light spatter.

PART 3 - Execution

3.1 Examination

A. Examine areas and substrates, with installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance. Make a detailed inspection of areas and surfaces to be enclosed or covered by gypsum board and arrange for correction of defective workmanship or materials. Ascertain that other work enclosed by gypsum board has been inspected and approved before starting installation; otherwise, uncover as directed at no additional time or cost to Contract.

B. For areas to receive gypsum sheathing, field inspect and verify that all framing studs, blocking and supporting materials are in place and ready for sheathing attachment prior to starting work. Coordinate
the exterior placement of electrical, mechanical and plumbing wall devices, accessories and access panels, wall signage and other type wall construction with other trades before proceeding with the work and during installation.

C. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Proceeding with installation indicates acceptance of substrate conditions by Contractor.

3.2 General Application

A. Comply with ASTM C 840.

B. Perform all gypsum board installation and finishing according to gypsum board manufacturer’s written instructions. Do not install gypsum board until building is weathertight. Conform to fire-rating requirements, building code approvals, and requirements herein.

C. Maintain temperature between 55° F and 70° F within building during installation. Furnish ventilation to eliminate excessive moisture.

D. Install joints, casings, trims, cornerbeads and other accessories in maximum lengths possible to minimize laps and joints. Miter exposed corners.

E. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

F. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

G. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

H. Form control joints with space between edges of adjoining gypsum panels.

I. Cover both faces of support framing with gypsum panels in concealed spaces.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

J. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch-wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant. Hold bottom edge of gypsum board up 1/4-1/2 inch above finish floor.

K. Attach panels to metal framing so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
L. Apply preliminary layers of fire rated gypsum board to locations in fire rated construction that will be concealed by other construction.

M. Install screws so heads are below gypsum board surface without breaking surface paper or stripping the steel framing member around the screw. Space screws according to code requirements.

N. Accurately cut and fit the gypsum board at openings. At door and other openings, cut gypsum board to continue across area above opening head; do not cut gypsum board to both jambs and fill in area over openings with separate pieces. Make the dimension from end joints to jamb over head of an opening 6” minimum. Stagger joints on opposite side of partition.

O. Use gypsum boards of maximum practical length to minimize end joints and properly support around cutouts and openings. Secure with screws.

P. Construct walls, soffits, roofs and ceilings in accordance with the requirements of the code for the time ratings indicated on the Drawings or otherwise required by the code.

3.3 Applying Interior Gypsum Board

A. Install interior gypsum board in locations indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.

2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), with vertical joints centered on framing unless otherwise required by fire-resistance-rated assembly, and minimize end joints. Stagger abutting end joints not less than one framing member in alternate courses of panels. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger vertical joints on opposite sides of walls.

3. Apply gypsum panels to supports with steel drill screws.

C. Curved Surfaces:

1. Install panels horizontally perpendicular to supports and unbroken, to greatest extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches on center. Offset gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 16 inches on center.


3.4 Installing Trim Accessories

A. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer’s written instructions.

B. Control Joints: Install control joints according to ASTM C 840, and approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners, unless otherwise indicated.

2. LC-Bead: Use at exposed panel edges.
3. U-Bead: Use at exposed panel edges.

3.5 Finishing Gypsum Board

A. Comply with Gypsum Association GA-214 and GA-232, finish panels to levels indicated on Drawings and according to ASTM C 840.

1. Level 1: Apply tape bedding compound and tape on joints in gypsum board.
2. Level 2:
   a. Apply joint compound and finishing compound over screw heads. Treat all inside corners with joint compound, tape, and finishing compound. Treat outside corners with cornerbeads and finishing compound.
   b. Provide metal casing beads at all edges of gypsum board which abut ceiling, wall, or column finish, and elsewhere as required, such as openings, offsets, etc. Make all exposed joints, trims, and attachments non-apparent following application of paint or other finishes; if the joints and fasteners are apparent, correct defects as directed with no additional cost or time to Contract.
   c. Seal the raw edges of plumbing openings and of boards that have been cut to fit with joint compound brushed on.
   d. When entire installation is completed, and prior to installation of finish materials by other trades; correct and repair broken, dented, scratched, or damaged gypsum board.
3. Level 3:
   a. Apply joint compound and finishing compound over screw heads. Treat all inside corners with joint compound, tape, and finishing compound. Treat outside corners with cornerbeads and finishing compound.
   b. Provide metal casing beads at all edges of gypsum board which abut ceiling, wall, or column finish, and elsewhere as required, such as openings, offsets, etc. Make all exposed joints, trims, and attachments non-apparent following application of paint or other finishes; if the joints and fasteners are apparent, correct defects as directed with no additional cost or time to Contract.
   c. Seal the raw edges of plumbing openings and of boards that have been cut to fit with joint compound brushed on.
   d. When entire installation is completed, and prior to installation of finish materials by other trades; correct and repair broken, dented, scratched, or damaged gypsum board.
   e. Spray apply one coat of high solids primer over entire surface.
4. Levels 4 and 5:
   a. Apply joint compound and finishing compound over screw heads. Treat all inside corners with joint compound, tape, and finishing compound. Treat outside corners with cornerbeads and finishing compound.
   b. Provide metal casing beads at all edges of gypsum board which abut ceiling, wall, or column finish, and elsewhere as required, such as openings, offsets, etc. Make all exposed joints, trims, and attachments non-apparent following application of paint or other finishes; if the joints and fasteners are apparent, correct defects as directed with no additional cost or time to Contract.
   c. Seal the raw edges of plumbing openings and of boards that have been cut to fit with joint compound brushed on.
   d. When entire installation is completed, and prior to installation of finish materials by other trades; correct and repair broken, dented, scratched, or damaged gypsum board.
5. Level 4: Spray apply one coat of high solids primer over entire surface.
6. Level 5: Apply one coat of skim coat over entire surface, followed by one spray applied coat of high solids primer over entire surface.
7. Textured Surfaces: Spray apply one coat of high solids primer to entire surface prior to texture application.
8. Levels of Gypsum Board Finish:

<table>
<thead>
<tr>
<th>Level</th>
<th>Joints</th>
<th>Interior Angles</th>
<th>Accessories</th>
<th>Fasteners</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>#0</td>
<td>No taping, finishing or accessories required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>Tape set in joint compound.</td>
<td>Tape set in joint compound.</td>
<td></td>
<td></td>
<td>Tool marks and ridges acceptable. Surface free of excessive joint compound.</td>
</tr>
<tr>
<td>#2</td>
<td>Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.</td>
<td>Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.</td>
<td>Shall be covered by one separate coat of joint compound</td>
<td>Shall be covered by one separate coat of joint compound</td>
<td>Surface shall be free of excessive joint compound. Tool marks and ridges acceptable. Joint compound applies over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.</td>
</tr>
<tr>
<td>#3</td>
<td>Tapes as in level #2, then covered with one separate coat of joint compound.</td>
<td>Tapes as in level #2, then covered with one separate coat of joint compound.</td>
<td>Shall be covered by two separate coats of joint compound.</td>
<td>Shall be covered by two separate coats of joint compound.</td>
<td>Joint compound shall be smooth and free of tool marks and ridges.</td>
</tr>
<tr>
<td>#4</td>
<td>Taped as in level #2, then covered with two separate coats of joint compound.</td>
<td>Taped as in level #2, then covered with two separate coats of joint compound.</td>
<td>Shall be covered by three separate coats of joint compound.</td>
<td>Shall be covered by three separate coats of joint compound.</td>
<td>Joint compound shall be smooth and free of tool marks and ridges.</td>
</tr>
<tr>
<td>#5</td>
<td>Taped as in level #2, then covered with two separate coats of joint compound.</td>
<td>Taped as in level #2, then covered with two separate coats of joint compound.</td>
<td>Shall be covered by three separate coats of joint compound.</td>
<td>Shall be covered by three separate coats of joint compound.</td>
<td>A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.</td>
</tr>
</tbody>
</table>
B. Levels of Finish: Finish gypsum board surfaces in accordance with GA-214 as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plenum areas above ceilings.</td>
<td>Level 1 finish, no texture.</td>
</tr>
<tr>
<td>Electrical and mechanical rooms.</td>
<td>Level 2 finish, no texture.</td>
</tr>
<tr>
<td>Moisture resistant gypsum backing board (substrate for adhesive applied finish material).</td>
<td>Level 2 finish.</td>
</tr>
<tr>
<td>Light texture (medium orange-peel); use: classrooms and offices.</td>
<td>Level 3 finish.</td>
</tr>
<tr>
<td>Smooth finish; satín/eggshell paint finish; use: corridors.</td>
<td>Level 4 finish.</td>
</tr>
<tr>
<td>Smooth finish; semi-gloss paint finish; use: restrooms.</td>
<td>Level 5 finish.</td>
</tr>
<tr>
<td>Heavy-grade wall covering.</td>
<td>Level 3 finish, no texture.</td>
</tr>
<tr>
<td>Wall covering.</td>
<td>Level 4 finish, no texture.</td>
</tr>
</tbody>
</table>

C. Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

D. Prefill open joints and damaged surface areas.

E. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

F. Take care that sanding operations do not raise paper surfaces of gypsum board.

3.6 Applying Texture Finishes

A. Prepare and apply primer to gypsum panels receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.7 Protection

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00
SECTION 09 65 00 - Resilient Flooring

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections:
   1. Section 03 30 00 “Cast-in-Place Concrete.”
   2. Section 07 92 00 “Sealants.”

1.2 Submittals

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

B. Shop Drawings: Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts. Show details of special patterns. Indicate seaming layout and locations including boots, drop outs, patch panels, and seams in top metal cap.

C. Samples: Full-size units of each color and pattern of floor tile required. For heat-welding bead, manufacturer's standard width and diameter, but not less than 12 inches long, of each color required.

D. Qualification Data: For qualified installer.

E. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.3 Quality Assurance

A. Provide a qualified installer who employs workers for this project who are competent in techniques required by manufacturer for resilient products indicated. Engage an installer who employs workers for this project who are trained or certified by manufacturer for installation techniques required. Provide installer with 5 years documented experience with installing products specified.

B. Fire-Test-Response Characteristics: Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm. NFPA E 648.

C. Before beginning actual work, install mockups of at least 8’ x 8’ to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups for each type of resilient flooring and installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:
      a. Inside and outside corners.
      b. Integral coves.
      c. Door openings.
      d. Base materials.
      e. Transitions to other finish materials.
      f. Joints.
      g. Corner joints.
2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.
3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.
4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.
5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.
6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

D. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 “Project Management and Coordination.” Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

E. Coordinate with flooring requirements for elevators.

1.4 Delivery, Storage, and Handling

A. Deliver materials in unbroken original protective wrapping with manufacturer’s identification, brand name and label.

1. Store inside, in well ventilated area, protected from weather, moisture, soiling, extreme temperatures and humidity.
2. Lay flat with blocking off ground.
3. Do not stack rolls on top of each other.
4. Do not store rolls against each other, allow ventilation all around roll.
5. Do not allow to be folded.

B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65° F or more than 85° F.

C. Allow material to acclimate to ambient temperatures listed below for 48 hours minimum prior to installation.

1.5 Project Conditions

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65° F or more than 85° F, in spaces to receive floor tile during the following time periods:

1. 48 hours minimum before installation.
2. During installation.
3. 48 hours minimum after installation.

B. Maintain ambient relative humidity between 40% and 60% during installation.

C. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55° F or more than 85° F.
D. Close spaces to traffic during floor tile installation.
E. Close spaces to traffic for 48 hours after floor tile installation.
F. Install floor tile after other finishing operations, including painting, have been completed.
G. Provide necessary testing to assure moisture content and pH levels of substrate are within acceptable range per flooring manufacturer’s recommendations and warranty requirements. Where resilient flooring is applied directly to concrete substrates cured with liquid applied curing compounds test for compatibility with curing compounds. Submit test results in writing.
H. Verify compatibility between joint sealants in substrate and adhesive used to adhere resilient products. Provide adhesive that is compatible with substrate.
I. Maintain adequate ventilation for the removal of moisture and fumes.

1.6 Extra Materials

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Furnish 5 percent of each type, color, and pattern of material installed. Provide material in unopened original manufacturer’s packaging with manufacturer’s labels. Provide new material. Do not provide scrap material.

PART 2 - Products

2.1 Vinyl Composition Tile

A. Subject to requirements, provide products by Armstrong World Industries, Inc., Chromaspin, or equal to, the following:
   1. Mannington Mills, Inc.
   2. Forbo Industries.
   3. Tarkett, Inc.

B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
C. Wearing Surface: Smooth.
D. Thickness: 0.125 inch.
E. Size: 12 inches by 12 inches.
F. Colors and Patterns: As selected by Architect from full range of industry colors.
G. Product is to be slip resistant.

2.2 Resilient Base

A. Resilient Base:
   1. Armstrong World Industries, Inc.
   2. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
   3. Endura Rubber Flooring; Division of Burke Industries, Inc.
Resilient Flooring
09 65 00 - 4

2.3 Resilient Transitions

A. Subject to requirements, provide products by one of, or equal to, the following:
   1. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
   2. Flexco, Inc.
   3. Roppe Corporation, USA.

B. Description: Cap for cove resilient floor covering.

C. Material: Rubber.

D. Profile and Dimensions: As indicated on drawings.

E. Colors and Patterns: As selected by Architect from full range of colors.

2.4 Installation Materials

A. Leveling Compound: Latex modified blended hydraulic cement type, Merkote Products “Mer-Ko Underlay L” or Crossfield Products “Dex-O-Tex G-26 Underlayment.” Verify that the compound is compatible with the proposed adhesive.

B. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
   1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
a. Vinyl Flooring Adhesives: Not more than 50 g/L.
b. Rubber Floor Adhesives: Not more than 60 g/L.


E. Provide protective liquid floor polish or wax products as recommended by manufacturer for each particular type of resilient flooring and particular characteristics. Verify product requirements with manufacturer prior to any waxing/polishing.

PART 3 - Execution

3.1 Examination

A. Examine substrates, with installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation indicates contractor’s acceptance of substrate conditions.

D. Proceed with installation only after moisture and pH levels satisfy flooring and adhesive manufacturer’s warranty requirements.

3.2 Preparation

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Mechanically remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Mechanically remove all existing or new paint, coatings, and layout markings.
4. Mechanically remove all materials that are incompatible with adhesives or will bleed through or broadcast through new flooring.
5. Perform alkalinity and adhesion testing. Proceed with installation only after substrates pass testing. Provide written evidence that alkalinity and pH levels are within manufacturer’s written recommendations and meet warranty requirements.
6. Perform pH and moisture testing. Proceed with installation only after substrates pass testing. Provide written evidence that pH and moisture levels are within manufacturer’s written recommendations and meet warranty requirements.
7. Allow concrete substrates to cure 28 days minimum.
8. Check subfloors for level, and make floor slabs true to level and plane within a tolerance of 1/8-inch in 12 feet. Test floor areas both ways with a 12 foot strait edge and repair high and low areas exceeding allowable tolerance. Remove high areas by power sanding, stone rubbing or grinding, chipping off and filling with leveling compound, or equivalent method. Fill low areas with leveling compound. Repair and level the surfaces having abrupt changes in plane, such as trowel
marks or ridges, whether or not within the allowable tolerance. Again clean areas where repairs are performed.

9. After leveling, if required, clean substrates of all deleterious substances and foreign matter. Fill cracks or depressions with latex leveling compound of type recommended by flooring manufacturer for the specific job conditions.

10. Prime concrete floor slabs on grade; prime other slabs if so recommended by flooring manufacturer.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate. Fill all depressions and recesses, holes, and cracks resulting from demolition and removal of existing elements and other construction activities.

D. Do not install flooring until it is the same temperature as space where they are to be installed. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation. Maintain temperatures.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

F. Verify that wall surfaces to receive base are free from irregularities, adhesives, joint compounds and other materials which would telegraph through the material. Remove such materials and sand wall surfaces smooth prior to installing base.

3.3 Floor Tile Installation

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter. Lay tiles square with room axis in pattern indicated. Do not install floor tiles over expansion joints.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door in closed position. Extend resilient flooring into cabinets and casework without bottoms.

F. Mix sufficient quantity of tiles to complete each area before laying to avoid color variations. Install flooring with tight joints, pattern direction as approved. Lay flooring square with axis of rooms, starting on center lines with the tile joint or tile center so that border tiles are not less than 4-inches-wide, accurately aligned. Install reducer strips at exposed edges of flooring and where shown. Cut flooring mechanically to produce square true edges. Closely trim to pipes, jambs, outlets, and like conditions. Adhesive application rate shall be as required to avoid telegraphing trowel likes to the surface after maintenance coatings are applied. Adjust tile "runoff" during installation if necessary.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
H. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

J. Seamless Installation:
   1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

3.4 Resilient Base Installation

A. Comply with manufacturer’s written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned. Assure that filler pieces are a minimum of 18 inches.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates. Assure that top and bottom of base continuously contact wall and floor, respectively.

E. Do not stretch resilient base during installation.

F. Base and outside corners shall be rolled with a seam roller before adhesive sets.

G. Corners:
   1. Job Formed Corners:
      a. Outside Corners: use straight pieces of minimum 48 inch lengths. Form without producing discoloration (whitening) at bends.
      b. Inside Corners: Use straight pieces of minimum 48 inch lengths.
   2. Install preformed corners, factory formed internal and external corners, and end stops where cove base ends at jambs and offsets.

3.5 Resilient Accessory Installation

A. Comply with manufacturer’s written instructions for installing resilient accessories.

B. Resilient Stair Accessories:
   1. Use stair-tread-nose filler recommended by stair tread manufacturer to fill nosing substrates that do not conform to tread contours.
   2. Tightly adhere to substrates throughout length of each piece.
C. Butt resilient transitions to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient flooring that would otherwise be exposed.

D. Install resilient accessories in as long a length as possible to minimize joints. Keep joints at least 48 inches minimum from end conditions.

E. Provide reducer strips to cover all exposed edges of resilient flooring. Use carpet-to-resilient flooring strips at junctions with carpet.

3.6 Cleaning and Protection

A. Comply with manufacturer's written instructions for cleaning and protection of floor tile. Verify requirements with manufacturer prior to performing any work.

B. Perform the following operations immediately after completing flooring installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Do not allow traffic of any kind for a period of 72 hours.

E. Wait 72 hours after installation before performing initial cleaning.

F. Apply wax/polish per manufacturer’s written recommendations to the following resilient flooring:
   1. VCT.

G. Do not apply wax/polish to the following resilient flooring:
   1. Resilient bases.

H. Cover flooring until Substantial Completion.

END OF SECTION 09 65 00
SECTION 09 84 13 – Acoustical Wall Panels

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 05 40 00 “Cold-Formed Metal Framing.”
3. Section 06 20 00 “Finish Carpentry.”
4. Section 07 92 00 “Sealants.”
5. Section 09 22 16 “Non-Structural Metal Framing.”
6. Section 09 29 00 “Gypsum Board.”

1.2 Definitions

A. NRC: Noise reduction coefficient.

1.3 Submittals

A. Product Data: For each type of panel edge, core material, and mounting indicated.

B. Shop Drawings: Include elevations showing panel sizes and direction of fabric weave and pattern matching. Indicate panel edge and core materials. Include mounting devices and details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Show intersections and interfaces with wall base, shelves, countertops, chart rails, chalk rails, electrical outlets and switches, thermostats, lighting fixtures, air outlets and inlets, speakers, sprinklers, access panels, and all other adjacent work.

C. Samples: Prepare Samples from same material to be used for the work.

1. Fabric: Full-width by 36-inch-long Sample from dye lot to be used for the work, and as follows:
   a. With specified treatments applied.
   b. Show complete pattern repeat.
   c. Mark top and face of fabric.

2. Panel Edge: 12-inch-square Sample showing edge profile, corner, and finish.
3. Core Material: 12-inch-square Sample showing corner.
5. Sample Panels: No larger than 36 by 36 inches. Show joints and mounting methods.

1.4 Quality Assurance

A. Provide fabricator that employs skilled workers who custom-fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Obtain acoustical wall panels through one source from a single manufacturer.
C. Provide acoustical wall panels with a flame-spread index of 25 or less and smoke-developed index of 450 or less, as determined by testing identical products per ASTM E 84.

D. Before beginning actual work, install mockups of at least 8’ x 4’ in surface area to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each type of acoustical wall type, texture, finish and installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:

   a. Inside and outside corners.
   b. Door openings.
   c. Underlying finishes.
   d. Transitions to other finish materials.
   e. Joints, casings, reveals and other accessories.
   f. Sealant joints.
   g. Sheathing, framing and substrates.

2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.

4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.

5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.

6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

E. Conduct pre-fabrication meeting at project site to comply with requirements in Section 01 31 00 “Project Management and Coordination.” Review project requirements and make necessary adjustments in fabrication strategy to meet requirements without additional cost or time to Contract.

F. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination.” Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

G. Installation shall be performed by a manufacturer authorized entity with a minimum of 5 years documented experience with installing acoustic wall systems specified.

1.5 Delivery, Storage, and Handling

A. Comply with fabric and acoustical wall panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and panels in unopened bundles with manufacturer’s original labels and store in a temperature-controlled dry place with adequate air circulation.

C. Protect panel edges from crushing and impact.
D. Do not deliver and store wall panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, dust generating work is complete and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.

1.6 Project Conditions

A. Do not install acoustical wall panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, dust generating work is complete and ambient temperature and humidity conditions are continuously maintained at the levels indicated for project when occupied for its intended use.

B. Do not install acoustical wall panels until permanent lighting is working at levels proposed for use of space.

C. Protect acoustical wall panels from exposure to airborne odors, such as tobacco smoke, cutting, welding, and grinding operations and install panels under conditions free from odor contamination of ambient air.

D. Verify locations of acoustical wall panels by field measurements before fabrication and indicate measurements on Shop Drawings. Where measurements are not possible due to progress of the work, coordinate with appropriate trades to determine required dimensions.

1.7 Coordination

A. Prior to enclosing of framing coordinate with wall framer to assure proper location and quantity of backing and blocking to adequately secure and support acoustical wall systems.

B. Coordinate depth of recessed items to assure cover plates and finish surfaces are flush with face of acoustic panels.

1.8 Warranty

A. Submit under provisions of Division 01.

B. Materials shall be warranted against defects and workmanship for a period of five years from the date of substantial completion.

C. Provide manufacturer’s warranty in which manufacturer agrees to repair or replace components of acoustical wall panels that fail in performance, materials, or workmanship within specified warranty period.

1. Failure in performance includes, but is not limited to, acoustical performance.

2. Failures in materials include, but are not limited to, fabric sagging, distorting, or releasing from panel edge; or warping of core.

1.9 Extra Materials

A. Furnish extra materials, before installation begins, that are identical to and from same lot as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. For each fabric, color, and pattern installed provide length equal to 10% of amount installed, but no fewer than 10 yards.
2. Provide full-size acoustical wall panel mounting device units equal to 5% of amount installed, but no fewer than 5 attachment devices.

PART 2 - Products

2.1 Acceptable Products and Manufacturers

A. Acoustics First.


C. Tectum, Inc.

D. Wall Technology.

E. Substitution: Under provisions of Division 01.

2.2 Materials – Wall Panels

A. Attach facing materials to cores to produce installed panels with visible surfaces fully covered and free of wrinkles, sags, blister, seams, adhesive or other foreign matter and wrapped two inches to the back.

1. Fabricate back-mounted panels in factory to exact sizes required to fit wall surfaces based on field measurements of completed substrates indicated to receive wall panels.
2. Where square corners are indicated, tailor corners.
3. Dimensional tolerances of finished units: +/- 1/16-inch.

B. Back-mounted acoustical wall panels: Facing material laminated to front face, edges and back border of dimensionally stable, rigid glass fiber board core; with edges chemically hardened to reinforce panel perimeter against warpage and damage; and complying with the following requirements:

C. Panel Characteristics:

2. Acoustical Core: 6-7 pound density rigid fiberglass.
3. Core Facing: Perforated co-polymer plastic, 1/16-inch thick, 3/32-inch diameter holes on 5/32-inch staggered centers with 33 percent open area.
4. Edge Detail: Square; chemically hardened edges to reinforce panel perimeter against warping and damage.
6. Panel Height: 96 inches.
7. Finish: Acoustically transparent 100 percent woven polyester, 2-ply, 16 ounce fabric. Fabric to be bonded directly to panel face with all edges wrapped a minimum of 1-1/2-inches to the back of the panel to ensure a flat, wrinkle-free surface with tailored corners.
8. Class A flame spread rating per ASTM E84 Tunnel Test.
10. NRC: 0.85 to 0.95 for 1-inch acoustical core thickness per ASTM C 423.

2.3 Fabrication

A. Provide acoustical wall panels with minimum NRCs indicated, as determined by testing per ASTM C 423 for mounting type specified.
B. Provide acoustical wall panel construction consisting of facing material adhered to edges and back border of dimensionally stable core; with rigid edges to reinforce panel perimeter against warpage and damage. Resin harden areas of glass-fiber board core for attachment of mounting devices.

C. Stretch fabric facing straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other foreign matter. Applied with visible surfaces fully covered.
   1. Where square corners are indicated, tailor corners.
   2. Where radius or other nonsquare corners are indicated, attach facing material so there are no seams or gathering of material.
   3. Where fabrics with directional or repeating patterns or directional weave are indicated, mark fabric top and attach fabric in same direction so pattern or weave is aligned and flows from panel to panel.

D. Evenly stretch core-face layer over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, sags.

E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
   1. Thickness.
   2. Edge straightness.
   3. Overall length and width.
   4. Squareness from corner to corner.
   5. Chords, radii, and diameters.

F. Provide concealed, extruded-aluminum spline-mounting accessories designed and fabricated for screw attachment to walls, with other moldings and trim for interior and exterior corners, leveling and base support with factory-applied finish on exposed items. Finish color as selected by Architect from manufacturer’s full range including custom colors and patterns.

G. Provide back-mounting device concealed on backside of panel, capable of supporting weight of panel consisting of two-part metal “Z” clips, with one part of each clip mechanically attached to back of panel and the other part to wall substrate, designed to allow for panel removal.

H. Provide concealed fasteners.

PART 3 - Execution

3.1 Examination

A. Examine all substrate conditions, blocking, and backing locations with installer present; for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with installation constitutes acceptance of substrate conditions by contractor.

B. Field measure each wall area which is to receive the stretched fabric system to establish correct layout prior to order and fabrication. Where measurements are not possible due to progress of the work, coordinate with appropriate trades to determine dimensions and proceed with order and fabrication.

3.2 Installation

A. Install acoustical wall panels in locations and sizes indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations. Locate joints in locations and patterns indicated. Ultimate size of units to be
cut must be at least 50% of unit width, with facing material extended over and adhered to cut edge to match uncut edge. Scribe acoustical wall panels to fit adjacent work. Butt joints tightly. Install wall systems where indicated on the Drawings; cutting and fitting as necessary to accommodate penetrating elements such as ceiling suspension wires and braces, HVAC outlets and grilles, luminaires, and sound and fire alarm systems.

B. Comply with acoustical wall panel manufacturer's written instructions for installation of panels. Use concealed mounting accessories. Anchor panels securely to supporting substrate with anchors spaced as recommended by manufacturer.

C. Match and level fabric pattern and grain among adjacent panels so that textures and patterns flow smoothly from panel to panel.

D. Allow for openings for light fixtures, speakers, fire sprinkler heads and ductwork, fitting tightly around penetrating elements, except maintain required clearance at light fixtures to allow for heat dissipation.

E. Paint exposed clips to match insulation finish. Do not paint insulation.

F. Installation Tolerances:

1. Variation from Level and Plumb: Plus or minus 1/16 inch.
2. Variation of Panel Joints from Hairline: Not more than 1/32-inch-wide.

3.3 Cleaning

A. Clip loose threads; remove pills and extraneous materials.

B. Inspect and restretch fabric as necessary for smooth installation, free of visual imperfections.

C. Clean exposed surfaces of panels with fabric facing, on completion of installation, to remove dust and other foreign materials according to manufacturer's written instructions.

D. Replace acoustical wall panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.4 Protection

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that acoustical wall panels are without damage or deterioration at time of Substantial Completion. At Substantial Completion remove protective coverings and gently vacuum fabric surfaces to remove all dust.

END OF SECTION 09 84 13
SECTION 09 90 00 - Painting

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 07 92 00 “Sealants.”
3. Section 08 11 13 “Steel Doors and Frames.”
4. Section 08 31 13 “Access Doors and Frames.”
5. Section 09 29 00 “Gypsum Board.”
6. Section 32 12 16 “Asphalt Paving.”

1.2 Submittals

A. Product Data: For each type of product indicated. Submit a complete list identifying each material by manufacturer’s name, product name and number, including primers, thinners, and coloring agents, together with manufacturers’ catalog data fully describing each material as to contents, recommended usage, and preparation and application methods. Identify surfaces to receive various paint materials. Do not deviate from approved list.

B. Samples: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit 7 (seven) samples on rigid backing, 8 inches square.
2. Step coats on samples to show each coat required for system including primer.
3. Label each coat of each sample with manufacturer and product designation name and number.
4. Indicating tinting of each coat.
5. Indicate color of finish coat.
6. Indicate percentage of gloss for finish coat.
7. Prepare sample on piece of actual substrate material that paint will ultimately be applied to.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

D. Submit manufacturer’s current written instructions and recommended methods of installation including substrate preparation and application rates.

1.3 Quality Assurance

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
B. Before beginning actual work, install mockups of at least 8’ x 8’ in surface area to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each type, color and sheen of paint. Construct mockup in a layered fashion to show all elements of the assembly, including primers and base coats. Include the following:
   a. Inside and outside corners.
   b. Window openings.
   c. Door openings.
   d. Transitions to other finish materials.
   e. Joints, casings, reveals and other accessories.
   f. Sealant joints.
   g. Actual substrate materials and conditions.
   h. Simulate actual lighting conditions for viewing mockups.
   i. Selected colors.

2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.

4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.

5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.

6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

7. Coordinate with work of other sections in support of mock up construction. Paint mockups may be part of mockups required by other sections as long as requirements of Section 09 90 00 “Painting” are satisfied.

C. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

D. Provide painter with 10 (ten) years experience in the type of painting applications specified for this project.

E. Comply with “Best Practices” of the American Plywood Association (APA) for painting plywood and all other manufactured wood sheet materials.

F. Conform to California Air Resource Board (CARB) and other applicable local air quality regulations for products and application.

G. Coordinate with other trades and work of other Sections that will be applying primers to work of those Sections, to ensure compatibility of the total paint system over substrate. Provide information on top coats to ensure use of compatible primers. Omit primer on metal surfaces that have been shop primed.
H. This Section includes painting of all work, items and surfaces which are normally painted in a building of this type and level of quality, and shall be included in the Contract, whether or not painting of a specific item or surface is specifically called out and included in the drawings or mentioned in specifications. Unless specifically noted, include painting of all exposed surfaces whether or not colors are indicated. Where products or surfaces are not specifically indicated for a specified finish, paint these the same as adjacent similar products and surfaces.

I. Schedule indications on drawings are general and do not necessarily define the detail requirements. Include all detailed refinements for the required complete finishing of all spaces and rooms.

J. Include painting of all items and assemblies even if color is not yet indicated.

K. Work Not to be Painted: Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

1. Do not paint factory- and shop-finished components, including but not limited to the following:
   b. Plastic laminate-faced wood doors.
   c. Toilet partitions.
   d. Acoustic Materials: Suspended acoustical t-bar grid and acoustical panels.
   e. Finished mechanical and electrical equipment.
   f. Light fixtures, unless specifically noted.
   g. Switchgear.
   h. Distribution cabinets.

2. Do not paint concealed surfaces, including but not limited to the following:
   a. Furred areas.
   b. Utility chases and pipe spaces.
   c. Duct, piping and conduit shafts.

3. Do not paint natural metal, plated metal and factory-finished metal surfaces (except where specifically indicated) including but not limited to the following:
   a. Anodized aluminum.
   b. Stainless steel.
   c. Chromium plate.

4. Do not paint operating parts, including but not limited to the following:
   a. Valve and damper operators.
   b. Linkages.
   c. Sensing devices.
   d. Motor and fan shafts.

5. Do not paint over Underwriters Laboratories, Inc. (UL) Factory Mutual Research Organization (FM) and other code-required labels and over equipment names, identifications, performance ratings, and nomenclature plates.

1.4 Delivery, Storage, and Handling
A. Deliver paint materials to project site in manufacturer’s original unopened containers bearing manufacturer’s label, with manufacturer’s name, logo, paint type, sheen, stock number, date of manufacture, contents by volume for pigment solids and vehicle constituents, thinning and mixing instructions, color name and number, and shelf life. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45° F until ready for use.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Place oily rags and waste in a metal container and remove from project site daily.
3. Comply with health and fire regulations.

1.5 Project Conditions

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 55° and 95° F. Avoid painting surfaces when exposed to direct sunlight.

B. Do not apply paints when relative humidity exceeds 50 percent; or at temperatures less than 55° F above the dew point. Do not apply paint in damp or rainy conditions, or to damp or wet surfaces, or when fog or inclement weather is expected within the drying /curing time recommended in writing by manufacturer.

C. Moisture test surfaces prior to applying any paint coatings. Prior to paint application verify that substrates have a maximum moisture content that complies with paint manufacturer’s written recommendations. Provide statement on paint manufacturer’s letterhead that moisture levels in substrates satisfy warranty requirements.

D. Perform pH tests on concrete and masonry substrates. Prior to paint application verify pH levels are within paint manufacturer’s written recommendations. Provide statement on paint manufacturer’s letterhead that pH levels in substrates satisfy warranty requirements. If required by paint manufacturer’s written recommendations due to alkali content, apply an appropriate surface primer to concrete and masonry prior to applying acrylic block filler.

E. Provide substrates that are dry and well-cured.

F. Minimize wind and drafts resulting in minimal direct air movement across surface being painted.

G. Do not paint under dusty conditions. Remove dust from substrate before painting. Do not allow dust to adhere to wet surface.

H. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45° F for 24 hours before, during, and 48 hours after application of finishes, unless permitted by manufacturer’s instructions and recommendations.

I. Provide full lighting level approximating final permanent lighting during application.

J. Apply paints to exterior substrates with a minimum 40° F to maximum 80° F.

1.6 Extra Materials

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 (five) percent, but not less than 5 gal. (5 gallons) of each material and color applied.
2. Label each container with color, gloss and original application locations, in addition to the manufacturer’s label.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

1. Kelly Moore.
2. Dunn-Edwards Corporation.

2.2 Paint Materials

A. Provide materials for use within each paint system that are compatible with one another and compatible with substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

B. For each paint system, provide products recommended in writing by topcoat manufacturer for substrate indicated. Provide all products within a paint system including thinners and coloring agents, produced by a single manufacturer including prep coats and primers.

C. Provide products that comply with jurisdictional requirements for VOC content, exclusive of colorants added to a tint base.

D. Provide paint that contains 30-45% solids, minimum.

E. In areas prone to mildew growth such as coastal areas or high humid environments, add a mildewcide to paint materials in quantities recommended in writing by manufacturer.

F. All paints and primers shall be ready mixed in original containers. Factory mix paint materials to correct colors, sheen and consistency for application.

PART 3 - Execution

3.1 Examination

A. Examine substrates and conditions, with applicator present, for compliance with requirements for maximum moisture content, pH levels and other conditions affecting performance of work.

B. Contractor is aware of a condition known as critical lightning. This condition causes shadows that accentuate even the slightest surface variations. A base sealer will provide tooth for succeeding paint coatings but does not equalize smoothness of surface texture. Any corrective action must be done by drywall finisher / installer prior to painting. Coordinate with drywall installer to achieve desired results.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Unsatisfactory surfaces and materials must be corrected by applicable trade before painting. Surfaces which cannot be prepared or painted as specified shall be immediately reported in written RFI to Architect. Specifically note each specific condition.
E. In reconstruction areas where permanent installed items have been removed; provide textures, primers, and coatings as needed to eliminate ghosting and to make surface visually indistinguishable in all respects to adjacent exposed surfaces.

F. Begin coating application only after unsatisfactory conditions have been corrected and are within manufacturer’s written recommendations and requirements of Contract documents. Architect shall be final judge on satisfactory conditions. Beginning coating application constitutes contractor's acceptance of substrates and conditions.

G. Notify Architect with written RFI of any problems anticipated using paint materials specified over substrates indicated or project conditions. Failure to provide written RFI prior to starting painting operations constitutes contractor’s acceptance of substrates and conditions.

3.2 Preparation

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" for preparation of substrates indicated. Surfaces which cannot be prepared or painted as specified shall be immediately brought to the attention of the Architect in writing. Starting of work without such written notification constitutes contractor’s acceptance of substrates and conditions.

B. 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.
3. Do not apply paint in areas where dust is being generated. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, dust, and incompatible paints and encapsulants, including construction layout marks and stains.

1. Remove incompatible primers and coatings, and reprime substrate with compatible primers as required to produce paint systems indicated.
2. Prepare all surfaces per manufacturer’s written recommendation and per SSPC SP1, SP2 and SP3 as required by substrate and paint system requirements and as required by Contract documents.
3. Screen, cover or mask adjacent surfaces and materials which are not to receive paint or paint dust. Use appropriate light or medium tack masking tape.
4. Clean all interior wall surfaces of loose, peeling, and scaly paint, dirt, dust, rust chalk and other foreign matter as required to provide a clean sound surface for the new coatings and paints.
5. Clean all exterior walls and surfaces of loose, peeling, and scaly paint, dirt, dust, rust, chalk and other foreign matter by power washing as necessary to provide clean sound surface for new coatings and paints.
6. Provide barrier coats over incompatible primers or remove and reprime.
7. Correct minor surface defects. Major defects shall be repaired by replacement.
8. Repair, patch and fill all surfaces as necessary to match surrounding surface texture and to present uniform surface appearance matching surrounding surfaces. Repair all cracks and voids greater than 1/32-inch as recommended in writing by paint manufacturer.
9. Verify that all exterior openings and joints are sealed prior to painting. Deteriorated sealant shall be removed and new backing material and sealant shall be installed prior to painting. Coordinate with sealant trades. Do not paint failed sealant joints. Determine compatibility between paints.
and joint sealers. Notify Owner of incompatibilities and other conditions which are detrimental to proper joint sealing and paint adhesion.

10. Verify that recessed and filled fasteners are smooth and not failing. Coordinate corrections with appropriate trade.

D. Measure moisture and pH at surfaces. Do not apply finishes unless moisture and pH content is below paint manufacturer’s written warranty and application requirements.

E. Ferrous Metal Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer and requirements of contract documents. In severe exposure conditions such as coastal areas subject to salt water, humid environments, or environments with exposure to corrosive chemicals, apply two coats of primer to ferrous metals. Surfaces shall be primed within 3 hours after preparation.

F. Shop Primed Steel Surfaces: Comply with SSPC requirements.

1. Sand and scrape to remove loose primer and rust.
2. Feather edges to make touch up patches inconspicuous.
3. Clean surfaces with solvent to remove oil and grease.
4. Treat surfaces with phosphoric acid solution, ensuring cleaning of weld joints, bolts and nuts.
5. Clean surface of dust with tackrags.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal with a solvent or water based degreaser. To produce clean surfaces, etch cleaned galvanized metal surfaces with an etching solution, such as Jasco Prep and Prime or approved equal before applying primer. Clean acid etch solution completely from surfaces. Thoroughly dry and prime surface within 3 hours of acid etching.

H. Shop Coated Metal: Degrease and clean of foreign matter. Clean and spot paint field connections, welds, soldered joints, burned or abraded portions with same material used in shop coats. After complete hardening, sand entire surface for coat to follow.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer. Verify compatibility of primer with sealer before application.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime and backprime all surfaces of wood including cut and uncut edges, ends, faces, undersides, and backsides of wood including wood paneling, doors, windows, trim and cabinets. Use clear sealer to back prime wood receiving transparent finishes.
4. For woods prone to tannin bleed (i.e., redwood and cedar,) apply 2 coats of primer.
5. After priming, fill holes, cracks and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
6. Fill all molding and trim joints and mortises completely and sand smooth prior to painting.

J. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth. Touch-up minor defects with spackle, sand smooth and flush. Spot prime repairs. All drywall surfaces to be dust free before painting. Verify that all surfaces have received a skim coat as specified in Section 09 29 00 “Gypsum Board.”

K. Existing surfaces to be recoated shall be thoroughly cleaned and prepared as recommended in writing by paint manufacturer. Patches and bare areas shall be spot primed with same primer as required for new surfaces.
L. **Fixtures, Equipment and Hardware Items:** Coordinate with the work of other sections; coordinate removal of fixtures, equipment, and hardware as required to perform painting. Items to be removed include, without limitation; signs and graphics, switch and receptacle plates, escutcheons and plates, all surface-mounted equipment, free standing equipment blocking access, grilles and louvers at ducts opening into finished spaces, and other items as required and directed.

M. **Surfaces Not Mentioned:** Prepare surfaces according to recommendations of the paint manufacturer. Submit preparation steps to Architect for approval.

N. **Previously Painted Surfaces:** Shall be repaired, prepared and spot primed as required and as recommended by the manufacturer of the paint.

### 3.3 Application

A. Verify compatibility of primers with surfaces on which to be applied. If primer or finish coating is incompatible, follow manufacturer’s recommendations.

B. Do not apply initial coating until moisture and pH content of surface is within limitations recommended by the paint manufacturer.

C. Mix and prepare paint materials according to manufacturer’s written instructions.

D. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

E. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

F. Use only thinners approved by paint manufacturer and only with recommended limits. Do not thin paints or primers, unless authorized by Architect in writing.

G. Apply primer to surfaces that have been properly cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

H. The minimum number of coats and film thickness are the same regardless of the application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer’s written instructions, sand between applications.

I. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a uniform, minimum dry film thickness equivalent to that of broader surfaces.

J. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

K. Apply primers, intermediate coats and finish coats of paint as scheduled below and in compliance with paint manufacturer’s instructions and recommendations.

L. Apply paint materials no thinner than manufacturer’s recommended spreading rate to achieve dry film thickness indicated.
M. Coating systems specified indicate a minimum number of coats. Do not thin primers or paints; apply paint taken directly from manufacturer’s containers. Apply at coverage rates recommended by paint manufacturer. Apply primer coat as recommended by manufacturer to properly prepare surface for finish coats, one coat minimum. Apply additional primer coats, as necessary, to cover suction spots or unsealed areas, to properly prepare surface for finish coats at no additional cost to Owner. Apply finish coats as recommended by manufacturer, two coats minimum. Apply additional finish coats as needed to completely hide base substrates and achieve the desired consistency, uniformity in finish surface, and sheen at no additional cost to Owner. Apply paint in manner that avoids sags, runs or other evidence of poor workmanship.

N. The numbers given in the Painting Schedule indicate the types of paints required for each surface, identified by their number in white. The actual paint to be applied on each surface shall be the same material in the color or colors as selected, and as approved on submitted samples. Allow for the use of several colors in each room or space, and for doors, frames, dadoes, trim and other items to be finished in different colors.

O. Degrees of gloss shown on drawings and herein specified are approximate only. The exact degree of gloss required for each surface will be determined and approved by Architect during paint sample submittal. Materials shall meet the following requirements for degree of gloss when tested according to ASTM D 523, using Gardner Laboratory 60 degree gloss meter after 14 days. Percentage of gloss:

1. Flat or eggshell: 25%-55%.
2. Satin or semi-gloss, 55%-70%.

P. Apply paints according to manufacturer's written instructions.

1. Flat and eggshell finishes may be rolled or brushed on drywall, plaster and CMU. Spray-apply primer, intermediate and finish coats on all other surfaces.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces. Paint inside surfaces of all non-electrical panels and covers and inside of all non-electrical boxes.

Q. Do not paint over dirt, rust, scale, grease, mildew, mold, moisture scuffed surfaces, or conditions detrimental to durable uniform paint film.

R. Apply acid etching primers within 3 hours of washing and drying substrates.

S. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. If undercoats or other conditions show through topcoat, apply additional coats until cured film as a uniform paint finish, color, and appearance. Comply with manufacturer’s written recommendations for drying times between succeeding coats.

T. Lightly sand and remove all dust between succeeding coats.

U. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

V. Painting Mechanical and Electrical Work: Paint all exposed items in interior conditions including, but not limited to, the following:

1. Uninsulated metal piping and conduit.
2. Uninsulated plastic piping.
3. Pipe hangers and supports.
4. Tanks that do not have factory-applied final finishes.
5. Visible portions of internal surfaces of metal ducts to a point 3 feet back from duct outlet, without liner, behind air inlets and outlets.
7. Paint all exposed surfaces in plenum spaces that can be visually seen through return and supply registers including: equipment, ductwork, piping and conduit.
8. Exposed ductwork.
10. Access panels.

W. Do not paint over prepainted mechanical equipment, electrical switch covers, transformers, UL labels, equipment and piping labels. Do not paint over fusible links or sprinkler heads. Do not paint valve assemblies.

X. Make edges of paint adjoining other material or color clean and sharp with no overlapping.

Y. Refinish whole wall where portion of finish is deemed unacceptable by Architect.

Z. All materials shall be spray-applied evenly with proper film thickness and free of runs, sags, skips and other defects, except drywall, plaster and CMU with flat or eggshell finish. Varnishes shall be sanded lightly between coats, dusted and cleaned before recoating.

AA. Hardware, hardware accessories, plates, lighting fixtures and similar items in place shall be removed prior to painting and replaced upon completion of each space.

BB. Heating and other equipment adjacent to walls shall be disconnected, using workmen skilled in appropriate trades, and moved to permit wall surfaces to be painted. Following completion of painting, expertly replace and reconnect.

CC. Wash bare metal grilles and ducts indicated to be painted with solvent, wash with etching solution then prime and paint as scheduled.

DD. Paint doors on tops, bottoms and edges same as door faces after fitting.

EE. Paint backside and inside faces of access panels, cover doors, frames, and removable or hinge covers to match exposed fronts.

FF. Carry finish coats to natural breaks and transitions.

GG. Provide even, smooth color and finish with no apparent marks.

HH. Provide wet paint signs, barricades, warning tape and other devices to protect newly finished surfaces. Remove after work is completed and paint has thoroughly dried.

3.4 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 rejected surfaces. Contractor at Owner’s discretion shall remove rejected materials from previously painted surfaces prior to re-preparing surfaces and re-applying approved paint coating systems.

3.5 Cleaning and Protection

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces. Clean and repair blemishes to all surfaces caused by work of this Section.

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. Leave surfaces in a first class condition.

E. Runs, sags, misses, holidays, stains and other defects in painted surfaces, including inadequate coverage, mil thickness, inconsistent sheen or uniformity of appearance shall be satisfactorily repainted as necessary. If a portion of a larger area is deemed unsatisfactory, the entire area of surface shall be stripped, re-prepared and re-painted with approved paint systems, at Owner’s discretion.

3.6 Painting Schedule

A. Interior Paint Gloss

<table>
<thead>
<tr>
<th>Interior</th>
<th>Paint Generic</th>
<th>Gloss Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classrooms</td>
<td>100% Acrylic</td>
<td>3 – Eggshell</td>
</tr>
<tr>
<td>Halls</td>
<td>100% Acrylic</td>
<td>5 – Semi-gloss</td>
</tr>
<tr>
<td>Storage</td>
<td>100% Acrylic</td>
<td>5 – Semi-Gloss</td>
</tr>
<tr>
<td>Hollow Metal Doors and</td>
<td>100% Acrylic</td>
<td>1 – Flat</td>
</tr>
<tr>
<td>Frames</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceiling</td>
<td>100% Acrylic</td>
<td>1 - Flat</td>
</tr>
<tr>
<td>APPLICATION</td>
<td>TYPE</td>
<td>MPI Gloss Level</td>
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<tr>
<td>------------</td>
<td>-----------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>PRIMERS – 1 COAT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Gypsum Board</td>
<td>PVA</td>
<td>G1</td>
</tr>
<tr>
<td>Interior Wood</td>
<td>Acrylic</td>
<td>G1</td>
</tr>
<tr>
<td>Interior Ferrous Metal</td>
<td>Acrylic</td>
<td>G1</td>
</tr>
<tr>
<td>Interior Galvanized Metal</td>
<td>Acrylic</td>
<td>G1</td>
</tr>
<tr>
<td><strong>FINISHES – 2 COATS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Gypsum Board, Wood, Ferrous Metal, Concrete, Masonry, and Galvanized Metal</td>
<td>Latex Enamel</td>
<td>G5</td>
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<tr>
<td>Interior Gypsum Board</td>
<td>Latex Enamel</td>
<td>G3</td>
</tr>
<tr>
<td>Interior Existing Acoustical Ceiling Tiles</td>
<td>Latex Enamel</td>
<td>G1</td>
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<td><strong>MISCELLANEOUS</strong></td>
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<tr>
<td>Interior Wood Stain</td>
<td>Alkyd</td>
<td>G1</td>
</tr>
<tr>
<td>Interior Wood Sanding Sealer</td>
<td>Alkyd</td>
<td>G5</td>
</tr>
<tr>
<td>Interior Wood Varnish</td>
<td>Acrylic Urethane</td>
<td>G4</td>
</tr>
<tr>
<td>Interior Wood Varnish</td>
<td>Acrylic Urethane</td>
<td>G5</td>
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<tr>
<td>Exterior and Interior Galvanized Metal Etch Prep.</td>
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<td>N/A</td>
</tr>
</tbody>
</table>

END OF SECTION 09 90 00
SECTION 09 93 00 - Transparent Finishes

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:
   1. Section 06 20 00 “Finish Carpentry.”
   2. Section 07 92 00 “Sealants.”
   3. Section 09 90 00 “Painting.”

1.2 Submittals

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

B. Samples: For each type of finish system and in each color and gloss of finish indicated. Submit samples on representative actual wood substrates, 8 inches square. Label each sample for location and application area.

C. Product List: For each product indicated, include the following:
   1. Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. Printout of MPI's current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.

D. Submit manufacturer’s current written instructions and recommended methods of installation including substrate preparation and application rates.

1.3 Quality Assurance

A. Comply with MPI standards indicated and listed in its "MPI Approved Products List." Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.

B. Create mockups of each finish and color to demonstrate aesthetic effects and set quality standards for materials and execution. Mockups shall be at least 100 sq. ft. Architect will select a representative surface for each type of finish system and substrate. Final approval of stain color selections will be based on mockups. If stain color selections are not approved in mockups, provide additional samples and mockups of additional stain colors as selected by Architect at no added cost to Owner.

C. Coordinate with other trades and work of other Sections that will be applying primers to work of those Sections, to ensure compatibility of the total finish system over substrate. Provide information on top coats to ensure use of compatible primers.

D. Schedule indications on drawings are general and do not necessarily define the detail requirements. Include all detailed refinements for the required complete finishing of all surfaces to receive transparent finish.
E. Include complete finishing of all items and assemblies even if color is not yet indicated.

F. Provide finisher with 10 years experience in the type of transparent finish applications specified for this project.

G. This Section includes finishes of all wood work requiring transparent finishes which are normally finished in a building of this type and level of quality, and shall be included in the Contract, whether or not finishing of a specific item or surface is specially called out and included in the drawings or mentioned in specifications.

H. Before beginning actual work, install mockups of at least 8’ in length to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each type of transparent finish sheen, species and installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:
   a. Wood trim.
   b. Simulate actual lighting conditions for viewing.

2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.

4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.

5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.

6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

I. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

1.4 Delivery, Storage, and Handling

A. Deliver finishing materials to project site in manufacturer’s original unopened containers bearing manufacturer’s label, with manufacturer’s name, logo, paint type, sheen, stock number, date of manufacture, contents by volume for pigment solids and vehicle constituents, thinning instructions, color name and number, and shelf life. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45° F.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Place oily rags and waste in a metal container and remove from project site daily.
1.5 Project Conditions

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50° and 95° F.

B. Do not apply exterior finishes in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5° F above the dew point; or to damp or wet surfaces.

C. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5° F above the dew point. Do not apply paint in damp or rainy conditions, or to damp or wet surfaces, or when inclement weather is expected within the drying/curing time recommended in writing by manufacturer.

1.6 Extra Materials

A. Furnish extra materials that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents. Furnish an additional 1 gal. of each material and color applied.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

   1. Benjamin Moore & Co.
   2. Dunn-Edwards Corporation.
   3. Frazee Paint.
   4. Sherwin-Williams Company (The)
   5. Vista Paint.

2.2 Materials, General

A. Material Compatibility:

   1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
   3. Provide all products within a finish system by a single manufacturer including sealants, primers, stains and clear coats.
   4. All finishes shall be ready mixed in original containers.

B. Comply with authorities having jurisdiction for VOC content and limits.

2.3 Wood Fillers

A. Wood Filler Paste: MPI #91.

2.4 Primers and Sealers

A. Lacquer Sanding Sealer: MPI #84.
2.5 Stains

A. Interior Wood Stain (Semitransparent): MPI #90.

B. Stain Colors: As selected by Architect from manufacturer’s full range.

2.6 Polyurethane Finishes

A. Interior, Oil-Modified, Clear Urethane (Satin): MPI #57, Gloss Level 4.

PART 3 - Execution

3.1 Examination

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

1. Moisture test surfaces prior to applying finishes. Verify that moisture content is within manufacturer’s written recommendations, and in no case higher than 12 percent when measured with an electronic moisture meter. Submit written test reports, on finish system manufacturer’s letterhead stating moisture content of surfaces is within manufacturer’s written recommended limits and satisfies warranty requirements.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.

3. Begin finish application only after unsatisfactory conditions have been corrected and are within manufacturer’s written recommendations and requirements of Contract documents. Architect shall be final judge on satisfactory conditions.

4. Beginning application of finish system constitutes contractor’s acceptance of substrate and conditions.

5. Unsatisfactory surfaces and materials must be corrected by applicable trade before finishing.

6. Notify Architect with written RFI of any problems anticipated using finishing materials specified over substrates indicated or project conditions. Failure to provide written RFI prior to starting finishing operations constitutes contractor’s acceptance of substrates and conditions.

7. Be aware of a condition known as critical lighting. This condition causes shadows that accentuate even the slightest surface variations. Any corrective action must be done by substrate installer prior to finishing.

8. In reconstruction areas where permanent installed items have been removed; provide preparation and finishes as needed to eliminate ghosting and to make surface visually indistinguishable in all respects to adjacent exposed surfaces.

3.2 Preparation

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated. Surfaces which cannot be prepared or finished as specified shall be immediately brought to the attention of the Architect, in writing. Starting of work without such written notification constitutes contractor’s acceptance of the substrates and conditions.

B. Remove plates, machined surfaces, and similar items already in place that are not to be finished. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing. After completing finishing operations, reinstall items that were removed; use workers skilled in the trades involved. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
1. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

3. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.

D. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.

3.3 Application

A. Finish systems specified indicate a minimum number of coats. Do not thin primers, sealers, stains or finish coats; apply finish taken directly from manufacturer’s containers. Apply at coverage rates recommended by finish manufacturer. Apply additional finish coats as needed to achieve the desired uniformity in finish surface, smoothness, and sheen at no additional cost to Owner.

B. Apply finishes according to manufacturer's written instructions.

1. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.

2. Apply transparent finish materials in the following manner:

   a. Primers and Sealers: As recommended in writing by manufacturer.
   b. Stains: As recommended in writing by manufacturer.
   c. Polyurethane: Spray apply only.

C. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

D. Lightly sand and remove all dust between succeeding finish coats.

E. Provide wet paint signs, barricades, warning tape and other devices to protect newly finished surfaces. Remove after work is completed and finish has thoroughly dried.

F. Leave all parts of molding and ornaments clean and true to details with no undue amount of finish in corners and depressions.

G. Make edges of finish adjoining other materials or color clean and sharp with no overlapping.

3.4 Field Quality Control

A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when finishes are being applied:

1. Owner will engage the services of a qualified testing agency to sample finish 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 finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces if, on refinishing with complying materials, the two finishes are incompatible.
B. Runs, sags, misses, holidays, stains and other defects in finished surfaces, including inadequate coverage, mil thickness, inconsistent smoothness, sheen or uniformity of appearance shall be satisfactorily refinished as necessary. If a portion of a larger area is deemed unsatisfactory, the entire area of surface shall be stripped, re-prepared and re-finished with approved finish systems, at Owner’s discretion.

3.5 Cleaning and Protection

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from project site. Remove rags and waste from storage areas daily.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces. Clean and repair all blemishes to all surfaces caused by this work.

C. Protect work of other trades against damage from finish application. Correct damage 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 finished wood surfaces.

3.6 Interior Wood-Finish-System Schedule

A. Finish Carpentry Substrates:

1. Polyurethane Varnish Over Stain System: MPI INT 6.3E.
   b. Three Finish Coats: Interior, oil-modified, clear urethane satin.

2. Polyurethane Varnish System: MPI INT 6.3K.
   a. Two Field-Applied Finish Coats: Interior, oil-modified, clear urethane satin.

END OF SECTION 09 93 00
SECTION 10 11 00 - Visual Display Units

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 05 40 00 “Cold-Formed Metal Framing.”
2. Section 06 20 00 “Finish Carpentry.”
3. Section 09 22 16 “Non-Structural Metal Framing.”
4. Section 09 29 00 “Gypsum Board.”
5. Division 26 Sections for wiring and other electrical work associated with power-operated visual display surfaces.

1.2 Submittals

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

1. Include motor capacities and individual panel weights for sliding visual display units.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Show location of panel joints.
2. Show location of special-purpose graphics for visual display surfaces.
3. Include sections of typical trim members.
4. Include wiring diagrams for motor-operated, sliding visual display units.

C. Samples: For each type of visual display surface indicated and as follows:

1. Visual Display Surface: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch-long.
3. Anchoring and mounting devices.

1.3 Quality Assurance

A. Provide an authorized representative of visual display unit manufacturer for installation and maintenance of units required for this project. Installer shall have a minimum of 5 years documented experience in the installation of the types of visual display units specified.

B. Obtain each type of visual display surface and product through one source from a single manufacturer. Provide visual display units from a manufacturer with a minimum of 10 years documented experience in the manufacturing of the types of visual display units specified.

C. Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on a specific system. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
D. Provide materials with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Flame Spread: 15 maximum.
2. Smoke Developed: 20 maximum.

E. Provide listed and labeled electrical components, devices, and accessories as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 Delivery, Storage, and Handling

A. Store visual display units vertically with packing materials between each unit.

B. Deliver visual display surfacing in rolls in unbroken original mill protective wrapping with manufacturer’s identification, brand name, lot number, mill register numbers and tags attached.

1. Store inside, in well ventilated area, protected from weather, moisture, soiling, extreme temperatures and humidity.
2. Lay flat with blocking off ground.
3. Do not stack rolls on top of each other.
4. Do not store rolls against each other, allow ventilation all around roll. Store roll off floor or ground on blocks.
5. Do not allow to be folded.

1.5 Project Conditions

A. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Where field measurements cannot be made due to progress of the work, coordinate with appropriate trades to establish dimensions and proceed with Shop Drawings. Coordinate wall construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting in the field.

B. Coordinate with work of framing and substrates to assure adequate location and extent of blocking and backing to attach and support visual display surfaces.

1.6 Warranty

A. Provide warranty to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Surfaces lose original writing and erasing qualities.
   b. Surfaces become slick or shiny.
   c. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: Life of the building.

B. Provide warranty to repair or replace electronic markerboards that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.
PART 2 - Products

2.1 Markerboard Assemblies

A. Provide balanced, high-pressure, factory-laminated porcelain-enamel markerboard assembly of 3-ply construction consisting of backing sheet, core material, and 24 gage minimum, porcelain-enamel steel face sheet complying with PEI: 5-104 with low-gloss finish.

1. Subject to requirements, provide products by one of, or equal to, the following:
   a. ADP/Lemco, Inc.
   b. Best-Rite Manufacturing.
   c. Claridge Products & Equipment, Inc.
   d. Egan Visual Inc.

2. Hardboard Core: 7/16-inch-thick formaldehyde free MDF; with 24 gage minimum, galvanized steel sheet backing.

3. Provide moisture-resistant thermoplastic laminating adhesive.

4. Provide moisture barrier aluminum foil back.

B. Provide porcelain writing surface of three (3) uniform coats as follows:

1. Nickel deposition coat of 2 grams/sq. ft.
2. Cobalt primer coat of .003-inch minimum thickness.
3. Marker board surface coat of .003-inch minimum thickness. A porcelain surface is fused to the steel at temperatures of over 1400° F by NCO.

C. The following marker board surfaces are not acceptable.

1. Low fired organic (paint) coatings.
2. Porcelain coatings of less than .006-inch minimum thickness on writing side and .003-inch on reverse side.
3. Porcelain coating on one side only.

D. Provide aluminum frame and chalk rail.

2.2 Visual Display Rails

A. Subject to requirements, provide products by one of, or equal to, the following:

1. Best-Rite Manufacturing.
2. Egan Visual Inc.
3. Peter Pepper Products, Inc.

B. Provide horizontal, wall-mounted, extruded-aluminum support rails; capable of gripping and suspending paper directly from rail. Finish: Clear anodic.

2.3 Modular Support System for Visual Display Boards

A. Subject to requirements, provide products by one of, or equal to, the following:

1. AARCO Products, Inc.
2. Claridge Products & Equipment, Inc.

B. Provide 72-inch-long, extruded-aluminum slotted standards designed for supporting visual display boards on panel clips. Standards shall be punched at not less than 4 inches o.c. Finish: Clear anodic.

C. Provide extruded aluminum panel clips.

2.4 Accessories

A. Provide factory-applied aluminum accessories fabricated from extruded aluminum; ASTM B 221 Alloy 6063 of size and shape indicated. Satin.

B. Provide extruded aluminum ASTM B 221 Alloy 6063 box type chalk tray with slanted front, grooved tray, and cast-aluminum end closures. Satin.

C. Provide the following accessories:
   1. Display Rail: Continuous and integral with rail; fabricated from cork approximately 1 to 2 inches wide.
   2. End Stops: Located at each end of rail.
   3. Hooks: Two hooks for every 48 inches of rail or fraction thereof.
   4. Hooks and Clips: Two hooks with flexible metal clips for every 48 inches of rail or fraction thereof.
   5. Paper Holder: Extruded aluminum; designed to hold paper by clamping action.
   6. Provide manufacturer’s approved mounting hangers, brackets and fasteners for installation of units.
   7. Furnish concealed fasteners and wall mounting devices, complete for each application, as shown on the drawings and the approved submittals.

2.5 Fabrication

A. Shop assemble visual display surfaces and units to greatest extent possible.

B. Provide laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with flexible, waterproof adhesive. Laminate at lowest possible temperature to reduce steel and porcelain stresses and achieve superior enamel and hardness.

C. Coordinate factory-assembled visual display units with trim and accessories indicated. Join parts with a neat, precision fit.
   1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board.
   2. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as necessary.
   3. Finish of all exposed materials shall be complete, uniform matching selected samples and free from blemish and rough edges.

D. Fabricate aluminum frames straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.
   1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.
2.6  **Aluminum Finishes**

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

D. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

E. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

F. Powder-Coat Finish: Apply manufacturer's standard baked finish, complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

**PART 3 - Execution**

3.1  **Examination**

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motor-operated, sliding visual display units.

C. Examine walls and partitions for proper backing and attachment for visual display surfaces.

D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with work constitutes contractor's acceptance of substrate conditions.

3.2  **Preparation**

A. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.

B. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display fabric and surfaces. Seal wall surfaces indicated to receive visual display surfaces.

C. Prepare recesses for sliding visual display units as required by type and size of unit.
3.3 **Installation**

A. Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Do not install boards on wet or damp walls or in damp and humid weather conditions.

3.4 **Installation of Factory-Fabricated Visual Display Units**

A. Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls.

1. Attach marker trays to boards with fasteners at not more than 12 inches o.c.

B. Install display rails in locations and at mounting heights indicated on Drawings. Attach to wall surface with fasteners at not more than 16 inches o.c.

3.5 **Cleaning and Protection**

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

**END OF SECTION 10 11 00**
SECTION 10 14 00 - Signage

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 05 40 00 “Cold-Formed Metal Framing.”
3. Section 06 20 00 “Finish Carpentry.”
4. Section 07 92 00 “Sealants.”
5. Section 08 11 13 “Steel Doors and Frames.”
6. Section 08 11 13 “Non-Structural Metal Framing.”
7. Section 09 22 16 “Non-Structural Metal Framing.”
8. Section 09 29 00 “Gypsum Board.”
9. Section 09 90 00 “Painting.”
10. Section 10 11 00 “Visual Display Units.”
11. Section 10 44 00 “Fire-Protection Specialties.”
12. Division 26 Electrical Sections.

1.2 Submittals

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

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show style, configuration and profiles of each sign.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
5. Mounting details.
6. Submit a matrix indicating the following:

   a. Room name.
   b. Sign number.
   c. Exact wording, symbols and Braille to be used on each sign.
   d. Use same room and sign numbers used in Drawings.

C. Samples: Provide 1 full size for each sign type and for each color and texture required. Samples must be identical in color, size, shape and material to signs that will be installed.

1.3 Quality Assurance

A. Regulatory Requirements: Comply with applicable provisions in ADA Accessibility Guidelines and California Title 24. Provide Braille signage as required by Accessible regulations.
B. Provide electrical components, devices, and accessories that meet listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Drawings indicate design intent only for signage. Signage is a design build item by contractor. Include design drawings and fabrication of all sign elements including footings, structural connection, internal support, electrical wiring and all related elements for a complete installation.

D. Provide all signs as a product from one manufacturer who has 10 years documented experience in the fabrication and distribution of signs similar in type to those specified.

E. Before beginning actual work, install mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups for each type of sign installation. Construct mockup in a layered fashion to show all elements of the assembly. Include the following:
      a. Full size signs.
      b. Mounting.
      c. Surrounding finishes.
      d. Text and symbols.
      e. Sealants.
      f. Underlayments.
   2. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.
   3. Do not proceed with work until mockup is approved by Architect. Reconstruct mockup as necessary to obtain Architect’s approval.
   4. Coordinate with necessary trades to construct mockup to reflect actual construction. Obtain materials, and services of other trades to participate in mockup construction so mockup reflects actual construction and conditions proposed in finished work in all respects, including but not limited to, supporting structure, substrates, flashing, attachment, backings, opening and finished materials. Provide materials identical to materials that will be used in actual work.
   5. Architect’s review and comments or no-comment of mockup does not relieve contractor from fulfilling requirements of Contract Documents. Deviations from Contract requirements in completed work whether noted or not noted in mockup are contractor’s responsibility and must be corrected at no additional cost or time to Contract.
   6. Use workers trained and experienced in each particular trade required to construct each element of the mockup.

F. Installer shall be either the fabricator or a firm approved by the fabricator which specializes in installation of signage, having a minimum of 5 years full time experience installing signage of similar scope and complexity.

PART 2 - Products

2.1 Manufacturers

A. ASI-Modulex, Infinity Series or approved equal.
2.2 Materials

A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA. Non-glare finish acrylic with integral color. Thickness shall be 1/4-inch at door mounted restroom signs and 1/8-inch minimum at all other locations, unless noted otherwise.

2.3 Interior Signage

A. Accessible Signage: Provide the following signages in accordance with ADAAG and CBC where indicated on Drawings:

1. Material: Acrylic plastic.
2. Color: White symbols and characters on contrasting background. Color contrast between characters/symbols and the background shall be 70 percent minimum per ADAAG 4.30.5. Colors as selected by Architect from manufacturer’s full range of colors.
3. Mounting Height:
   a. Doors: Mount signs centered in the width of the door 60-inches above the finished floor.
   b. Walls: See Detail 4/11.01.
4. Functional Room Signage, General: Provide room signage with inlaid characters raised 1/32-inch, upper case, sans serif type with corresponding California Contracted Grade 2 Braille. Raised characters shall be at least 1-inch-high, but no higher than 2 inches. Color contrast between characters/symbols and the background shall be 70 percent minimum per ADAAG 4.30.5.
5. Room Identification Signage:
   a. Holder shall be extruded aluminum with square profile and natural satin anodized finish. Size: 4-inches high by 4-inches wide.
   b. ADA insert shall be photo-etched polymer 2-inch-high band applied to non-glare clear lens. Numerals shall be 5/8-inch.
   c. Paper inserts for interior signs shall be generated in house and inserted through top slot (inner access).
   d. Signs shall have APCO Notifier bar below for attachments. Bar shall have natural satin anodized finish. Signs that mount to glass shall have matching glass backup plate to cover reverse side of sign. Signs shall be attached with double-faced vinyl tape.
   e. Locations: All interior rooms except utility rooms.
6. Assistive Listening Signage: Provide sign notifying availability of assistive listening system, 14-inch wide by 8-inch high acrylic plaque with 1/32-inch raised international symbol of access for hearing loss imprinted centered at the top of the sign and 1/32-inch from raised characters below with text “ASSISTIVE LISTENING DEVICE AVAILABLE FROM SCHOOL PERSONNEL”.
7. Tactile Exit Signage: Provide acrylic plaque tactile exit signs with at least 1-inch high but no higher than 2-inch high text and corresponding California Contracted Grade 2 Braille 3/8-inch below the text as follows:
   a. At each grade-level exit door with text “EXIT”.

2.4 Anchors and Fasteners

A. Use non-ferrous concealed fasteners to as great an extent as possible. Exposed anchor and fastener materials shall be compatible with metal to which applied and shall match in color and finish. Exposed fasteners shall be flat head Phillips type anchors set flush.
B. Provide 3M Scotch Brand foam double sided tape. Foam tape shall be minimum 1/16 inch thick closed cell vinyl foam with adhesive backing. Adhesive shall be transparent, long aging, high tech formulation on two sides of the vinyl foam. Adhesive surfaces shall be protected with a 5 mil green flatstock treated with silicone. Foam pads shall be sized for the signage as per signage manufacturer’s recommendations.

C. Provide Dow-Corning No. 999-A silicon adhesive. Adhesive shall be transparent, long aging, high tech formulation.

D. Provide non-corrosive fasteners, hangers, and mounting devices which are compatible with sign material and finish. All fasteners shall be tamper proof type.

E. Other materials not specifically described but required for a complete and proper installation of signs, shall be as approved.

2.5 Accessories

A. Provide nonferrous-metal or hot-dip galvanized anchors and inserts for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors.

2.6 Fabrication

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.

2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.

3. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

B. Surface texture of signs shall be matte in accordance with ADA standards.

C. Work shall be assembled in the shop, insofar as practicable, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practicable. Items specified to be galvanized shall be by hot-dip process after fabrication if practicable. Galvanizing shall be in accordance with ASTM A 123 and ASTM A 525, as applicable. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

D. Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled be trial fit in the shop to ensure proper field assembly.

E. Drill or punch holes for bolts and screws; produce clean, true lines and surfaces.

F. Acrylic signs shall have inlaid acrylic copy/characters and Braille symbols as described in this Section.

1. Signage with removable inserts shall be constructed with a 1/16-inch-thick clear non-glare acrylic face over three-sided 0.040-inch-thick clear polycarbonate spacer over 1/8-inch-thick integral color acrylic base. Each layer shall be attached with double sided clear tape. The subsurface of the spacer shall be painted to match the color of the base.
PART 3 - Execution

3.1 Inspection

A. Examine foundations, walls, doors, ceilings, and other area scheduled to receive signs for conditions that would affect quality and execution of work.

B. Do not proceed with installation until defects are corrected. Proceeding with work constitutes contractor’s acceptance of conditions.

3.2 Installation

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance. Signs on finished surfaces shall not be installed until finishes on such surfaces have been installed and fully cured and dried. Comply with ADA requirements for mounting heights of signs. Conform to layout information on reviewed shop drawings and as indicated on Drawings. Locate signage to coordinate with joints and panel edges of substrate construction.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
3. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
4. Mount signs so a person may approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
5. Use double sided foam vinyl tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl covered or rough surfaces.
6. Use liquid silicone adhesive recommended by the sign manufacturer to attach units to irregular, porous, or vinyl covered surfaces. Use methods recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
7. Provide concealed aluminum shim plates 1/8 inch thick, with predrilled and countersunk holes, at locations indicated and where other mounting methods are not practicable. Attach the plate with fasteners and anchors suitable for secure attachment to the substrate. Attach panel sign units to the plate using the method specified above.
8. Mount letters with backs in contact with the wall surface unless otherwise directed.

3.3 Protection and Cleaning

A. The work shall be protected against damage during construction. Sign surfaces shall be cleaned in accordance with the manufacturer’s approved instructions.

END OF SECTION 10 14 00
SECTION 10 44 00 - Fire-Protection Specialties

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:
   1. Section 03 30 00 “Cast-in-Place Concrete.”
   2. Section 05 40 00 “Cold-Formed Metal Framing.”
   3. Section 06 20 00 “Finish Carpentry.”
   4. Section 07 92 00 “Sealants.”
   5. Section 09 22 16 “Non-Structural Metal Framing.”
   6. Section 09 29 00 “Gypsum Board.”
   7. Section 09 90 00 “Painting.”
   8. Section 10 14 00 “Signage.”

1.2 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for security fire-protection cabinets.
   1. Fire Extinguishers: Include rating and classification.
   2. Security Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples: For each type of exposed metal and finish required, 6 by 6 inches square.

1.3 References

A. Fire Extinguishers Standard: NFPA 10, “Portable Fire Extinguishers.”

B. Title 19, California Code of Regulations (CCR), “Public Safety.”

C. California Fire Code (CFC).

1.4 Quality Assurance

A. Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers.”

C. Provide fire extinguishers listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction. Provide fire extinguishers approved, listed, and labeled by FMG.
D. Conduct pre-installation meeting at Project site. Review methods and procedures related to fire protection cabinets including schedules and coordination requirements.

E. Fire extinguisher cabinets shall comply with CBC Title 24.

1.5 Coordination

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers required by fire authority are accommodated.

B. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

C. Coordinate with fire authority on location and spacing of fire extinguisher. Arrange with fire authority to walk project to identify required locations of fire extinguishers, prior to enclosure of framed walls. In addition to quantity shown, review requirements with Fire Authority and provide all fire protection equipment required by Fire Authority.

D. Coordinate with framing, gypsum board and plaster trades prior to covering framing, to assure proper framing blocking, backing, and opening size depth to receive fire protection devices. Assure continuity of fire rated assemblies.

1.6 Warranty

A. Provide manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to failure of hydrostatic test according to NFPA 10, faulty operation of valves or release levers. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - Products

2.1 Manufacturers

A. Subject to requirements, provide products by one of, or equal to, the following:

1. JL Industries, Inc.
2. Kidde Commercial
3. Koetter Fire Protection
5. Potter Roemer, Div. of Smith Industries, Inc.

2.2 Materials

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B.

B. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1-1/5 inch thick.

2.3 Portable Fire Extinguishers

A. Provide fire extinguishers of type, size, and capacity required by fire authority.

3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb. nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.4 Fire-Protection Cabinet

A. Non-Rated Cabinet Enameled Steel: Suitable for fire extinguisher.

B. Cabinet: J.L. Industries, Non-Rated: Ambassador Series, Model No. 1817G10, or approved equal.

C. Provide door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated, and as follows:

1. Recessed door pull.
2. Continuous Hinge: Same material and finish as trim, permitting door to open 180 degrees.
4. Provide steel break-glass strike, complete with chain and mounting clip, secured to cabinet.
5. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle. Provide 3 keys per lock.
6. Lettering decals complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by fire authority. Identify fire extinguisher in fire protection cabinet with the words “FIRE EXTINGUISHER”.
7. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to security fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

D. Finishes:

1. Steel baked-enamel paint:
   a. Exterior of cabinet, door and trim.
   b. Interior of cabinet and door.
   c. Color and Texture: As selected by Architect from manufacturer’s full range of colors including custom colors.

2.5 Fabrication

A. Fabricate cabinets and components per manufacturer’s written recommendations to comply with Project conditions, styles specified, and fire extinguishing equipment required by fire authority. Verify requirements with fire authority.

B. Provide box (tub) cabinets, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style. Weld joints and grind smooth. Ease and round all edges and sharp corners. Prepare doors and frames to receive locks. Install door locks at factory.

C. Fabricate doors from materials indicated and coordinated with cabinet types and trim styles selected. Fabricate door frames of one-piece construction, with edges flanged. Miter and weld perimeter door frames. Ease and round all edges and sharp corners.

D. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
2.6 Fasteners

A. Provide concealed fasteners to greatest extent possible.

B. Exposed fasteners shall be flathead Phillips type anchors finished flush with adjacent surface.

C. Exposed fasteners shall be finished to match adjacent surfaces.

D. Provide stainless steel fasteners.

2.7 Finishes

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designating finishes.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are not acceptable.

2.8 Steel Finishes

A. Remove all mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, “White Metal Blast Cleaning.” After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

B. Immediately after cleaning and pretreating, apply manufacturer’s standard three-coat, baked-on finish consisting of prime coat and two thermosetting topcoats. Comply with coating manufacturer’s written instructions for applying and baking to achieve a minimum dry film thickness of 2.5 mils. Color and Gloss: As selected by Architect from manufacturer’s full range of colors including custom colors.

PART 3 - Execution

3.1 Examination

A. Examine walls and partitions while open stages of framing progress and while there is still time to modify framing for suitable framing depth and blocking where recessed, semirecessed, and surface-mounted cabinets will be located and installed. Notify Architect in writing immediately if conflicts are found. Semirecessed and surface mounted cabinets shall not project more than 4 inches into corridors, passageways or aisles. Coordinate locations of blocking, backing and framing to accommodate cabinets.

B. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged units.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with any part of cabinet installation constitutes acceptance of substrate conditions by Contractor.
3.2 Preparation

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 Installation

A. Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction. Install cabinets square, plumb, and level. Securely anchor by mechanical means only using stainless steel fasteners. Conform to installation instructions. Exact locations shall be as indicated or directed.

B. Maintain acoustical integrity of walls by filling cavity around box with unfaced fiberglass insulation or by applying electrical outlet box acoustical sheeting to the back, top, bottom and sides.

C. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

D. Place extinguishers in cabinets and mount extinguishers on brackets on walls at locations indicated on the Drawings. Place fire extinguishers immediately prior to Substantial Completion review or sooner if directed by Fire Marshal.

E. Apply decals at locations required by fire authority.

3.4 Adjusting and Cleaning

A. Remove temporary protective coverings and strippable films, if any, as security fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust security fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of security fire-protection cabinet installation, clean interior and exterior surfaces. Repair/paint wall surfaces to surrounding fire extinguisher cabinets damaged during installation to match existing wall surface.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by security fire-protection cabinet manufacturer.

E. Replace security fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 00
SECTION 11 52 13 - Projection Screens

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 06 20 00 “Finish Carpentry.”
2. Section 09 90 00 “Painting.”
3. Division 26 Sections for electrical service and connections including metal device boxes for switches and conduit, where required, for low-voltage control wiring.

1.2 Definitions

A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.

1.3 Submittals

A. Product Data: For each type of screen indicated.

B. Shop Drawings: Show layouts and types of projection screens. Include the following:

1. Location of screen centerline relative to ends of screen case.
2. Location of wiring connections.
3. Location of seams in viewing surfaces.
4. Drop length.
5. Connections to supporting structure for pendant- and recess-mounted screens.
6. Anchorage details.
7. Details of juncture of exposed surfaces with adjacent finishes.
8. Frame details.
10. Wiring Diagrams: For electrically operated units.
11. Housing and cover panel details.

C. Samples for Initial Selection: For finishes of surface-mounted screen cases.

D. Maintenance Data: For projection screens to include in maintenance manuals.

1.4 Quality Assurance

A. Obtain projection screens and accessories through one source from a single manufacturer with a minimum of 10 years experience in the fabrication of projection screens similar to type specified. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.

B. Provide installer with minimum of 3 years full time experience installing projection screens similar in scope and complexity to that specified. Where applicable, installer shall be certified or acceptable to manufacturer of equipment.
C. Regulatory Requirements:

1. Electrical components, devices and accessories shall comply with California Electrical Code (CEC) U.L. listed and labeled as defined in NFPA 70, Article 100 and all other requirements of authorities having jurisdiction. Refer to Division 16 – Electrical.

2. Mounting and installation of projection screen components shall comply with seismic restraint and anchoring requirements of California Building Code (CBC).

D. All projection screen components shall be securely anchored to withstand seismic forces. Standard shall be the criteria required for the building structure or those of authorities having jurisdiction, whichever is more stringent.

E. Coordinate recesses, backing and supports to suit projection screen equipment. Provide access ways for installation, removal and servicing of built-in equipment.

1.5 Project Conditions

A. Comply with environmental requirements and recommendations of projection screen manufacturers under which installation shall be performed including temperature, humidity and dust.

1.6 Delivery, Storage, and Handling

A. Do not deliver projection screens until building is enclosed and weather tight and other construction, including finishes, within spaces where screens will be installed is substantially complete and ready for intended occupancy.

1.7 Coordination

A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling framing, light fixtures, HVAC equipment, fire-suppression system, partitions and structure. Coordinate for required framing, blocking and backing necessary.

PART 2 - Products

2.1 Front-Projection Screens

A. Da-Lite Screen Co., Inc., Model No. 70136 LS, Advantage Electrol 16:10 wide format with black case.

B. Concealed mounting type projection screen electrically operated 120 volt (60 Hz.), 1.0 amp, shall have specially designed motor mounted inside the roller with noise silencer. Motor shall be three wire quick reversal type, oiled for life, with automatic thermal overload cutout, integral gears, capacitor and an electric brake to prevent coasting. Screen shall have preset but adjustable limit switches to automatically stop picture surface in the “up” and “down” positions. The roller shall be of rigid metal, 3-inches in diameter, mounted on two vibration and noise absorbing supports. Screen fabric shall be flame retardant and mildew resistant fiberglass with matte white surface and black masking borders standard. Bottom of fabric shall be formed into a pocket holding a 3/8-inch diameter metal rod. Case shall be 22 gauge embossed steel with baked enamel paint finish, hexagonal in shape, with flat back to prevent scraping fabric. Provide case end caps to allow no exposed roller pins. Powder coated caps shall be form sturdy brackets for ceiling installation. Screen shall be complete with three position control switch in box with cover plate. Screen shall be listed by Underwriters’ Laboratories and CSA.

C. Screen Material and Viewing Surface:
1. Matte-White Viewing Surface: Peak gain of 0.9 to 1.0, and gain of not less than 0.8 at an angle of 50 degrees from the axis of the screen surface.

   a. Subject to requirements, provide products by one of, or equal to, the following:

      1) Da-Lite Screen Co., Inc., Matte White or approved equal.

2. Mildew Resistance: Rating of 0 or 1 when tested according to ASTM G 21.


4. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.

5. Provide screens, in sizes indicated, without seams. Where length of screen indicated exceeds maximum length produced without seams in material specified, provide screen with horizontal seam placed at bottom of screen at juncture between extra drop length and viewing surface.


7. Provide extra drop length of six-inches to comply with the following requirements for fabric color and location of drop length:

   a. Color: Black.
   b. Location: At top of screen.

8. Size of Viewing Surface: As indicated.

PART 3 - Execution

3.1 Installation

   A. Install projection screens at locations indicated to comply with screen manufacturer's written instructions for projection screens mounted at suspended acoustical ceiling. Independently support projection screen on threaded rods separate from suspended ceiling grid, with steel angle diagonal bracing at each suspension point. Secure projection screen to supports using bolted connections, not with swing connections.

   B. Power and signal connections as specified in Division 26 – Electrical.

   C. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.

      1. Install low-voltage controls according to NFPA 70 and manufacturer's written instructions. Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

      2. Test electrically operated units to verify that screen controls, limit switches, closure, and other operating components are in optimum functioning condition.

3.2 Testing

   A. Before Substantial Completion demonstrate proper operation by opening and closing each projection screen. Open and close each manual projection screen two times. Open and close automatic electric projection screen five full cycles in succession. Demonstrate successful operation of projection screens to satisfaction of Owner. Make necessary adjustments to system to satisfaction of Owner at no additional cost or time to Contract.
3.3 Protecting and Cleaning

A. After installation, protect projection screens from damage during construction. Provide temporary covering of rear-projection screens until time of Substantial Completion. Use type of covering approved by screen manufacturer that will effectively protect screen from abrasion, breakage, or other damage. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

B. Clean rear-projection screens on both faces immediately before date scheduled for inspection intended to establish date of Substantial Completion. Use methods and cleaning materials recommended by screen manufacturer, taking care not to scratch or damage optical coatings or screen substrates.

END OF SECTION 11 52 13
SECTION 12 61 00 - Fixed Audience Seating

PART 1 - General

1.1 Related Documents
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary
A. Section includes fixed audience seating with the following:
   1. Fixed seating for lecture halls where multiple seating is required.
   2. Standard mounting.
   3. Molded-plastic chairs with upholstered inserts.
   4. Self-rising seat mechanism.

1.3 Description of the Work
A. Provide all labor, materials, necessary equipment and services to complete the installation of the multiple seating, as indicated on the drawings, or as specified herein or both.

1.4 Performance
A. Field performance shall be demonstrated by providing a list of not less than five (5) installations of similar specifications that have been in service for a minimum period of five (5) years.
B. Gray iron shall be of a quality and strength in accordance with ASTM A-48 for Class 25 gray iron castings.
C. Wood used in the construction of the arms shall be hardwood. All veneers used in plywood shall be well seasoned hardwoods.
D. Molded polyurethane foam shall meet Cal TB-117 Burn Test and ASTM D3574-05.

1.5 Submittals
A. Complete Seat Plan: Submit drawings fully describing the seat plan developed from architect’s prints of the building. Include details of all chairs, sizes, widths, anchorage and accessories.
B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fixed audience seating.
C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Seating Layout: Show seating layout, aisle widths, row-lettering and chair-numbering scheme, chair widths, and chair spacing in each row.
   2. Accessories: Show accessories, including locations of left- and right-hand tablet arms, accessibility provisions, and attachments to other work.
D. Samples for Initial Selection: For each type of exposed finish, color, texture, and pattern indicated.
E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Molded Plastic: Manufacturer's standard-size unit, not less than 3 inches square.
2. Plastic Laminate: Manufacturer's standard-size unit, not less than 3 inches square.
3. Baked-on Coating Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
4. Aluminum Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
5. Wood and Plywood Materials and Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
6. Upholstery Fabric: Full width by 36-inch-long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
7. Row-Letter and Chair-Number Plates: Full-size units with letters and numbers marked.
8. Exposed Fasteners: Full-size units of each type.

F. Product Certificates: For each type of flame-retardant treatment of fabric, from manufacturer.

G. Field quality-control reports.

H. Maintenance Data: For fixed audience seating to include in maintenance manuals. Include the following:

2. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

I. Warranty: Sample of special warranty.

1.6 Quality Assurance

A. All component parts of the product are to be made under direct control of the manufacturer. Utilize testing and inspection procedures to assure uniform high quality component parts and finished product.

B. Source Limitations: Obtain each type of seating required, including accessories and mounting components, from single source from single manufacturer.


C. Fire-Test-Response Characteristics of Upholstered Chairs:

1. Fabric: Class 1 according to DOC CS 191 and 16 CFR 1610.61, tested according to California Technical Bulletin 117.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for the following types of fixed audience seating including fabric, finishes, and accessories:

   a. Size: Two typical seats or a typical two-seat unit.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
E. Preinstallation Conference: Conduct conference at Project site.

1.7 Project Conditions

A. Environmental Limitations: Do not deliver or install seating until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of seating layout and construction contiguous with seating by field measurements before fabrication.

1.8 Warranty

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fixed audience seating that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including standards, beams, and pedestals.
   b. Faulty operation of self-rising seat mechanism.
   c. Faulty operation of electrical components.
   d. Wear and deterioration of fabric and stitching beyond normal use.
   e. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Periods: As follows, from date of Substantial Completion.

   b. Structural: 15 years.
   c. Operating Mechanisms: 15 years.

1.9 Extra Materials

A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Chair Seats and Backs: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of chair seat and back.

2. Upholstered, Slip-on Cushions: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of cushion.

3. Tablet Arms: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of tablet arm.

4. Armrests: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type of armrest.

PART 2 - PRODUCTS

2.1 Fixed Audience Seating Sheet A1-03

A. Interior assembly-space seating in permanent arrangement by American Seating, Stellar, Style 35-230-1 19° Pitch Back or approved equal.
1. Subject to compliance with requirements by one of the following:
   a. Ducharme Seating International Inc.
   b. Hussey Seating Company.
   c. Interkal LLC.
   d. Irwin Seating Company.
   e. JG Seating; Division of USSC Group.
   f. KI, Inc.
   g. Preferred Seating.
   h. Seating Concepts LLC.
   i. Series International; Series USA.
   j. Sitmatic.
   k. Theatre Solutions, Inc.

2.2 Operation

A. The product has two independent hinge mechanisms for a consistent three-quarter safely fold with the ability to temporarily be positioned to full fold when manually rotated by the occupant. The hinge application will not require adjustment or lubrication.

2.3 Construction

A. Back: The back is made of a compound curved upholstered inner panel with wrap-around polypropylene outer panel and two wings for attaching the back to the chair standards. The back shall be mounted to achieve a back height of 36” from finished floor when installed at a 19 degree pitch. Back adjusts to four (4) back angles from 16 through 24. Two back widths accommodate 19”, 20”, 21”, 22”, and 23” chairs.

1. Wrap around plastic outer panel is provided with a continuous return flange extending 1 1/4” over the top and around the sides to provide fabric protection and strength. The outer panel is 0.10” molded polypropylene plastic covering the rear, top and over the sides of the back including the back wings and extends below seat level to protect seat cushions. The plastic has a hair-cell textured surface to provide an attractive mar-resistant appearance and is supplied in the manufacturer’s standard colors.

2. Inner structural panel consists of 0.10” minimum thickness 20% talc filled polypropylene injection molded to compound curves with deep web reinforcing. Engineered resin inner panel construction provides freedom from worry of wood fatigue or damage from drying, moisture or aging. Along the lower rear of the panel there shall be four (4) steel threaded inserts for attaching the back to the back wing.

3. The upholstery fabric cover is fastened to the inner panel with staples for a taunt sculpted fit.

4. Padding consists of molded polyurethane foam 2” thick meeting Cal TB-117 and ASTM D3574-05 specifications. It shall be non-hardening and non-oxidizing. It shall resist acids, alkalis, oils, greases, soaps, abrasions, moisture, mildew and tearing.

5. Back wings to be 14 gauge steel, die cut and formed to attach to the rear of the inner panel using mating steel inserts and two threaded fasteners per back wing.

6. Back attachment to standards is made using two back wings which thru bolt to the standards using black finish smooth head machine screws and mating mini nuts with smooth covers to minimize catching or snagging.

7. It shall be possible to remove the back assembly from the standards without disturbing the standards.
8. The back must withstand a 300 pound vertical load applied downward on one side of the back to
the top, 250 pound horizontal load applied forward and backward on the center of the back, 75
pound swinging impact load forward and backward on the center of the back for 80,000 cycles,
250 pound horizontal load applied forward and backward on each top corner of the back, all
without damage to the back or chair (each load applied independently).

B. Seat: Chairs without tablet arms shall accommodate 19", 20", 21", 22", and 23" chairs.
1. Seat shall be of the spring arch type and shall be composed of two parts, the upholstered spring
frame and the seat foundation. Five (5) 8 gauge serpentine springs shall be attached to and
suspended from a die formed 18 gauge steel frame with proper lateral bracing to resist spring
tension. The points of spring attachment shall be open and well lubricated to permit quiet, free
spring rotation thus eliminating noise and spring fatigue.
2. Padding shall consist of an integrally molded polyurethane foam pad. It shall be molded to 100%
bonded polyester netting and contoured to interlock with the spring frame, forming an integral one
piece unit. It shall be non-hardening and non-oxidizing. It shall resist acids, alcalis, oils, greases,
soaps, abrasions, moisture, mildew and tearing. The pad shall be approximately 3" thick at the
front and 1-1/2" thick at the rear with an overall thickness of 2" over the center portion.
3. The upholstery cover shall be of a panel side construction without welts and shall be fastened to
the frame without the use of nails, tacks, or screws, thereby providing for easy reupholstering.
4. Seat foundation shall be of one piece deep drawn die formed steel foundation, not less than 20
gauge thickness with edges rolled inward around entire perimeter. Foundation shall be free from
screws and bolts on bottom, front and sides. It shall enclose the entire seat raising mechanism and
at the point of hinge attachment, shall be reinforced by large steel plates of not less than 11 gauge
thickness. It shall be possible to remove the upholstery portion of the seat from the steel
foundation without removing the complete seat from the chair. Seat foundation can be provided
with number plates located centrally near the front edge. Area provided for number plates shall be
recessed to prevent wear and abrasion of the plate. Attaching of number plates shall be by tamper-
resistant mechanical fastening.
5. Seat hinge shall be completely enclosed in seat assembly and shall automatically fold to a 3/4
uniform position at all times without adjustment. It shall also fold 100% to provide additional
clearance when necessary. Hinges shall consist of a cast iron pivot securely fastened to the cast
iron pivot ledge on the standards by a heavy bolt to prevent possibility of the hinge pivot being
disengaged from the standard. Rotation of the seat about hinge pivot shall be on a Delrin bearing
requiring no maintenance. Lifting is provided by two independent paraffin oil coated 0.120"
diameter music wire wound springs with seven active coils. With the seat unoccupied, the springs
are in a relaxed position to increase spring life. Both the up and down stops on the seat shall be
cushioned with Neoprene rubber to reduce noise.

C. Standards shall be of solid cast iron meeting ASTM A48-64, Class 25 Gray iron.
1. Standard shall be of one integral piece gray iron pedestal shaped design. The foot pad shall
measure a minimum of 7" long x 2 5/8" wide. The cast iron standard contains anchor points for
holding chair back, seat and arm rest in accurate and secure position. Standards shall be cast to fit
the floor incline to maintain proper seat height.

D. Arm Rests: Arm rests for end treatments and for middle standards shall be either wood or plastic as
specified below.
1. Aisle end armrests shall be of solid wood construction with edges well rounded, finished with
lacquer seal and finish coats. The under surface of the arm rest shall be provided with two
rounded “T” slots to secure arms to lugs on cast iron standards. Color to be selected from
manufacturer's standard finishes or finished with a solid lacquer to match plastic color.
2. Middle armrests shall be high density blow molded polyethylene. Armrest shall have slots to secure to the lugs on the cast iron standards. A steel spring clip shall be used to lock armrest into position to deter vandalism.

2.4 Finish

A. Cast Iron Parts: Cast iron parts shall be provided with a hybrid epoxy powder coat in one of the manufacturer’s standard colors. Finish treatment will be done using the following procedure:

1. Pre-powder coat cleaning in a 7-stage bonderizing process
   a. 1st stage: acid clean
   b. 2nd stage: water rinse
   c. 3rd stage: zirconium immersion
   d. 4th stage: deionized water rinse
   e. 5th stage: seal spray
   f. 6th stage: deionized water rinse
   g. 7th stage: deionized water rinse
   h. Parts pass thru a dry off oven

2. Powder coat finishing of parts in an electrostatic system.
   a. Parts shall be coated with a thermosetting epoxy powder.
   b. Cured powder coat to have dry film thickness of 1.0 to 2.0 mils.
   c. Parts shall be high temperature cured in a gas fired convection oven.
   d. Cured powder coat must pass; ASTM D3363-74 Hardness 2H, ASTM D2794-69 Impact Resistance 120 in-lbs without cracking, ASTM D522-60 Flexibility no cracking or loss of adhesion, ASTM B117-73 Salt Spray 144 hours with no corrosion, ASTM D1654-79a Salt Spray maximum 1/8" creep from scribe line, ASTM D3359-83 Adhesion 5B, ASTM G53-96 Light Resistance 48 hour exposure with no chalking, 75% gloss retention and color change less than 1.5 deltaE CIE and Hoffman Scratch Hardness Tester no substrate appearance with 1,000 gram load.

B. Steel Parts: Steel parts shall be provided with a hybrid epoxy powder coat in one of manufacturer's standard colors using the following procedure:

1. Pre-powder coat cleaning in a 7-stage bonderizing process
   a. 1st stage: acid clean
   b. 2nd stage: water rinse
   c. 3rd stage: zirconium immersion
   d. 4th stage: deionized water rinse
   e. 5th stage: seal spray
   f. 6th stage: deionized water rinse
   g. 7th stage: deionized water rinse
   h. Parts pass thru a dry off oven

2. Powder coat finishing of parts in an electrostatic system.
   a. Parts shall be coated with a thermosetting epoxy powder.
   b. Cured powder coat to have dry film thickness of 1.0 to 2.0 mils.
   c. Parts shall be high temperature cured in a gas fired convection oven.
   d. Cured powder coat must pass; ASTM D3363-74 Hardness 2H, ASTM D2794-69 Impact Resistance 120 in-lbs without cracking, ASTM D522-60 Flexibility no cracking or loss of adhesion, ASTM B117-73 Salt Spray 144 hours with no corrosion, ASTM D1654-79a Salt Spray maximum 1/8" creep from scribe line, ASTM D3359-83 Adhesion 5B, ASTM G53-96 Light Resistance 48 hour exposure with no chalking, 75% gloss retention and color change less than 1.5 deltaE CIE and Hoffman Scratch Hardness Tester no substrate appearance with 1,000 gram load.
Spray maximum 1/8” creep from scribe line, ASTM D3359-83 Adhesion 5B, ASTM G53-96 Light Resistance 48 hour exposure with no chalking, 75% gloss retention and color change less than 1.5 deltaE CIE and Hoffman Scratch Hardness Tester no substrate appearance with 1,000 gram load.

C. Wood Parts: All exposed surfaces shall be coated with lacquer of sufficient film depth to afford adequate protection. Stain colors to be selected from manufacturer's standard finishes.

2.5 Options and Accessories

A. Aisle End: #560 Laminate. 0.05” thick grade HGS high pressure decorative laminate surfaces adhered to a moisture resistant plywood core that is CARB Phase 2 certified. The edge shall be finished with a radial burnish or custom lacquered finish using manufactures standard colors.

B. ADA Aisle End: Provide an end standard with a hinged armrest adjacent to the aisle to allow access to the chair from the side as indicated in the seating plan. Folding of the arm for access shall be an upward rotation around a rear axis point that is in alignment with the chair back. Rotation and use shall not be in directions or to extents which could impede the adjacent aisle way or aisle access way. The hinged armrest height shall match the fixed armrest height. The arm rest and supporting standard is to be made from cast iron with a stainless steel arm pivot and Teflon end bearing. The arm rest is to be constructed to withstand a vertical load of 250 pounds applied at 1” rearward from the front and a separate horizontal load of 200 pounds applied 1” rearward from the front. The standard is marked with a 1” square access plate for ease of identification and plates have a brushed aluminum symbol with an etched and blue filled background. Accessible end can be finished with a plastic or wood arm block to match adjacent seating.

C. The tablet arm shall provide a writing surface and a unique folding action which permits the tablet arm to fold between the occupants of two chairs, completely out of the way and easily accessible when needed. The tablet arm movement must meet International Building Code 2009 and NFPA 101 Life Safety Code. Chair size with tablet arm shall accommodate 20”, 21”, 22” and 23”.

1. The tablet arm mechanism shall consist of a cast iron tablet arm support securely attached to the tablet arm writing surface, and a tablet arm hinge which will provide for easy tablet arm folding operation. The tablet arm folds by raising 90 degrees to a vertical position then automatically pivots downward 180 degrees, positioning itself alongside the standard just below the arm rest. The tablet arm is held in place in its folded position by a spring actuated mechanism. The spring tension shall prevail during the first 45 degrees of pivoting motion, starting at the stored position. The remainder of the pivoting cycle shall be free of spring tension and friction making the return to the writing position possible with a quick easy motion, not requiring occupant to bend or reach. The transmission of the spring tension shall be made with nylon cam and cam finger, to prevent noise and insure long wear life.

a. The tablet arm spring and pivot mechanism shall be housed in a powder coated finish cast iron support, which is attached to the middle and end standards using two graded fasteners.

b. Optional standard writing surface is 0.05” thick grade HGS high pressure decorative laminate top and bottom surfaces adhered to a moisture resistant plywood core that is CARB Phase 2 certified. The writing surface is attached to the tablet arm support by no less than six screws.

c. The edge of the writing surface shall be finished with a radial burnished or custom lacquer finish using manufactures standard colors.

d. The oversized tablet arm is 127 square inches measures 10.56” x 13.44”. The tablet arm assembly shall be capable of supporting a critical load of at least 200 lbs on a point directly in front of the occupant.

D. Row and Seat Identification:
1. Row and Seat Identification Plates: Plates shall be made of clear anodized aluminum of .025” thickness. Size of plate shall be 1-5/8” by 5/8”. Letters or numbers shall be recessed and filled with baked black enamel. The numbers and letters shall be a 36-point, Swiss #721 style. Plates shall be provided with two (2) holes for attachment to a recessed area in front edge of the steel seat pan with two (2) tamper proof blind fasteners. When attaching plates to wood arm rests, two chrome plated escutcheon pins shall be used.

PART 3 - EXECUTION

3.1 Examination

A. Preparation of site shall be by the General Contractor. Any deviation of site conditions contrary to approved shop drawings shall be called to the attention of the architect.

B. Delivery to the job site shall be coordinated by the general contractor. Proper storage of the product before installation and continued protection during and after the installation shall be the responsibility of the general contractor.

C. Installation shall be by an authorized factory trained installer, or by a capable superintendent under whose direction the installation is to be performed in a manner satisfactory to the architect, owner or both.

D. Installation will be in accordance to the approved seating plan and drawings.

E. The complete installation of the product as called for, and detailed on the drawings, shall be provided in strict accordance with the drawings and manufacturer’s standard specification, instructions and recommendations.

F. Examine floors, risers, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Install seating in locations indicated and fastened securely to substrates according to manufacturer's written installation instructions.

1. Use installation methods and fasteners that produce fixed audience seating assemblies with individual chairs capable of supporting an evenly distributed 600-lb static load without failure or other conditions that might impair the chair's usefulness.

2. Install standards and pedestals plumb.

B. Install seating with chair end standards aligned from first to last row and with backs as shown on Drawings.

C. Install riser-mounted attachments to maintain uniform chair heights above floor.

D. Install chairs in curved rows at a smooth radius.

E. Install seating so moving components operate smoothly and quietly.

3.3 Field Quality Control

A. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

2. Tests for Power Receptacles: As specified in Division 16 Sections.

3. Tests for Data Ports: As specified in Division 16 Sections.

B. Prepare test and inspection reports.

3.4 Adjusting

A. Adjust chair backs so that they are aligned with each other in uniformly curved rows.

B. Adjust self-rising seat mechanisms so seats in each row are aligned when in upright position.

C. Verify that all components and devices are operating properly.

D. Verify that seating returns to correct at-rest position.

E. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.

F. Replace upholstery fabric damaged during installation.

End of Section 12 61 00
23 05 29 - Hangers and Supports for HVAC Piping and Equipment

Part 1 - General

1.1 Summary
A. This Section includes the following hangers and supports for mechanical system and equipment:

B. Fastener systems.
1. Equipment supports.

C. Related Sections include the following:
1. Division 5 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
2. Division 23 Section "Mechanical Vibration and Seismic Controls" for vibration isolation devices.
3. Division 23 Section(s) Metal Ducts" and "Nonmetal Ducts for duct hangers and supports.

1.2 Performance Requirements
A. Structural Performance: Hangers and supports for HVAC equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Design seismic-restraint hangers and supports for piping and equipment.

1.3 Submittals
A. Product Data: For the following:
1. Mechanical expansion anchors.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
1. Equipment supports.

C. Welding certificates.

D. Calculations: Complete calculations required to provide support system for vertical and lateral loads as required by the California Building code – 2010. Seismic loads shall be determined in accordance with the California Building Code – 2010.

E. Company and individual welding certificates for all on site and shop welding.

1.4 Quality Assurance
A. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."

Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 Fasteners Systems

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Available Manufacturers:
   a. Hilti, Inc.
   b. ITW Ramset/Red Head.
   c. Masterset Fastening Systems, Inc.
   d. MKT Fastening, LLC.
   e. Powers Fasteners.

B. Mechanical-Expansion Anchors: Insert-wedge-type [zinc-coated] [stainless] steel, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:
   b. Empire Industries, Inc.
   c. Hilti, Inc.
   d. ITW Ramset/Red Head.
   e. MKT Fastening, LLC.
   f. Powers Fasteners.

2.3 Equipment Supports

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.4 Miscellaneous Material

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
3.1 Hanger and Support Applications

A. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar Joist construction to attach to top flange of structural shape.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
5. C-Clamps (MSS Type 23): For structural shapes.
6. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
7. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
8. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
9. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
10. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
11. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
   a. Light (MSS Type 31): 750 lb
   b. Medium (MSS Type 32): 1500 lb
   c. Heavy (MSS Type 33): 3000 lb
12. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
13. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

B. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.

C. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

D. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
3.2 Hanger and Support Installation

A. Fastener System Installation:
   1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4
      inches thick in concrete after concrete is placed and completely cured. Use operators that are
      licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated
      tool manufacturer's operating manual.
   2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured.
      Install fasteners according to manufacturer's written instructions.

B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other
   accessories.


D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to
   permit freedom of movement between pipe anchors, and to facilitate action of expansion joints,
   expansion loops, expansion bends, and similar units.

3.3 Equipment Supports

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment
   above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 Metal Fabrication

A. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop
   welded because of shipping size limitations.

B. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and
   quality of welds, and methods used in correcting welding work, and with the following:
      1. Use materials and methods that minimize distortion and develop strength and corrosion resistance
         of base metals.
      2. Obtain fusion without undercut or overlap.
      3. Remove welding flux immediately.
      4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded
         surfaces match adjacent contours.

3.5 Adjusting

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated
   slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches
3.6 Painting

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

End of Section 23 05 29
23 05 48 - Vibration and Seismic Controls for HVAC Equipment

Part 1 - General

1.1 Summary

A. This Section includes the following:

1. Elastomeric isolation pads and mounts.
2. Restrained elastomeric isolation mounts.
3. Freestanding and restrained spring isolators.
4. Housed spring mounts.
5. Elastomeric hangers.
7. Spring hangers with vertical-limit stops.
8. Thrust limits.
10. Restraining cables.

1.2 Submittals

A. Product Data: Include load deflection curves for each vibration isolation device.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include the following:

1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases. Seismic loads shall be determined in accordance with the California Building Code – 2010.
2. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.
3. Seismic-Restraint Details: Detail fabrication and attachment of seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.
4. Submittals for Interlocking Snubbers: Include load deflection curves up to 1/2-inch deflection in x, y, and z planes.

C. Welding certificates.

D. Air-Mounting System Performance Certification: Include natural frequency, load, and damping tests performed by an independent laboratory or acoustician.

E. Manufacturer Seismic Qualification Certification: Submit certification that all specified equipment will withstand seismic forces identified in "Performance Requirements" Article above. Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.3 Quality Assurance

A. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval "R" number, from an agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. If preapproved ratings are not available, submittals based on calculations (including combining shear and tensile loads) to support seismic-restraint designs must be prepared and signed and sealed by a qualified professional engineer. Testing and calculations must include both shear and tensile loads and 1 test or analysis at 45 degrees to the weakest mode.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel" for all onsite and shop welding.

1.4 Coordination

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into base. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Basis of Design Product: The design for each product is based on manufacturer named on the drawings. Subject to compliance with requirements, provide either named product or a comparable equivalent product by one of the other manufacturers specified.

2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 Vibration Isolators

A. Manufacturers:

2. Mason Industries, Inc.
3. Amber/Booth Company, Inc.
4. Ace Mounting Co., Inc.
2.3 Vibration Isolation Equipment

Provide vibration isolation equipment for all mechanical equipment as specified herein and indicated on the drawings. The vibration isolation system shall be installed in a manner to prevent the transmission of vibration to the structure. No rigid connections between rotating or oscillating equipment or piping and the building will be permitted. Vibration isolation shall be as manufactured by M.W. Sausse and Co., Mason Industries, Amber Booth or equal.

A. General Requirements:

1. Vibration isolation manufacturer shall furnish written instructions covering the installation and adjustment of all isolators. The manufacturer shall replace any isolation that has been improperly sized. Piping supports in the penthouse equipment areas shall be designed by the vibration isolation manufacturer.

2. Design Build Entity (DBE) shall coordinate his work with the other trades. All trades following him, such as plastering or electrical, shall be notified and instructed to avoid any contact with his installation that would reduce the effectiveness of the system.

3. Inspections: Vibration isolation manufacturer shall make an inspection of the vibration installation, and inform the Contracting Officer in writing of any necessary corrections and/or adjustments.

4. All isolators shall be selected to perform their function without undue stress or overloading. All isolators shall have a method for leveling and have a 1/4" thick ribbed neoprene acoustical pad under the spring baseplate.

5. All isolators shall be designed to operate in the linear portion of their load versus deflection curve. Load versus deflection curves shall be furnished by the manufacturer, and must be linear over a deflection range of not less than 50 percent above the design deflection. The ratio of lateral to vertical stiffness shall be not less than 0.8 nor greater than 1.5. Isolators shall be designed to be non-resonant with equipment forcing frequencies or support structure natural frequencies. Design isolators for positive anchorage against uplift and overturning.

6. Unless otherwise indicated, all equipment mounted on vibration bases shall have a minimum operating clearance of 1" between structural steel base and floor or support base beneath. The minimum operating clearance between concrete inertia bases and housekeeping pads shall be 2 inches. Check clearance space after installation to ensure that no debris has been left to possibly short circuit isolation bases.

7. Bases: Where called for in the specifications and on the drawings, all structural steel bases, including concrete pouring form bases, shall be designed and fabricated by the vibration isolation manufacturer. The concrete for the pouring form bases shall be by others.

8. Vibration isolation shall be manufactured by a single manufacturer. All isolation shall be in strict accordance with the following specifications. The isolation manufacturer shall include in the submittal the following information:

   a. Specific vibration isolators and seismic restraints to be utilized showing compliance with the specifications, including deflection, free height, and physical characteristics.
   b. Isolation frame construction for each machine including dimensions, structural member sizes, support points and restraint locations and details.
   c. Methods for isolation and restraint of suspended piping, ductwork, and equipment.
   d. Methods for guides and isolation of piping risers.

B. Technical Requirements:

1. Isolators shall be designed or treated for resistance to corrosion. Structural steel bases shall be cleaned of welding slag and painted with a coat of red lead primer-finish composed of basic lead silicon chromate. All nuts, bolts and washers shall be zinc-electroplated.
2. All equipment shall be equipped with seismic restraints in accordance with the requirements of all governing agencies. These restraints shall be designed and supplied by the vibration isolation manufacturer. Suspended equipment and piping shall be restrained by steel cable. This cable and the method of installation shall be the responsibility of the Design Build Entity. The cable restraints shall be installed in such a manner as to not short circuit the vibration isolation.

   a. Seismic restraints for ducts shall be as per SMACNA Guidelines for seismic Restraint of Mechanical Systems.
   b. Seismic restraints for equipment shall be designed to meet the criteria established in the California Code of Regulations latest edition.
   c. The manufacturer of Vibration Isolation and Seismic Control Equipment shall have the following responsibilities:

      1) Determine adequate vibration isolation and seismic restraint sizes and locations.
      2) Provide equipment isolation systems and seismic restraints as scheduled and/or specified.
      3) Provide installation instructions and drawings to assure proper installation and performance.

   d. Seismic restraint calculations signed and stamped by an engineer licensed in the State of California and experienced in the design of isolation and seismic restraint for flexibly mounted equipment.

3. Vibration Isolator Types:

   a. Type A: Air Spring: A complete vibration isolation system consisting of a minimum of three airsprings, a total of three height sensing valves and associated interconnecting air tubing. Air tubing and connection shall also be provided to a source of compressed air providing a minimum 100 psi. If the building uses a pneumatic control system, the air compressor for that system may be used for this system if it is sized properly. Otherwise, an adequately-sized air compressor is a part of this work. One height control valve shall be provided at each isolator mounting location. If there are two or more air springs per location, they shall be connected to the outlet of the height control valve in parallel. The air spring shall operate at its normal operating height and the maximum pressure shall not exceed the manufacturer's recommendations. The air system shall maintain an elevation of + 1/8", once adjusted. Height limit stops shall be provided to preclude more than 1/4" rise in the event of failure. The vertical natural frequency of the airspring system shall not exceed 1.5 Hertz. The ratio of lateral to vertical stiffness shall meet the general requirements.

   b. Type B: Unhoused Spring: Springs shall be designed and installed so their ends are parallel before and after installation and during equipment operation. All mounts shall have equipment leveling bolts. Each isolator shall have a steel base plate with mounting bolt holes and a ribbed or waffled neoprene friction pad permanently adhered to the bottom. The pad shall be 5/16 to 1/2 inch thick, 40 durometer hardness, and sized for a load of 60 psi.

   c. Type C: Spring with Seismic Restraint and Vertical Travel Limit: Same as Mount B with the addition of steel columns on either side of the spring to provide seismic restraint and accommodate vertical travel limit stops. Mount shall resist a seismic acceleration in any direction of at least 0.5 G or as required by the relevant codes. Travel limit stops shall be capable of serving as blocking during erection of the equipment. A minimum clearance of 1/4 inch shall be maintained around restraining bolts and between the limit stops and the spring so as not to interfere with the spring action. Each isolator assembly shall have a friction pad of ribbed or waffled neoprene permanently adhered to the bottom. The pad shall be 5/16 to 1/2 inch thick, 40 durometer hardness, and sized for a load of 60 psi.
d. Type D: Isolator shall be an individual semi-housed steel spring isolator complete with vertical motion limit stops incorporating seismic restraints, leveling, and ribbed neoprene pad bonded to the baseplate.

e. Type E: Neoprene Pad(s) and Bearing Plate(s): Neoprene pad shall be ribbed or waffled, 5/16 to 1/2 inch thick, 40 durometer, with a minimum 1/16-inch-thick steel bearing plate on top. Size pad and bearing plate to receive 60 psi load. Provide single or multiple pads and plates in series as specified, with 1/16-inch-thick steel shim between layers.

f. Type F: Spring Hanger: Vibration isolation hangers shall contain a laterally-stable steel spring set in a neoprene cup manufactured with a bushing to prevent short-circuiting of the hanger rod as it passes through the hanger housing. The cup shall contain a steel washer designed to properly distribute the spring load on the neoprene and prevent its crushing. Spring diameters and hanger housing lower hole sizes shall be large enough to allow the hanger rod to swing through a 30° arc before contacting the housing. Neoprene cup shall be minimum 1/4 inch thick and maximum 50 durometer.

g. Type G: Same as "Type F" with the addition of a neoprene element in series to isolate the upper connection.

h. Type P3: Neoprene Bushing for Bolt Holes in Pads: Bushings shall be minimum 3/16" thick in all places and maximum 40 durometer. Provide steel washer to distribute bolt head loads to bushing.

i. Mount BEQ: Neoprene Mount with Integral Seismic Restraint: A neoprene isolator with concentric steel elements separated by neoprene no harder than 50 durometer. Mount capable of acting in tension, compression or shear.

j. Type C2: Vibration Isolation Curb: Vibration isolation curbs shall be a prefabricated assembly consisting of a lower frame of steel tubes topped by steel springs resting on neoprene pads in turn topped with an upper frame which provides continuous equipment support. Upper frame and spring connections to be adjustable and to include resilient snubbing to resist wind and seismic forces. Springs to be galvanized, accessible and stable. Springs shall be placed no less than 7’ apart along the 2 long sides of the curb. The static deflection of any individual spring shall differ from the others by no more than 10%. It shall be possible to replace individual springs while the isolated equipment is operating normally, without affecting its performance. Provide "RSC” by Mason or approved equal.

k. Type H3: Felt-lined Clevis Hanger: Clevis hanger to be lined with minimum 1/4" thick felt to prevent the contact between piping and metal parts of hanger. Hangers to be spaced to prevent crushing of the felt liner by more than 1/8”.

4. Seismic Restraints: Restraints shall be capable of safely accepting external forces as specified in the applicable codes without failure. Restraints shall maintain equipment, duct, in a captive position during an earthquake. Restraints shall not short circuit vibration isolation systems or transmit objectionable vibration or noise under normal operating conditions. Seismic restraints shall be provided on all equipment as scheduled on the drawings. Submit calculations by a California registered structural engineer to verify restraint capacities.

a. Type S1: Seismic restraint shall be constructed of steel plate, concentric steel pipes, and structural members in an all welded assembly. All contact points shall be cushioned with minimum 1/4” thick resilient pad. Restraints shall be O.S.H.P.D pre-approved type R-0029.

b. Type S2: Seismic restraints shall be constructed of 7x19 strand galvanized aircraft cable. Cable assembly shall come complete with minimum (2) "U" bolt clamps per end and thimbles to protect cable from chafing. Allowed loads shall be the cable breaking strength with a safety factor of three. Actual loads shall be calculated with the worst case of all load applied to one cable and anchor pattern. Cable shall be installed with 1/4" slack to prevent the transmission of vibration to the structure.
Part 3 - Execution

3.1 Examination

A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements, installation tolerances, and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Install thrust limits at centerline of thrust, symmetrical on either side of equipment.

B. Install seismic snubbers on isolated equipment. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.

C. Install resilient bolt isolation washers on equipment anchor bolts.

3.3 Field Quality Control

A. Testing: Owner will engage a qualified testing agency to perform the following field quality-control testing:

B. Testing: Engage a qualified testing agency to perform the following field quality-control testing:

C. Testing: Perform the following field quality-control testing:

1. Isolator seismic-restraint clearance.
2. Isolator deflection.
3. Snubber minimum clearances.

3.4 Adjusting

A. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

B. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.

C. Adjust active height of spring isolators.

1. Adjust snubbers according to manufacturer's written recommendations.
2. Adjust seismic restraints to allow free movement of equipment within normal mode of operation.
3. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.

3.5 Cleaning

A. After completing equipment installation, inspect vibration isolation and seismic-control devices. Remove paint splatters and other spots, dirt, and debris.
End of Section 23 05 48
Section 23 05 53 - Identification for HVAC Piping and Equipment

Part 1 - General

1.1 Summary

A. This Section includes the following mechanical identification materials and their installation:

1. Equipment nameplates.
2. Equipment markers.
3. Equipment signs.
4. Access panel and door markers.
5. Duct markers.
6. Warning tags.

1.2 Submittals

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

1.3 Coordination

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with location of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

Part 2 - Products

2.1 Equipment Identification Devices

A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.

1. Data:

   a. Manufacturer, product name, model number, and serial number.
   b. Capacity, operating and power characteristics, and essential data.
   c. Labels of tested compliances.

2. Location: Accessible and visible.

3. Fasteners: As required to mount on equipment.

B. Equipment Markers: Engraved, color-coded laminated plastic. Include contact-type, permanent adhesive for interior and screws for exterior fastening.

1. Terminology: Match schedules as closely as possible.

2. Data:
a. Name and plan number.
b. Equipment service.
c. Design capacity.
d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.

3. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.

C. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.

1. Data: Instructions for operation of equipment and for safety procedures.
2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
3. Thickness: 1/16 inch for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.2 Warning Tags

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.

Part 3 - Execution

3.1 Equipment Identification

A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:

1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.

3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:

   a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
   b. Fire department hose valves and hose stations.
   c. Meters, gages, thermometers, and similar units.
   d. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
   e. Pumps, compressors, chillers, condensers, and similar motor-driven units.
f. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
g. Fans, blowers, primary balancing dampers, and mixing boxes.
h. Packaged HVAC central-station and zone-type units.
i. Tanks and pressure vessels.
j. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.

B. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.

1. Identify mechanical equipment with equipment markers in the following color codes:

   a. Green: For cooling equipment and components.
   b. Yellow: For heating equipment and components.
   c. Green and Yellow: For combination cooling and heating equipment and components.

2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

3.2 Cleaning

A. Clean faces of mechanical identification devices and glass frames of valve schedules.

End of Section 23 05 53
23 05 93 - Testing, Adjusting, and Balancing for HVAC

Part 1 - General

1.1 Summary

A. This Section includes TAB to produce design objectives for the following:

1. Air Systems:
   a. Variable-air-volume systems.

2. HVAC equipment quantitative-performance settings.

3. Space pressurization testing and adjusting.

4. Coordinate VAV box calibration with BMS contractor and verifying that automatic control devices are functioning properly.

5. Reporting results of activities and procedures specified in this Section.

1.2 Definitions

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

E. NC: Noise criteria.

F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

G. RC: Room criteria.

H. Report Forms: Test data sheets for recording test data in logical order.

I. Smoke-Control System: An engineered system that uses fans to produce airflow and pressure differences across barriers to limit smoke movement.

J. Smoke-Control Zone: A space within a building that is enclosed by smoke barriers and is a part of a zoned smoke-control system.

K. TAB: Testing, adjusting, and balancing.

L. Test: A procedure to determine quantitative performance of systems or equipment.

M. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.
1.3  Submittals
A. Qualification Data: Within 30 days from Design Build Entity’s Notice to Proceed, submit 6 copies of evidence that TAB firm and this Project’s TAB team members meet the qualifications specified in "Quality Assurance" Article.
B. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.
C. Sample Report Forms: Submit two sets of sample TAB report forms.
D. Warranties specified in this Section.

1.4  Quality Assurance
A. TAB Firm Qualifications: Engage a TAB firm certified by either AABC or NEBB.
B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
   1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
   2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
D. Instrumentation Type, Quantity, and Accuracy: As described in AABC’s "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems," or NEBB’s "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
   1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.5  Coordination
A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
B. Coordinate with BMS contractor the calibration of all VAV boxes.
C. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
D. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.
E. Perform follow-up TAB after 180 days of occupied normal operations.
1.6 Warranty

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Design Build Project if TAB firm fails to comply with the Design Build Project. Guarantee includes the following provisions:

B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Design Build Project if TAB firm fails to comply with the Design Build Project. Guarantee shall include the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Design Build Project requirements.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

Part 2 - Products (Not Applicable)

Part 3 - Execution

3.1 Examination

A. Examine the Specifications and Design Build Drawings to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

1. Verify that balancing devices, such as test ports, gage cocks, and manual volume dampers, are required by the Specifications. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 1 Section "Project Record Documents."

D. Examine equipment performance data including. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

F. Examine system and equipment test reports.

G. Examine HVAC system and equipment installations to verify that indicated balancing devices, such volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

H. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning...

I. Examine equipment for installation and for properly operating safety interlocks and controls.

J. Examine automatic temperature system components to verify the following:
1. Dampers, other controlled devices are operated by the intended controller.
2. Dampers are in the position indicated by the controller.
3. Integrity of dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in variable-air-volume terminals.
4. Sensors are located to sense only the intended conditions.
5. Controller set points are set at indicated values.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 Preparation

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:
   1. Permanent electrical power wiring is complete.
   2. Automatic temperature-control systems are operational.
   3. Equipment and duct access doors are securely closed.
   4. Balance, smoke, and fire dampers are open.
   5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
   6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 General Procedures for Testing and Balancing

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

B. Cut insulation, ducts and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 General Procedures for Balancing Air Systems

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Check for airflow blockages.

G. Check for proper sealing of air duct system.

3.5 Procedures for Variable-Air-Volume Systems

A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.

3.6 Procedures for Vibration Measurements

A. Use a vibration meter meeting the following criteria:

1. Solid-state circuitry with a piezoelectric accelerometer.
2. Velocity range of 0.1 to 10 inches per second
3. Displacement range of 1 to 100 mils
4. Frequency range of at least 0 to 1000 Hz.
5. Capable of filtering unwanted frequencies.

B. Calibrate the vibration meter before each day of testing.

1. Use a calibrator provided with the vibration meter.
2. Follow vibration meter and calibrator manufacturer's calibration procedures.

C. Perform vibration measurements when other building and outdoor vibration sources are at a minimum level and will not influence measurements of equipment being tested.

1. Turn off equipment in the building that might interfere with testing.
2. Clear the space of people.

D. Perform vibration measurements after air and water balancing and equipment testing is complete.

E. Clean equipment surfaces in contact with the vibration transducer.

F. Position the vibration transducer according to manufacturer's written instructions and to avoid interference with the operation of the equipment being tested.

G. Measure and record vibration on rotating equipment over 3 hp

H. Inspect, measure, and record vibration isolation.

1. Verify that vibration isolation is installed in the required locations.
2. Verify that isolators are properly anchored.
3. For spring isolators, measure the compressed spring height, the spring OD, and the travel-to-solid distance.
4. Measure the operating clearance between each inertia base and the floor or concrete base below. Verify that there is unobstructed clearance between the bottom of the inertia base and the floor.

3.7 Tolerances

A. Set HVAC system airflow:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 to plus 10 percent.
2. Air Outlets and Inlets: 0 to minus 10 percent.

3.8 Reporting

A. Initial Construction-Phase Report: Based on examination of the Specifications and Design Build Drawings as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.9 Final Report

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

1. Manufacturers' test data.
2. Field test reports prepared by system and equipment installers.
3. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Report date.
6. Signature of TAB firm who certifies the report.
7. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
8. Summary of contents including the following:
   a. Indicated versus final performance.
b. Notable characteristics of systems.

6. Nomenclature sheets for each item of equipment.
7. Data for terminal units, including manufacturer, type size, and fittings.
8. Notes to explain why certain final data in the body of reports varies from indicated values.
9. Test conditions for fans and pump performance forms including the following:
   a. Settings for outside-, return air dampers.
   b. Conditions of filters.
   c. Settings for supply-air, static-pressure controller.
   d. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air. Present each system with single-line diagram and include the following:
   1. Quantities of outside, supply, return air.
   2. Duct, outlet, and inlet sizes.
   3. Terminal units.
   5. Position of balancing devices.

F. Air-Terminal-Device Reports:

1. Unit Data:
   a. System and air-handling unit identification.
   b. Location and zone.
   c. Test apparatus used.
   d. Area served.
   e. Air-terminal-device make.
   f. Air-terminal-device number from system diagram.
   g. Air-terminal-device type and model number.
   h. Air-terminal-device size.

2. Air-terminal-device effective area in sq. ft. Test Data (Indicated and Actual Values):
   a. Airflow rate in cfm
   b. Air velocity in fpm
   c. Preliminary airflow rate as needed in cfm
   d. Preliminary velocity as needed in fpm
   e. Final airflow rate in cfm
   f. Final velocity in fpm
   g. Space temperature in deg F

3. Test Data (Indicated and Actual Values):
   a. Airflow rate in cfm
   b. Entering-water temperature in deg F
   c. Leaving-water temperature in deg F

3.10 Field Reviews

A. Initial Field Review:
1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the Final Report.

2. Randomly check the following for each system:
   a. Measure airflow of at least 10 percent of air outlets.
   b. Measure water flow of at least 5 percent of terminals.
   c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
   d. Measure sound levels at two locations.
   e. Measure space pressure of at least 10 percent of locations.
   f. Verify that balancing devices are marked with final balance position.
   g. Note deviations from the Design Build Requirements in the Final Report.

B. Final Field Review:

1. After initial Field Review is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final Field Review be made by Design Build Entity.

2. TAB firm test and balance engineer shall conduct the Field Review in the presence of Design Build Entity.

3. Owner’s Representative shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.

4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as “FAILED.”

5. If the number of “FAILED” measurements is greater than 10 percent of the total measurements checked during the final Field Review, the testing and balancing shall be considered incomplete and shall be rejected.

6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.

7. Request a second final Field Review. If the second final Field Review also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing and deduct the cost of the services from the final payment.

3.11 Additional Tests

A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

End of Section 23 05 93
23 07 00 HVAC Insulation

Part 1 General

1.1 Summary

A. Section Includes:

1. Insulation Materials
2. Adhesives.
3. Mastics.
4. Lagging adhesives.
5. Sealants.
6. Tapes.
7. Securements.
8. Corner angles.

B. Related Sections:

1. Division 23 Section "Metal Ducts" for duct liners.

1.2 Submittals

A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

B. Qualification Data: For qualified Installer.

C. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

1.3 Quality Assurance

A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.4 Delivery, Storage, and Handling

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.
1.5 Coordination

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports."

B. Coordinate installation and testing of heat tracing.

1.6 Scheduling

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

Part 2 Products

2.1 Insulation Materials

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Foam insulation materials shall not use CFC, HFC, or HCFC blowing agents in the manufacturing process.

E. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials. Material shall have a maximum water vapor transmission of 0.08 perm-inches per ASTM E96, and a maximum water absorption rate of 0.2% (% by volume) per ASTMC209.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Aeroflex USA Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

2.2 Adhesives

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Aeroflex USA Inc.; Aerosetal.
   b. Armacell LCC; 520 Adhesive.
   c. Foster Products Corporation, H. B. Fuller Company; 85-75.
   d. RBX Corporation; Rubatex Contact Adhesive.
2.3 Mastics

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-35.
   b. Foster Products Corporation, H. B. Fuller Company; 30-90.
   c. ITW TACC, Division of Illinois Tool Works; CB-50.
   d. Marathon Industries, Inc.; 590.
   e. Mon-Eco Industries, Inc.; 55-40.
   f. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.

2.4 Lagging Adhesives

A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-52.
   b. Foster Products Corporation, H. B. Fuller Company; 81-42.
   c. Marathon Industries, Inc.; 130.
   d. Mon-Eco Industries, Inc.; 11-30.
   e. Vimasco Corporation; 136.

2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
3. Service Temperature Range: Minus 50 to plus 180 deg F.

2.5 Sealants

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass, Phenolic, and Polyisocyanurate Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-76.
   b. Foster Products Corporation, H. B. Fuller Company; 30-45.
   c. Marathon Industries, Inc.; 405.
   d. Mon-Eco Industries, Inc.; 44-05.
   e. Pittsburgh Corning Corporation; Pittseal 444.
f. Vimasco Corporation; 750.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-76-8.
   b. Foster Products Corporation, H. B. Fuller Company; 95-44.
   c. Marathon Industries, Inc.; 405.
   d. Mon-Eco Industries, Inc.; 44-05.
   e. Vimasco Corporation; 750.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250 deg F.

5. Color: Aluminum.

C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.

3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250 deg F.


2.6 Factory-Applied Jackets

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96, Procedure A, and complying with NFPA 90A and NFPA 90B.

2.7 Field-Applied Jackets

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. Metal Jacket:
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; Metal Jacketing Systems.
   b. PABCO Metals Corporation; Surefit.
   c. RPR Products, Inc.; Insul-Mate.

   a. Sheet and roll stock ready for shop or field sizing.
   b. Finish and thickness are indicated in field-applied jacket schedules.
   d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
   e. Factory-Fabricated Fitting Covers:
      1) Same material, finish, and thickness as jacket.
      2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      3) Tee covers.
      4) Flange and union covers.
      5) End caps.
      6) Beveled collars.
      7) Valve covers.
      8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

D. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross laminated polyethylene film covered with white stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Polyguard; Alumaguard 60.

E. PVDC Jacket for Indoor Applications: 4-mil- thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E 96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E 84.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Dow Chemical Company (The), Saran 540 Vapor Retarder Film.

2.8 Tapes

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
b. Compac Corp.; 104 and 105.
c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
   b. Compac Corp.; 110 and 111.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
   d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches.
3. Thickness: 6.5 mils.
5. Elongation: 2 percent.
   a. Tensile Strength: 40 lbf/inch in width.
   b. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   b. Compac Corp.; 120.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
   d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.9 Securements

A. Bands:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products; Bands.
b. PABCO Metals Corporation; Bands.

c. RPR Products, Inc.; Bands.

2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing or closed seal.


B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   1) AGM Industries, Inc.; CWP-1.
   2) GEMCO; CD.
   3) Midwest Fasteners, Inc.; CD.
   4) Nelson Stud Welding; TPA, TPC, and TPS.

2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   1) AGM Industries, Inc.; CWP-1.
   2) GEMCO; Cupped Head Weld Pin.
   3) Midwest Fasteners, Inc.; Cupped Head.
   4) Nelson Stud Welding; CHP.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
   2) GEMCO; Perforated Base.
   3) Midwest Fasteners, Inc.; Spindle.

   b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
   d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) AGM Industries, Inc.; RC-150.
2) GEMCO; R-150.
3) Midwest Fasteners, Inc.; WA-150.
4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Wire: 0.080-inch nickel-copper alloy or 0.062-inch soft-annealed, stainless steel.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   b. Childers Products.
   c. PABCO Metals Corporation.
   d. RPR Products, Inc.

2.10 Corner Angles

A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.

Part 3 Execution

3.1 Examination

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

   1. Verify that systems and equipment to be insulated have been tested and are free of defects.
   2. Verify that surfaces to be insulated are clean and dry.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 General Application Requirements

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs...

E. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

F. Keep insulation materials dry during application and finishing.

G. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

H. Apply insulation with the least number of joints practical.

I. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

1. Apply insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor retarders are indicated, extend insulation on anchor legs at least 12 inches from point of attachment to pipe and taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
3. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

J. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

K. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

L. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches o.c.
3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches. Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.

   a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.

4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

M. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
N. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

1. Firestopping and fire-resistive joint sealers are specified in Division 7 Section "Firestopping."

3.4 Finishes

A. Glass-Cloth Jacketed Insulation: Paint insulation finished with glass-cloth jacket as specified in Division 9 Section "Painting."

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of the insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Design Build Entity. Vary first and second coats to allow visual review of the completed Work.

3.5 Insulation Application Schedule, General

A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.

3.6 Interior Insulation Application Schedule

A. Indoor Duct and Plenum Application Schedule:

   b. Thickness: As required to achieve the minimum code required thermal (R) value.
   c. Number of Layers: One.
   d. Vapor Retarder Required: No.

   b. Thickness: As required to achieve the minimum code required thermal (R) value.
   c. Number of Layers: One.
   d. Vapor Retarder Required: No.

3. Service: Rectangular, supply-air ducts, concealed.
   b. Thickness: As required to achieve the minimum code required thermal (R) value.
   c. Number of Layers: One.
   d. Vapor Retarder Required: No.
   e. Service: Material: Flexible Elastomeric.
   f. Thickness: As required to achieve the minimum code required thermal (R) value.
   g. Number of Layers: One.
   h. Vapor Retarder Required: No.

   b. Thickness: As required to achieve the minimum code required thermal (R) value.
c. Number of Layers: One.
d. Vapor Retarder Required: No.

5. Service: Rectangular, supply air ducts, exposed.
   a. Material: acoustical lagging, fiber glass decouple.
   b. Thickness: 1”.
   c. Number of Layers: One.
   d. Vapor Retarder Required: No.

3.7 Equipment Applications

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Materials and thicknesses for systems listed below are specified in schedules at the end of this Section.

End of Section 23 07 00
23 31 13 - HVAC Ductwork – Metal Ducts

Part 1 - General

1.1 Summary

A. This Section includes metal ducts for supply, return, systems in pressure classes from minus 2-inches wg to plus 10-inches wg. Metal ducts include the following:

1. Rectangular, ducts and fittings.
2. Single-wall, round, and formed fittings.

B. Related Sections include the following:

1. Division 23 Section "Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 Definitions

A. FRP: Fiberglass-reinforced plastic.

1.3 System Description

A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components.

1.4 Submittals

A. Shop Drawings: BIM-generated and drawn to 1/4 inch equals 1 foot scale. Show fabrication and installation details for metal ducts. Provide complete shop drawings in PDF format for review.

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Duct layout indicating sizes and pressure classes.
3. Elevations of top and bottom of ducts.
4. Dimensions of main duct runs from building grid lines.
5. Fittings.
6. Reinforcement and spacing.
7. Seam and joint construction and sealing.
8. Penetrations through fire-rated and other partitions.
9. Equipment installation based on equipment being used on Project.
10. Duct accessories, including access doors and panels.
11. Hangers and supports, including methods for duct and building attachment, vibration isolation, and seismic restraints.

B. Coordination Drawings: Coordinate with all trades to develop overhead MEP coordination drawings to complete a coordination effort whose end result will be a scaled set of MEP coordination drawings for construction, the completed drawings shall include the following:

1. Ceiling suspension assembly members.
2. Other systems installed in same space as ducts.
3. Ceiling- and wall-mounting access doors and panels required to provide access to dampers and other operating devices.
4. Ceiling-mounting items, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Elevations from bottom of duct to finished floor.
6. Duct size.
7. Elevations of all intersection MEP.

C. Welding certificates. Provide welding certificates for all on site and off site personal welding on this project.

D. Field quality-control test reports, including pressure/leak test.

1.5 Quality Assurance

A. NFPA Compliance:
   1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
   2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."


Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 Sheet Metal Materials

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.

D. Stainless Steel: ASTM A 480/A 480M, Type 304.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.
2.3 Sealant Materials

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.


C. Tape Sealing System: Woven-fiber tape impregnated with gypsum mineral compound and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.

D. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with NFPA requirements for Class 1 ducts.

E. Solvent-Based Joint and Seam Sealant: One-part, non-sag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.

F. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

G. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.4 Hangers And Supports

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.

2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

B. Hanger Materials: Galvanized sheet steel or threaded steel rod.

1. Hangers Installed in Corrosive Atmospheres: Electro galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.

3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

2.5 Rectangular Duct Fabrication

A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.

1. Manufacturers:
   a. Ductmate Industries, Inc.
   b. Nexus Inc.
   c. Ward Industries, Inc.

C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.

1. Manufacturers:
   a. Ductmate Industries, Inc.
   b. Lockformer.

2. Duct Size: Maximum 30 inches wide and up to 2-inch wg pressure class.

3. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.

D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.

E. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

1. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

2.6 Round And Flat-Oval Duct And Fitting Fabrication

A. Diameter as applied to flat-oval ducts in this Article is the diameter of a round duct with a circumference equal to the perimeter of a given size of flat-oval duct.

B. Round, Spiral Lock-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

C. Flat-Oval, Spiral Lock-Seam Ducts: Fabricate supply ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible. Fabricate ducts larger than 72 inches in diameter with butt-welded longitudinal seams.

D. Duct Joints:

1. Ducts up to 20 Inches in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.

2. Ducts 21 to 72 Inches in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.

3. Ducts Larger Than 72 Inches in Diameter: Companion angle flanged joints per SMACNA "HVAC Duct Construction Standards--Metal and Flexible," Figure 3-2.

4. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.
a. Manufacturers:

1) Ductmate Industries, Inc.
2) Lindab Inc.

5. Flat-Oval Ducts: Prefabricated connection system consisting of two flanges and one synthetic rubber gasket.

a. Manufacturers:

1) Ductmate Industries, Inc.
3) SEMCO Incorporated.

E. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.

F. Diverging-Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.

G. Fabricate elbows using die-formed, pleated, or mitered construction. Bend radius of die-formed, and pleated elbows shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:

1. Mitered-Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
2. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from minus 2- to plus 2-inch wg:

   a. Ducts 3 to 36 Inches in Diameter: 0.034 inch.
   b. Ducts 37 to 50 Inches in Diameter: 0.040 inch.
   c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
   d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.

3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2- to 10-inch wg:

   a. Ducts 3 to 26 Inches in Diameter: 0.034 inch.
   b. Ducts 27 to 50 Inches in Diameter: 0.040 inch.
   c. Ducts 52 to 60 Inches in Diameter: 0.052 inch.
   d. Ducts 62 to 84 Inches in Diameter: 0.064 inch.

4. Flat-Oval Mitered Elbows: Welded construction with same metal thickness as longitudinal-seam flat-oval duct.
5. 90-Degree, 2-Piece, Mitered Elbows: Use only for supply systems or for material-handling Class A or B exhaust systems and only where space restrictions do not permit using radius elbows. Fabricate with single-thickness turning vanes.
6. Round Elbows 8 Inches and Less in Diameter: Fabricate die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
7. Round Elbows 9 through 14 Inches in Diameter: Fabricate gored or pleated elbows for 30, 45, 60, and 90 degrees unless space restrictions require mitered elbows. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
8. Round Elbows Larger Than 14 Inches in Diameter and All Flat-Oval Elbows: Fabricate gored elbows unless space restrictions require mitered elbows.
9. Die-Formed Elbows for Sizes through 8 Inches in Diameter and All Pressures 0.040 inch thick with 2-piece welded construction.
10. Flat-Oval Elbow Metal Thickness: Same as longitudinal-seam flat-oval duct specified above.
11. Pleated Elbows for Sizes through 14 Inches in Diameter and Pressures through 10-Inch wg: 0.022 inch.

Part 3 - Execution

3.1 Duct Applications

A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:

1. Main Supply Ducts: 4-inch wg, medium pressure.
2. Supply Ducts (before Air Terminal Units): 4-inch wg, medium pressure.
3. Supply Ducts (after Air Terminal Units): 2-inch wg, low pressure.
4. Return Ducts (Negative Pressure): 2-inch wg, low pressure.

3.2 Duct Installation

A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," unless otherwise indicated.

B. Install round and flat-oval ducts in lengths not less than 12 feet unless interrupted by fittings.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, size, and shape and for connections.

E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches, with a minimum of 3 screws in each coupling.

F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 15 Section "Duct Accessories." Firestopping materials and installation methods are specified in Division 7 Section "Through-Penetration Firestop Systems."

O. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

P. Paint interiors of metal ducts, for 24 inches upstream of registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.

Q. Prime and paint interiors and exteriors of exhaust and outside ducts and risers including all joints to prevent corrosion. Refer to Division 9 specification for paint materials and application requirements.

3.3 Seam And Joint Sealing

A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.

1. For pressure classes lower than 2-inch wg, seal transverse joints.

B. Seal ducts before external insulation is applied.

3.4 Hanging And Supporting

A. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

B. Support vertical ducts at maximum intervals of 16 feet and at each floor.

C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

D. Install concrete inserts before placing concrete.

E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

3.5 Connections

A. Make connections to equipment with flexible connectors according to Division 15 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.
3.6 Field Quality Control

A. Perform the following field tests according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:

1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
2. Conduct tests at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round and flat-oval ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch wg (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2- to 10-inch wg.
4. Remake leaking joints and retest until leakage is equal to or less than maximum allowable.
5. Duct system used as part of smoke control system shall comply with the requirements of 2010 CBC Section 909.10.2.

3.7 Cleaning New Systems

A. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.

B. Use service openings, as required, for physical and mechanical entry and for inspection.

1. Create other openings to comply with duct standards.
2. Disconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling sections to gain access during the cleaning process.

C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.

D. Clean the following metal duct systems by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, or duct accessories.
4. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
F. Cleanliness Verification:

1. Visually inspect metal ducts for contaminants.
2. Where contaminants are discovered, at the discretion of the District, re-clean and re-inspect ducts as directed by the District.

End of Section 23 31 13
23 33 00 - Air Duct Accessories

Part 1 - General

1.1 Summary

A. This Section includes the following:
   1. Backdraft dampers.
   2. Volume dampers.
   3. Volume damper remote control cable assemblies.
   4. Combination fire and smoke dampers.
   5. Turning vanes.
   6. Duct-mounting access doors.
   7. Flexible connectors.
   8. Flexible ducts.
   9. Duct accessory hardware.
  10. Duct silencers.
  11. Control actuators.

B. Related Sections include the following:
   1. Division 13 Section "Fire Alarm" for duct-mounting fire and smoke detectors.
   2. Division 23 Section "HVAC Instrumentation and Controls" for electric and pneumatic damper actuators.

1.2 Submittals

B. Product Data: For the following:
   1. Backdraft dampers.
   2. Volume dampers.
   3. Combination fire and smoke dampers.
   4. Turning vanes.
   5. Duct-mounting access doors.
   6. Flexible connectors.
7. Flexible ducts.

8. Duct Accessory hardware.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Special fittings.


3. Motorized-control damper installations.

4. Fire-damper, smoke-damper, and combination fire- and smoke-damper installations, including sleeves and duct-mounting access doors.


D. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinating penetrations and ceiling-mounting items. Show ceiling-mounting access panels and access doors required for access to duct accessories.

1.3 Quality Assurance


Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2.2 **Sheet Metal Materials**

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Stainless Steel: ASTM A 480/A 480M.

D. Aluminum Sheets: ASTM B 209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.


F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 **Backdraft Dampers**

A. Manufacturers:

1. Air Balance, Inc.
2. Greenheck.
3. Penn Ventilation Company, Inc.
4. Ruskin Company.
B. **Description:** Multiple-blade, parallel action gravity balanced, with center-pivoted blades of maximum 6-inch width, with sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.

C. **Frame:** 0.052-inch thick, galvanized sheet steel, with welded corners and mounting flange.

D. **Blades:** 0.025-inch thick, roll-formed aluminum.

E. **Blade Seals:** Vinyl or Neoprene.

F. **Blade Axles:** Galvanized steel.

G. **Tie Bars and Brackets:** Galvanized steel.

H. **Return Spring:** Adjustable tension.

### 2.4 Volume Dampers

**A. Manufacturers:**

1. Air Balance, Inc.
2. Greenheck
3. Penn Ventilation Company, Inc.
4. Ruskin Company.

**B. General Description:** Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

1. **Pressure Classes of 3-Inch wg or Higher:** End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.

**C. Standard Volume Dampers:** Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.

1. **Steel Frames:** Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
2. **Roll-Formed Steel Blades:** 0.064-inch thick, galvanized sheet steel.
3. **Aluminum Frames:** Hat-shaped, 0.10-inch thick, aluminum sheet channels; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
4. **Roll-Formed Aluminum Blades:** 0.10-inch thick aluminum sheet.
5. **Extruded-Aluminum Blades:** 0.050-inch thick extruded aluminum.
6. **Blade Axles:** Galvanized steel.
7. **Bearings:** Oil-impregnated bronze.
8. Tie Bars and Brackets: Galvanized steel.

D. Low-Leakage Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.

1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 0.064-inch-thick, galvanized sheet steel.
4. Bearings: Oil-impregnated bronze thrust or ball.
5. Blade Seals: Vinyl or Neoprene.
7. Tie Bars and Brackets: Galvanized steel.

E. Jackshaft: 1-inch-diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.

1. Length and Number of Mountings: Appropriate to connect linkage of each damper in multiple-damper assembly.

F. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.5 Volume Damper Control Cable Assemblies

A. Manufacturer:

1. Young Regulator Company.

B. Concealed Ceiling Regulator:

1. Damper controller and cable shall be concealed above the ceiling. Cable to consist of Bowden cable .054" stainless steel control wire encapsulated in 1-16" flexible galvanized spiral wire sheath. Control kit shall consist of 2-5/8" diameter die cast aluminum housing with 3" diameter zinc plated (polished chrome is optional) cover and 14 gauge steel rack and pinion gear drive converting rotary motion to push-pull motion. Control shaft shall be D-style flatted and 1/4" diameter with 265-degree rotation providing graduations for positive locking and control, and 1-1/2" linear travel capability. Control kit is designed to be imbedded in the ceiling flush with the finished surface. Control kit shall be manually operated using Young Regulator Model 030-12 wrench. Control kit shall be Young Regulator Model 270-301.
2.6 Combination Fire and Smoke Dampers

A. Manufacturers:

1. Air Balance, Inc.
2. Greenheck.
3. Penn Ventilation Company, Inc.
4. Ruskin Company.

B. Model: FSD-300 series combination fire smoke dampers.

C. Ratings:

1. Fire Resistance: Dampers shall have a UL 555 fire resistance rating of 1-1/2 hours.
2. Fire Closure Temperature: Each combination fire smoke damper shall be equipped with a factory installed heat responsive device rated to close the damper when the temperature at the damper reaches 165°.
3. Elevated Operational Temperature: Dampers shall have a UL 555S elevated temperature rating of 350°F.
4. Leakage: Dampers shall have a UL 555S leakage rating of Leakage Class II.
5. Velocity: Dampers shall have a minimum UL 555S velocity rating of 3000 fpm.

D. Construction:

1. Frame: Damper frame shall be 16 ga. galvanized steel formed into a 5” x 1” structural hat channel. Top and bottom frame members on dampers less than 17” high shall be low profile design to maximize the free area of these smaller dampers. Frame shall be 4-piece construction with 1-1/2” (minimum) integral overlapping gusset reinforcements in each corner to assure square corners and provide maximum resistance to racking.
   a. Blades: Damper blades shall be 16 ga. galvanized steel with full length structural reinforcement and a double skin airfoil shape. Each blade shall be symmetrical relative to its axle pivot point, presenting identical performance characteristics with air flowing in either direction through the damper. Provide symmetrical blades of varying size as required to completely fill the damper opening.
   b. Blade Stops: Each blade stop (at top and bottom of damper frame) shall occupy no more than 1/2” of the damper opening area to allow for maximum free area and to minimize pressure loss across the damper.
2. Blade Edge: Blade seals shall be extruded silicone rubber permanently bonded to the appropriate blade edges.
   b. Linkage: Concealed in jamb.
   c. Retaining Angles: Damper shall be supplied with factory retaining angles sized to provide installation overlap in accordance with the manufacturer’s UL listing.
   d. Axles: Minimum ½ inch dia. plated steel.
   e. Bearings: Axle bearings shall be sintered bronze sleeve type rotating in polished extruded holes in the damper frame.
   f. Sleeve: Damper shall be supplied as a single assembly with a factory sleeve.

E. Actuators:

a. Type: Electric, 120V AC, 2-position
b. Mounting: External

F. Damper shall be furnished with temperature limited override equivalent to Greenheck TOR.

2.7 Turning Vanes

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.

B. Manufactured Turning Vanes: Fabricate 1-1/2-inch wide, double-vane, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.

1. Manufacturers:
   a. Ductmate Industries, Inc.
   b. Duro Dyne Corp.
   c. Ward Industries, Inc.

C. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.8 Flexible Connectors

A. Manufacturers:

   1. Ductmate Industries, Inc.
   2. Duro Dyne Corp.
   3. Ventfabrics, Inc.

B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch wide, 0.028-inch thick, galvanized sheet steel or 0.032-inch thick aluminum sheets. Select metal compatible with ducts.


   1. Minimum Weight: 26 oz./sq. yd.
   2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
   3. Service Temperature: Minus 40 to plus 200 deg F.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

   1. Minimum Weight: 24 oz./sq. yd.
   2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
   3. Service Temperature: Minus 50 to plus 250 deg F.
2.9 **Flexible Ducts**

A. Manufacturers:
   1. Casco Silentflex II.
   2. Thermaflex

B. Insulated Flexible Duct: UL 181, Class I with:
   1. Non-woven nylon liner.
   2. Steel spring wire helix.
   3. Polyethylene vapor barrier jacket.
   4. Adjustable metal male/female collars.
   5. Pressure rating 1-1/2 in. positive to 1/2 in. negative.
   6. Maximum Air Velocity: 4,000 fpm (continuous).
   7. Temperature Range: 20 deg. F to 200 deg. F.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 through 18 inches to suit duct size.

2.10 **Duct Accessory Hardware**

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.11 **Duct Silencers**

A. Manufacturers:
   1. Industrial Acoustics Company (IAC)
   2. Commercial Acoustics.

B. General Description: Factory-fabricated and -tested, round or rectangular silencers with performance characteristics and physical requirements as indicated.

C. Fire Performance: Adhesives, sealants, packing materials, and accessory materials shall have fire ratings not exceeding 25 for flame-spread index and 50 for smoke-developed index when tested according to ASTM E 84.

D. Rectangular Units: Fabricate casings with a minimum of 0.034-inch thick, solid galvanized sheet metal for outer casing and 0.022-inch thick, ASTM A 653/A 653M, G60, perforated galvanized sheet metal for inner casing.

E. Round Units:
   1. Outer Casings:
      b. Up to 24 Inches in Diameter: 0.034 inch thick.
2. Interior Casing, Partitions, and Baffles:
   b. At least 0.034 inch thick and designed for minimum aerodynamic losses.

F. Sheet Metal Perforations: 1/8-inch diameter for inner casing and baffle sheet metal.

G. Fill Material: Inert and vermin-proof fibrous material, packed under not less than 5 percent compression.
   1. Erosion Barrier: Polymer bag enclosing fill and heat-sealed before assembly.

H. Fabricate silencers to form rigid units that will not pulsate, vibrate, rattle, or otherwise react to system pressure variations.
   1. Do not use nuts, bolts, or sheet metal screws for unit assemblies.
   2. Lock form and seal or continuously weld joints.
   3. Suspended Units: Factory-installed suspension hooks or lugs attached to frame in quantities and spaced to prevent deflection or distortion.
   4. Reinforcement: Cross or trapeze angles for rigid suspension.

I. Source Quality Control:
   1. Acoustic Performance: Test according to ASTM E 477.
   2. Record acoustic ratings, including dynamic insertion loss and self-noise power levels with an airflow of at least 2000-fpm face velocity.
   3. Leak Test: Test units for airtightness at 200 percent of associated fan static pressure or 6-inch wg static pressure, whichever is greater.

2.12 Control Actuators

A. All motor driven actuators shall use Belimo actuators. Belimo actuators with Position indicators may be used to satisfy the position indicator requirement as described in 2.17.

2.13 Position Indicators

A. All dampers shall be equipped with position indicators wired back to the Computrols BMS for damper open/closed position indication. Normal position shall provide a contact closure.

Part 3 - Execution

3.1 Application and Installation

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
C. Install backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

D. Install volume dampers in ducts with liner; avoid damage to and erosion of duct liner.

E. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.

F. Where volume damper adjustment is not readily accessible through finished ceilings, provide volume damper remote control cable adjustment. Location of concealed ceiling regulators to be approved by Owner.

G. Provide test holes at fan inlets and outlets and elsewhere as indicated.

H. Install fire and smoke dampers, according to manufacturer's UL-approved written instructions.

I. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:
   1. On both sides of duct coils.
   2. Downstream from volume dampers and equipment.
   3. Adjacent to fire or smoke dampers, providing access to reset or reinstall fusible links.
   4. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot spacing.
   5. On sides of ducts where adequate clearance is available.

J. Install the following sizes for duct-mounting, rectangular access doors:
   1. One-Hand or Inspection Access: 8 by 5 inches.
   2. Two-Hand Access: 12 by 6 inches.

K. Install the following sizes for duct-mounting, round access doors:
   1. One-Hand or Inspection Access: 8 inches in diameter.
   3. Head and Hand Access: 12 inches in diameter.

L. Install the following sizes for duct-mounting, pressure relief access doors:
   1. One-Hand or Inspection Access: 5 inches in diameter.

M. Label access doors according to Division 23 Section "Mechanical Identification."

N. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
O. For fans developing static pressures of 5-inch wg and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

P. Connect diffusers or light troffer boots to low pressure ducts directly or with minimum 60-inch lengths of flexible duct clamped or strapped in place.

Q. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.

R. Install duct test holes where indicated and required for testing and balancing purposes.

S. Primed and painted sheet metal cover shall be provided over flexible connectors located on roof.

T. Coordinate with BMS contractor the wiring, programming, installation, and commissioning of the position indicators.

3.2 Adjusting

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

D. Coordinate with BMS contractor the final testing an adjustment of the position indicators.

End of Section 23 33 00
23 36 00 – Air Terminal Units

Part 1 - General

1.1 Summary

A. This Section includes the following:

1. Shutoff single-duct air terminal units (VAV boxes).

1.2 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties, sound-power ratings, and accessories.

B. Controls: Provide shop drawings for the following factory installed components: factory supplied and mounted 24v controls transformer, disconnect, actuator, DDC/actuator and enclosure, hot water heating coil, air flow sensor, damper access panel, handing right or left.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.

1. Include a schedule showing unique model designation, room location, model number, size, and accessories furnished.
2. Wiring Diagrams: Power, signal, and control wiring.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension assembly members.
2. Method of attaching hangers to building structure.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

E. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1, include the following:

1. Instructions for resetting minimum and maximum air volumes.
2. Instructions for adjusting software set points.

1.3 Quality Assurance

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of air terminal units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. NFPA Compliance: Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."
1.4 Coordination

A. Included as a part of this work is the Coordinate layout and installation of air terminal units and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Provide maintenance clearances to disconnect, DDC control and Hot Water Coil piping and valves. Select right or left configured to units to allow for maintenance and access to damper access.

Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 Shutoff Single-Duct Air Terminal Units

A. Basis of Design Product: The design for each product is based on manufacturer named on the drawings. Subject to compliance with requirements, provide either named product or a comparable equivalent product by one of the other manufacturers specified.

B. Manufacturers:

1. Titus

C. Configuration: Volume-damper assembly inside unit casing with control components located inside a protective metal shroud.

D. Casing: 22 gauge galvanizes steel.

1. Casing Lining: 1/2-inch-thick, coated, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive.

2. Casing Lining: Adhesive attached, 3/4-inch-thick, polyurethane foam insulation complying with UL 181 erosion requirements, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

3. Air Inlet: Round stub connection or S-slip and drive connections for duct attachment.


5. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket.

E. Regulator Assembly: Extruded-aluminum or galvanized-steel components; key damper blades onto shaft with nylon-fitted pivot points located inside unit casing.

1. Automatic Flow-Control Assembly: Combined spring rates shall be matched for each volume-regulator size with machined dashpot for stable operation.
2. Factory-calibrated and field-adjustable assembly with shaft extension for connection to externally mounted control actuator.

F. Regulator Assembly: System-air-powered bellows section incorporating polypropylene bellows for volume regulation and thermostatic control. Bellows shall operate at temperatures from 0 to 140 deg F; shall be impervious to moisture and fungus; shall be suitable for 10-inch wg static pressure; and shall be factory tested for leaks.

G. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings.
   1. Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 6-inch wg inlet static pressure.

H. Attenuator Section: 22 gauge sheet metal.

I. Hot-Water Heating Coil: Copper tube, mechanically expanded into aluminum-plate fins; leak tested underwater to 200 psig; and factory installed.

J. DDC Controls: Single-package Computrols unitary controller and Bleimo actuator, see spec section 25 55 00 for detailed BMS requirements.

2.3 Source Quality Control

A. Identification: Label each air terminal unit with plan number, nominal airflow, maximum and minimum factory-set airflows, coil type, and ARI certification seal.

B. Verification of Performance: Rate air terminal units according to ARI 880.

Part 3 - Execution

3.1 Installation

A. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

3.2 Connections

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to air terminal units to allow service and maintenance and coordinate the need for a right or left hand box and control panel and valve access.

C. Hot-Water Piping: In addition to requirements in Division 23 Section "Hydronic Piping," connect heating coils to supply with shutoff valve, strainer, control valve, and union or flange; and to return with balancing valve and union or flange.

D. Connect ducts to air terminal units according to Division 23 Section "Metal Ducts."

E. Ground units with electric heating coils according to Division 26 Section "Grounding and Bonding."
F. Connect wiring according to Division 26 Section "Conductors and Cables" and BMS requirements; take special note of all grounding requirements for controls wiring.

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 Field Quality Control

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing and balancing. All results are to be reported in writing.

B. Perform the following field tests and reviews and prepare test reports:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.

2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.

3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

4. Test and adjust controls in coordination with the Computrols BMS contractor and confirm that all testing methods and results satisfy the project specifications requirements. Replace damaged and malfunctioning controls and/or equipment with new.

C. Remove and replace with new malfunctioning units, and retest as specified above.

3.4 Startup Service

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions and do the following:

   a. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.

   b. Verify that controls and control enclosure are accessible.

   c. Verify that control connections are complete.

   d. Verify that nameplate and identification tag are visible.

   e. Verify in coordination with the BMS controls contractor, that controls respond to inputs as specified.

3.5 Demonstration

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air terminal units. Refer to Division 1.

End of Section 23 36 00
23 37 13 - Diffusers, Registers, and Grilles

Part 1 - General

1.1 Summary

A. This Section includes ceiling, registers, and grilles.

1. Related Sections include the following:

   a. Division 10 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
   b. Division 23 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.2 Submittals

A. Product Data: For each product indicated, include the following:

   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
   2. Diffuser, Register, and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

   1. Ceiling suspension assembly members.
   2. Method of attaching hangers to building structure.
   3. Size and location of initial access modules for acoustical tile.
   4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
   5. Duct access panels.

C. Samples for Initial Selection: For each diffusers, registers, and grilles with factory-applied color finishes to match specified.

D. Samples for Verification: For each diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.

Part 2 - Products

2.1 Manufacturers

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

   1. Products: Subject to compliance with requirements, provide one of the products specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
2.2 Grilles And Registers

A. Product:

1. Adjustable Ceiling Supply Grill: Titus model 300/350
2. Ceiling Round diffuser: Titus model TMR

B. Manufacturers:

1. Anemostat; a Mestek Company.
2. Price Industries.
3. Titus.

C. Steel supply grilles shall be of the sizes and mounting types required for installation. The deflection blades shall be available parallel to the long or short dimension of the grille. Construction shall be of steel with a 1-1/4 inch wide border on all sides. Screw holes shall be countersunk for a neat appearance. Corner shall be welded with full penetration resistance welds.

D. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be spaced on 3/4-inch centers. Blades shall have steel friction pivots on both ends to allow individual blade adjustment without loosening or rattling. Plastic blade pivots are not acceptable.

E. Optional opposed-blade volume damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the grille. The grille finish shall be #26 white. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.

F. The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

G. Perforated Return Grill:

2. Manufacturers:
   a. Anemostat; a Mestek Company.
   b. Price Industries.
   c. Titus.
3. Diffusers shall have a perforated face with 3/16-inch diameter holes on 1/4-inch staggered centers and no less than 51 percent free area. Perforated face shall be steel or aluminum according to the model selected. The back pan shall be heavy gauge steel of the sizes and mounting types required. The diffuser neck shall have at least 1 inch depth for easy duct connection.
4. Provide 24” x 24” modular face size at accessible ceiling areas. Use 16” x 16” modular face size for hard ceiling application. Provide suitable mounting/border to ceiling system. Provide face accessible opposed blade damper for all diffusers located in hard ceiling.
5. Individually adjustable curved deflectors shall be mounted in the neck of the diffuser and must allow the discharged air to enter the room in either vertical or one-, two-, three-, four-way horizontal jets. The perforated face must be easily unlatchable from the back pan to facilitate opening of the face for pattern controller adjustment or to access an optional damper.
6. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H.
7. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering, or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.
8. Optional damper shall be constructed of heavy gauge steel. Damper must be operable from the face of the diffuser by unlatching the diffuser face. The diffuser must be designed such that complete removal of the face is not required during damper adjustment. Optional volume damper shall be provided at hard ceiling application.

2.3 Source Quality Control

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

Part 3 - Execution

3.1 Examination

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Install diffusers, registers, and grilles level and plumb.
B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of panel.
C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 Adjusting

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

End of Section 23 37 13
26 05 01- General Electrical Requirements

Part 1 – General

1.1 Summary

A. This Section includes the general requirements for Division 26 - Electrical.

1. Division 1 and the General Conditions apply to all work of this section.
2. Division 26 supplements the applicable requirements of other Divisions.

B. The Work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the drawings and/or specified herein.

1. Examine all divisions for related work required to be included as work under this division.

C. Owner-furnished items: Pick up Owner-furnished items and handle, deliver, install, and make all final connections.

1. Assume responsibility for the items when consigned at the storage facility in accord with requirements of the Contract Documents.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. CEC California Electrical Code (NFPA 70)
5. NEMA National Electrical Manufacturers Association
6. NFPA National Fire Protection Association
7. UL Underwriters Laboratories, Inc.

1.3 Quality Assurance

A. Regulation: All the electrical equipment and materials, including their installation, shall conform to the following latest applicable codes and standards:

2. California State Fire Marshal.
3. Occupational Safety and Health Act (OSHA).
4. Requirements of Serving Utility Companies.
5. Local Codes and Ordinances.
6. Requirements of the California Division of the State (DSA).
7. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.
9. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply.
B. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.

1.4 Submittals

A. Submit all of the items described in Paragraphs 1, 2, and 3 (below) as a single submittal. Partial submittals will not be accepted. Contractor shall review submittals for conformance with Contract Documents, and make necessary revisions. Contractor shall also verify dimensions of equipment and be satisfied as to fit and that they comply with all code requirements relating to adequacy and clear working space. Submit the following in accordance with Division 1, with the additional electrical systems-related document requirements and additional number of copy sets as specified below:

1. Detailed shop drawings and associated product data/material lists (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:
   a. Lighting control equipment
   b. Structured cabling system

2. Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following:
   a. Component Anchorage Requirements:
      1) All mechanical, plumbing, and electrical components shall be anchored and installed per the details on the DSA approved construction documents. Where no detail is indicated, the following components shall be anchored or braced to meet the force and displacement requirements prescribed in the 2010 CBC. Sections 1615A.1.12 through 1615A.1.22 and ASCE 7-05 Chapter 6 and 13:
         a) All permanent equipment and components.
         b) Temporary or movable equipment that is permanently attached (e.g. hard wired) to the building utility services such as electricity, gas or water.
         c) Movable equipment which is stationed in one place for more than 8 hours and heavier than 400 pounds are required to be anchored with temporary attachments.
      2) The attachments of the following mechanical and electrical components shall be positively attached to the structure but need not be detailed on the plans. These components shall have flexible connections provided between the component and associated ductwork, piping and conduit:
         a) Components weighing less than 400 pounds and have a center of mass located 4 feet or less above the adjacent floor or roof level that directly support the component.
         b) Components weighing less than 20 pounds, or in the case of distributed systems, less than 5 pounds per foot which are suspended from a roof or floor or hung from a wall.
      3) For those elements that do not require details on the approved drawings, the installation shall be subject to the approval of the Structural Engineer of Record and the DSA District Structural Engineer. The project inspector will verify that all components and equipment have been anchored in accordance with above requirements.
         a) Piping, Ductwork, and Electrical Distribution System Bracing requirements:
1) Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-05 Section 13.3 as defined in ASCE 7-05 Section 13.6.8, 13.6.7, 13.6.5.6, and 2010 CBC, Section 1615A.1.20, 1615A.1.21 and 1615A.1.22.

2) The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the OSHPD Pre-Approvals (OPA #) as modified to satisfy anchorage requirements of ACI 318, Appendix D.

3) Copies of the manual shall be available on the jobsite prior to the start of hanging and bracing of the pipe, ductwork, and electrical distribution systems.

4) The Structural Engineer of Record shall verify the adequacy of the structure to support the hanger and brace loads.

3. Product data/material lists (also see applicable technical specification sections following for additional requirements), at least six submittal document sets, for:

   a. Raceways
   b. Building wire and cable
   c. Cabinets, boxes and fittings
   d. Wiring devices
   e. Nameplates and identification markers/labels
   f. Enclosed circuit breakers
   g. Overcurrent protective devices
   h. Enclosed switches
   i. Lighting fixtures and associated equipment
   j. Lighting system control equipment and devices

4. Substitutions

   Catalog numbers and specific brands or trade names followed by designation "or equal" are used in conjunction with material and equipment required by the Specifications to establish the standards of quality, utility, and appearance required. Substitutions which are equal in quality, safety, and appearance to those specified may be accepted, subject to the following provisions:

   a. All substitutions must be submitted in writing to the Owner. Contractor shall submit to the Owner a typewritten list containing a description of each proposed substitute material or equipment.

   b. The Owner will accept, in writing, proposed substitutions that are, in the Owner's opinion, equal in quality, utility and appearance to the material or equipment specified. Such acceptance shall not relieve Contractor from complying with the requirements of the Drawings and the Specifications.

   c. Contractor shall be responsible for all costs of any changes resulting from Contractor's proposed substitutions which affect other parts of the Work or the work of separate Contractors.

      1) Contractor also agrees to compensate the Owner for time and expenses spent reviewing substitutions.

   d. The decision of the Owner shall be final.

5. Submit test results (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:
a. Structured cabling system  
b. Lighting control system

6. Submit operating, maintenance and instructional data (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:
   a. Lighting control system

7. Instruction Materials (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:
   a. Provide prior to the time of the personnel instruction period, instruction manuals associated with all systems listed above.
   b. Include the following information, as a minimum, in each copy of the instruction manual:
      1) Manufacturers’ names and addresses.
      2) Serial numbers of items furnished.
      3) Catalog cuts, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and the intended use.
      4) Recommended maintenance procedures.

B. Project record documents:

1. Mark Record Documents daily to indicate all changes made in the field.
   a. In addition to general requirements of Record Documents, indicate on Project Record Drawings all changes of equipment locations and ratings, fuse sizes, trip sizes and settings on magnetic-only circuit breakers.
   b. Alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one line diagrams, control diagrams and schedules.

2. Use green to indicate deletions and red to indicate additions.
   a. Use the same symbols and follow as much as possible the same drafting procedures used on the Contract Drawings.

3. Locate conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.

1.5 Operating and Maintenance Manuals

A. Prepare and submit Operating and Maintenance Manuals, six document sets. In addition to the requirements specified in Division 1 (also see technical specification sections following for additional requirements), include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers and replacement parts.
2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and, as required, summer and winter operating instructions.
3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
4. Servicing instructions and lubrication charts and schedules.
1.6 Quality Assurance

A. As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

B. Material and equipment substitution.
   1. Equipment other than that specified will be accepted only when written approval is given by the Owner, in accordance with Division 1.
   2. The Contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the Owner of equipment other than that specified does not relieve the Contractor of this responsibility.

1.7 Owner’s Instructions

A. Prior to completion of the contract, and at the Owner's convenience, instruct verbally and demonstrate to the Owner's personnel, the operation of the systems as listed in Part 1 above.

1.8 System Startup

A. Do not energize or place electrical equipment in service until all relevant parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the Owner, notify the Owner in writing when the equipment will be ready. Notify the Owner's Representative two weeks in advance of the date the various times of equipment will be complete.

Part 2 – Products Not Used

Part 3 – Execution

3.1 Examination

A. Site verification of conditions: Contractor shall survey the entire project site and become thoroughly familiar with actual existing conditions. The intent of the work is shown on the drawings and described hereinafter. By the act of participation in the pre-bid conference and site inspection tour specified in the applicable Division 1 section, the Contractor shall be deemed to have made such a study and examination and to accept all conditions present at the site. No request for additional payment shall be considered as valid, due to failure to allow for conditions which may exist.

B. Electrical work shown: Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Report immediately to the Owner any conflicts in the drawings and specifications with any code or between the electrical work and the work of other trades. No work shall be commenced where a conflict exists prior to receiving proper instructions. Any work or materials shown on the drawings and not mentioned in this division, or vice-versa, shall be executed the same as if specifically mentioned by both. Notify the Owner of any changes of location requirements prior to installation.

3.2 Seismic Bracing

A. Contractor shall be responsible for anchors and connections of electrical work to building structure to prevent damage as a result of earthquake, including manufactured equipment, the connection and integrity of shop-fabricated and field-fabricated materials and equipment. All building equipment and connections therefore shall be designed to resist seismic forces in conformance with Title 24 of the California Administrative Code.
Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following requirements:

1. Electrical equipment: For requirements, see Part 1 above.
2. Raceway: All raceway shall be supported and braced per SMACNA “Guidelines for Seismic Restraint Systems and Plumbing Piping Systems.” (See Table 23-P of Title 24 for limitations.)

3.3 Penetration Sealing

A. Seal penetrations through exterior walls and fire rated walls, floors, and ceilings. Sealing methods used shall be in compliance with the requirements of the Authority Having Jurisdiction to maintain required fire ratings, and shall be in accordance with the applicable sections in Division 7 which prescribe applicable firestopping and weatherproofing of wall, floor, ceiling, and roof penetrations. Seal all conduit penetrations through roofs.

3.4 Demolition, Alteration and Extension Work

A. Provide and perform demolition, alteration, extension, preparatory and miscellaneous work as indicated.
B. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures equipment, wiring, etc. include all demolition, alteration and extension work in bid.

3.5 Service Interruptions and Utility

A. Coordinate with the Owner any interruption of services necessary to accomplish the work.
B. Coordinate with the utility company all work associated with power and communications/signal distribution systems and service entrance equipment.

3.6 Field Quality Control

A. Site Tests:
   1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and such other tests and adjustments as may be required for the proper completion and operation of the electrical system.
   2. Include all testing indicated in other sections, specifically, but not limited to lighting control equipment and structured cabling system.

3.7 Cleaning

A. Clean exterior surfaces of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.
B. Clean-out cracks, corners and surfaces on equipment to be painted, remove grease and oil spots so that paint may be applied without further preparation.
C. Locate underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations, using building lines by indicating on the Project Record Drawings.
26 05 19- Low-Voltage Electrical Power Conductors and Cables

Part 1 – General

1.1 Summary

A. This Section includes wire and cable systems rated 600 volts and less:
   1. Building wire and cable.
   2. Wiring connectors and connection accessories.

B. Cabling requirements in this Section may be supplemented in other sections of these specifications.

C. Related Sections:
   1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

   1. ANSI American National Standards Institute
   3. Institute of Electrical and Electronics Engineers.
      IEEE Standard 82 Test Procedures for Impulse Voltage Tests on Insulated Conductors.
   4. CEC California Electrical Code (NFPA 70).
   5. NECA National Electrical Contractors Association: "Standard of Installation."
   6. National Electrical Manufacturers Association/Insulated Cable Engineers Association
      NEMA/ICEA WC-5 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
      NEMA/ICEA WC-7 Cross-Linked Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
      NEMA/ICEA WC-8 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   7. NFPA National Fire Protection Association
   8. Underwriters Laboratories, Inc.
      UL 4 Armored Cable
      UL 62 Flexible Cord and Fixture Wire.
      UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
      UL 486B Wire Connectors for Use with Aluminum Conductors
      UL 83 Thermoplastic-Insulated Wires and Cables.
      UL 854 Service Entrance Cables.

1.3 Submittals

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Samples: Provide samples upon specific request.
C. Product Data: Submit product data giving complete description for sizes employed, material types, and electrical ratings.

D. Certificates:
   1. Labels of Underwriters' Laboratories, Inc., fixed to each item of material.
   2. If materials are by manufacturers other than those specified submit certification that material meets applicable Underwriters' Laboratories, Inc. Standards.
   3. Submit in accordance with Section 260501.

1.4 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.5 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

C. Deliver wire and cable to the project in full unbroken cartons or reels marked with conductor size, insulation type, and Underwriters' Laboratories, Inc. label.

D. Handle wire and cable in a manner to prevent damage to conductor, insulation and identifying markings.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of wiring system prior to rough-in.

C. Wire and cable routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

Part 2 – Products

2.1 Manufacturers

Subject to compliance with requirements, provide products by the following, or equal:
A. Wire and cable:
   Triangle
   Anaconda
   General Cable Corporation

B. Connectors:
   AMP
   Buchanan
   Burndy
   3M Company
   O-Z/Gedney
   Thomas & Betts

C. Insulating Tapes: 3M Company

D. Wire Ties:
   Ideal
   Thomas and Betts ("Ty-Rap")
   Panduit

E. Pulling Compound: American Polywater Corp. ("Polywater J")

2.2 Materials

A. General: Provide wire suitable for the temperature, conditions, and location where installed, except as otherwise indicated.

1. Conductor: Copper only — No aluminum conductors shall be permitted. Provide solid conductor for No. 12 AWG and smaller. Provide stranded conductors for sizes No. 10 and larger.
   a. Use stranded conductors:
      1) At motors and other applications where subject to vibration.
      2) For control circuits.

2. Minimum Size Conductor: No. 12 AWG, except as otherwise indicated.
   a. Control circuits: No. 14 AWG.

3. Insulation voltage rating: 600 volts.

B. Building wire and cable:

1. Description: Single conductor insulated wire.

2. Insulation: ANSI/NFPA 70:
   a. Type XHHW/XHHW-2, rated 90 degrees C.

C. Connectors:
1. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

D. Pull Cord: 1/8" polypropylene or nylon.

Part 3 – Execution

3.1 Wiring Method

A. General:

1. Use insulation types suitable for the temperature, moisture and elements to which exposed.
   a. Minimum 90°C temperature rated insulation on conductors, except as otherwise indicated.

2. Equipment grounding conductors:
   a. Provide where required by the California Electrical Code, and where indicated. Where conductor size is not indicated, provide size as required by the California Electrical Code.
   b. Provide for:
      1) All branch circuit wiring.
      2) All feeders and motor branch circuits
      3) All nonmetallic conduits.
      4) All flexible metal conduits exceeding 72 inches in length.

3. Use flexible cords and cables for connection of special equipment as indicated. Length not to exceed 72 inches.

B. Wire and cable connections:

1. Connector types:
   a. No. 10 AWG wire and smaller: Spring-type connectors. All terminations shall be made on device terminals or on terminal blocks.
      1) Maximum number of conductors in a connection: 3.
   b. No. 8 AWG wire and larger: Compression- or pressure-type solderless connectors and terminal lugs. Wrap connection with electrical insulating tape, half-lapped to produce a dielectric value equal to or greater than wire insulation.

2. Provide connector sealing packs for splices that require complete protection from dampness and water where indicated.
3. Splices in feeders and mains may only be made where designated on the drawings and where prior approval is obtained from Owner.
4. Location of splices and terminations shall be limited to accessible locations such as outlet boxes, pull boxes, junction boxes, panelboard boxes, and splice boxes.
5. Insulate taps and splices equal to insulation of adjoining conductor.
6. Splice or tap permitted only on conductors that are a component part of a single circuit properly protected by approved methods.
3.2 Preparation

A. Examine the system in which the wire is to be installed for defects in equipment and installation which may cause damage to the wire.

B. Examine wires to be jointed, tapped, spliced, terminated, and their connecting devices for defects which may affect the mechanical and electrical integrity of the connection.

C. Check conduit systems for damage and loose connections, replace damaged sections. Make sure that the inside of conduit is free of dirt and moisture.
   1. Completely and thoroughly swab raceway before installing wire.
   2. Pull mandrel, one size smaller than the conduit, through entire length of all underground conduits prior to conductor installation.

D. Do not start work until defects have been corrected and until authorization to proceed has been obtained from Owner’s Representative.

3.3 Installation

A. Install wire, cable, and connectors in compliance with the CEC.

B. Install products in accordance with manufacturers instructions.

C. Install all wire in raceway.

D. When pulling conductors do not exceed manufacturer's recommended values.

E. Use polypropylene or nylon ropes for pulling conductors.

F. Do not bend wire less than the manufacturer's recommended minimum bending radius.

G. Coordinate cable installation with other work.

H. Protect exposed cable from damage.

I. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound where necessary.

J. Use pulling means including fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.

K. Keep conductor splices to a minimum.

L. Clean conductor surfaces before installing connectors.

M. Tape uninsulated conductors and connectors with electrical insulating tape to 150 percent of insulation rating of conductor.

N. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

O. Use splice and tap connectors which are compatible with conductor material.
P. Provide adequate length of conductors within electrical enclosures and neatly train the conductors to terminal points with no excess. Make terminations so there is no bare conductor at the terminal.

Q. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer’s published torque-tightening values. Where manufacturer’s torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

R. Circuits of multiple phases passing through enclosures shall have phases grouped (bundled together) to reduce the reactance effect.

S. Arrange conductors in switchboards, panelboards, gutters, boxes, control cabinets and terminal cabinets neatly and lace with black T & B "Ty-Raps" ties.

T. Connect control circuits as indicated and in accordance with the wiring diagrams furnished by the equipment manufacturer. Control conductors shall be color coded or identified with the provision of non-deteriorating type wire markers.

U. Consistently color code wiring continuous throughout the work:

1. Color code secondary service, feeder, and branch circuit conductors with insulation/jacket (factory-applied) color for phase identification as follows:

<table>
<thead>
<tr>
<th>Phase</th>
<th>System Voltage</th>
<th>208Y/120</th>
<th>480Y/277</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>White</td>
<td>Gray</td>
<td>Gray</td>
</tr>
<tr>
<td>Ground</td>
<td>Green</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>Switch Legs</td>
<td>Purple &amp; Pink</td>
<td>Purple &amp; Pink</td>
<td>Purple with Black Strips</td>
</tr>
<tr>
<td>Travelers</td>
<td>Purple with Black Strips</td>
<td>Purple with Black Strips</td>
<td></td>
</tr>
</tbody>
</table>

2. For conductors No. 6 AWG or larger, permanent plastic colored tape may be used to mark conductor in lieu of color-coded insulation/jacket. Tape shall cover not less than 2 inches of conductor insulation within enclosures.

### 3.4 Identification

A. In addition to requirements in Section 260553, the following are applicable:

1. At all switchboard terminations, provide each feeder circuit with a permanent plastic name tag indicating the load fed.
2. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices and in pull boxes.
3. Branch Circuits: Identify with the corresponding circuit designation at the over-current device and at all splices and devices.
4. Control Wires: Identify with the indicated number and/or letter designation at all terminal points and connections.
5. Alarm and Detection Wires: Identify with the indicated wire and zone numbers at all connection, terminal points, and coiled conductors within cabinets.
6. Conductors Terminated by Others: Indicate location of opposite end of conductor, i.e., Pull Box-Room 101.
7. For identification of conductors use plastic coated self-sticking markers such as Thomas & Betts
8. Circuit Designation is construed to mean panel designation and circuit number, i.e., LA-13.

3.5 **Field Quality Control**

A. Prior to energizing:

1. Inspect wire and cable for physical damage and proper connection.
   
   a. Confirm that field-connections made by others in equipment furnished by others are mechanically and electrically sound prior to energization.

2. Confirm electrical continuity and absence of short circuits for all wire and cable with the use of a megohm meter.
   
   a. Obtain values for phase-to-phase, phase-to-neutral, and phase-to-ground.

3. Confirm required insulation resistance as follows:

   a. Perform insulation resistance test for all 600 volt insulated conductors No. 8 AWG and larger.
   
   b. Use a 500 volt megger.

   c. Obtain and record values for insulation resistance to ground and for insulation resistance between each conductor and every other conductor in the same conduit.

   d. Conductors not complying with the following minimum values of insulation resistance are to be replaced and retested until satisfactory.

<table>
<thead>
<tr>
<th>Conductor Rated Amperes:</th>
<th>Minimum Insulation Resistance, Ohms:</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 through 50</td>
<td>500,000</td>
</tr>
<tr>
<td>51 through 100</td>
<td>250,000</td>
</tr>
<tr>
<td>101 through 200</td>
<td>100,000</td>
</tr>
<tr>
<td>201 through 400</td>
<td>50,000</td>
</tr>
</tbody>
</table>

   e. Perform tests after conductors have been installed, but before terminal connections have been made. Take readings for each test after the voltage has been applied continuously for one minute.

   f. Perform tests according to manufacturer's recommendations.

   g. Test results shall be in accordance with manufacturer's recommendations.

   h. Correct defects revealed by above tests.

B. Subsequent to wire and cable hook-ups:

1. Energize circuits and demonstrate proper functioning. Correct malfunctioning units, and retest to demonstrate compliance.

End of Section 26 05 19
26 05 26- Grounding and Bonding for Electrical Systems

Part 1 – General

1.1 Summary

A. This Section includes basic materials and methods for grounding and bonding electrical systems and equipment. Grounding requirements specified in this Section may be supplemented in other sections of these Specifications.

1. Equipment grounding conductors.
2. Bonding.

B. System Requirements

1. Electrical continuity to ground metal raceways and enclosures which are isolated from the equipment ground due to use of conduit or fittings which are nonmetallic (non-conducting), shall be established by providing by a green insulated grounding conductor of approved size within each raceway which shall connect to the isolated metallic raceways or enclosures at supply side. (If bare grounding conductors were specified, connect to enclosure on raceway at both ends.)
2. Non-current-carrying metal parts of all high voltage, conduit systems, supports, cabinets and enclosures shall be permanently and effectively grounded.

C. Related Sections

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

   ASTM B3 Soft or Annealed Copper Wire.
   ASTM B8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
3. Institute of Electrical and Electronics Engineers.
5. CEC California Electrical Code (NFPA 70).
7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.
   UL 467 Electrical Grounding and Bonding Equipment.
   UL 486A Wire Connectors and Grounding Lugs for Use With Copper Conductors.
   UL 96 Lightning Protection Components.

1.3 Quality Assurance
A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards for grounding and bonding materials and systems. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.4 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.5 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

Part 2 – Products

2.1 Manufacturers

A. Subject to compliance with requirements, provide products by the following, or equal:

Anixter Brothers
Blackburn
Burndy
A.B. Chance Co.
Joslyn
Kearney-National
O-Z/Gedney
Thomas & Betts

2.2 Grounding and Bonding Products

A. Products: Of types indicated and of sizes and ratings to comply with CEC. Where types, sizes, ratings, and quantities indicated are in excess of CEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

B. Conductor Materials: Copper Only – No aluminum conductors will be permitted.

2.3 Wire and Cable Conductors

Grounding and Bonding for Electrical Systems
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A. General: Comply with the following, except as otherwise indicated:

B. Equipment Grounding Conductor: Green insulated copper.

2.4 Miscellaneous Conductors

A. Ground Bus: Bare annealed copper bars of rectangular cross section, minimum 1/4 inch x 3 inch x 12 inch drilled and tapped every 2 inches on center for two hole lugs.

B. Braided Bonding Jumpers: Copper tape, braided No. 30 gauge bare copper wire, terminated with copper ferrules.

C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.5 Connector Products

A. General: Listed and labeled as grounding connectors for the materials used.

B. Pressure Connectors: High-conductivity plated units.

C. Bolted Clamps: Heavy-duty units listed for the application.

Part 3 – Execution

3.1 Application

A. Equipment Grounding Conductor Application:

Comply with CEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

1. Install separate insulated equipment grounding conductors with circuit conductors for the following in addition to those locations where required by Code:

   a. Feeders and branch circuits.

B. Signal and Communications System: Provide #4 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each terminal cabinet or central equipment location.

1. Equipment Bonding Jumper: Shall be sized in accordance with the California Electrical Code and be conducted on the supply side of the service main equipment.

2. Grounding Electrode: Bond together the following items to establish the electric service grounding electrode, unless otherwise indicated:

   a. Minimum 20 feet number 3/0 AWG copper conductor encased in concrete footing or grade beam to contact with earth in two opposite directions.

   b. Building domestic water service entrance piping on house side of meter; provide bonding jumper across meter.

   c. Structural steel building framework.

C. Flexible metal and liquid-tight conduit: Provide equipment grounding conductors.

D. Rigid nonmetallic conduit: Provide equipment grounding conductors.
3.2 Installation

General: Ground electrical systems and equipment in accordance with CEC requirements except where the drawings or specifications exceed CEC requirements.

A. Braided-Type Bonding Jumpers: Install to connect ground clamps on water meter piping to bypass water meters electrically. Use elsewhere for flexible bonding and grounding connections.

B. Route grounding conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

3.3 Connections

A. General: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible. Make connections with clean bare metal at points of contact.

B. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare copper grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare copper grounding conductors.

C. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer’s published torque tightening values for connectors and bolts. Where manufacturer’s torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.

D. Compression-Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

E. Moisture Protection: Where insulated ground conductors are connected to ground rods or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

F. Ground Bus Assembly: Make connections to the ground bus assembly in the following manner:

1. Bond cable to two hole lug using exothermic welding process.
2. Bolt two hole lugs to ground bus assembly.

3.4 Field Quality Control

A. Test all ground fault interrupter (GFI) receptacles and circuit breakers for proper connection and operation with methods and instruments prescribed by the manufacturer.

B. Tests: Subject the completed grounding system to a megger test at each location where a maximum ground resistance level is specified, at service disconnect enclosure ground terminal, and at ground test wells. Measure ground resistance without the soil being moistened by any other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the two-point method in accordance with Section 9.03 of IEEE 81.

C. Ground/resistance maximum values shall be as follows:
1. Equipment rated 500 kVA and less: 10 Ohms.
2. Grounded secondary distribution system neutral and non-current carrying parts associated with
distribution systems and grounds not otherwise covered: 25 ohms.

D. Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding
system to reduce resistance values. Where measures are directed that exceed those indicated, the provisions
of the Contract covering the changes shall apply.

End of Section 26 05 26
26 05 29- Hangers and Supports for Electrical Systems

Part 1 - General

1.1 Summary

A. This Section Includes:

1. Hangers, straps, clamps, steel channel, and fastening hardware for supporting and anchoring electrical work.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. CEC California Electrical Code (NFPA 70)
5. NEMA National Electrical Manufacturers Association
6. NFPA National Fire Protection Association
7. UL Underwriters Laboratories, Inc.
8. NECA National Electrical Contractors Association ("Standard of Installation")
9. SMACNA Sheet Metal Air Conditioning Contractors National Association

1.3 Submittals

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product Data: Provide manufacturer's catalog data for supporting devices and fastening systems.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instruction for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 Regulatory Requirements

A. Conform to requirements of NFPA 70, "California Electrical Code."

B. Furnish products listed and classified by Underwriter's Laboratories, Inc. as suitable for purpose specified and shown.

1.5 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section
with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.6 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.7 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

B. Verify supporting device requirements prior to rough-in.

C. Electrical work is shown on Drawings in approximate locations unless dimensioned. Provide supporting devices as required to complete the electrical work.

Part 2 – Products

2.1 Manufacturers

A. Subject to compliance with requirements, provide products by the following, or equal:

1. Hangers, Straps and Beam Clamps:
   Appleton
   Raco, Inc.
   Steel City
   O.Z./Gedney Co.
   Midland Ross

2. U-Channel Systems, Slotted Metal Angle, and Fittings:
   B-Line
   Unistrut

3. Anchors:
   Acherman-Johnson Corp.
   B-Line
   Hilti
   Phillips Drill Co.
   Rawl Products Co.

2.2 Material and Fabrication

A. Coatings: Supports, support hardware, and fasteners shall be protected with zinc coating. Products for use outdoors shall be hot-dip galvanized.

B. Manufactured supporting devices:

1. Raceway supports: Steel. Clevis hangers, riser clamps, pipe straps, threaded C-clamps with retainers, ceiling trapeze hangers, and wall brackets.
2. U-Channel systems: 12-gauge steel channels, with 9/16 inch diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.
3. Fasteners: Types, materials, and construction features as follows:
   a. Expansion anchors: Carbon steel wedge or sleeve type.
   b. Toggle bolts: All-steel springhead type.
   c. Powder-driven threaded studs: Heat-treated steel, designed specifically for the intended service.
4. Concrete Inserts: Steel, with hot-dipped galvanized finish.
5. Cable support for vertical conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.
6. Conduit sealing bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

C. Fabricated supporting devices:

1. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.
2. Steel brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.
3. Pipe sleeves: Provide pipe sleeves of the following:
   a. Sheet metal: Fabricate from galvanized sheet metal: round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gauge metal for sleeve diameter noted:
      3-inch and smaller: 20-gauge.
      4-inch to 6-inch: 16-gauge.
      Over 6-inch: 14-gauge.
   b. Steel pipe: Fabricate from Schedule 40 galvanized steel pipe.
   c. Plastic pipe: Fabricate from Schedule 80 PVC plastic pipe.

Part 3 – Execution

3.1 Installation, General

A. Provide supporting devices to fasten electrical components securely and permanently to the building or structure in accordance with CEC requirements. Install products in accordance with manufacturer’s instructions.

B. Coordinate with the building structural, mechanical, and other systems, and with other electrical installation.
C. Fastening: Fasten electrical items and their supporting hardware securely to the building structure. Electrical items include, but are not limited to: raceway, cables, cable tray, busway, transformers, panelboards, enclosed switches and motor controllers, control components, boxes, and cabinets.

1. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.
2. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams, or to a depth of more than 3/4 inch in concrete shall not cut reinforcing bars. Fill holes that are not used.
3. Fastening methods:
   a. Wood: Wood screws.
   b. Hollow masonry units: Toggle bolts.
   c. Concrete or solid masonry: Concrete inserts or expansion bolts. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts.
   d. Steel: Machine screws or welded steel studs.

D. Conductors in vertical raceways: Provide support for wire and cable in riser pull boxes in accordance with CEC Article 300.

E. Sleeves: Provide in concrete slabs and walls and all other fire-rated floors and walls for raceway and cable installations. For sleeves through fire-rated wall- or floor-construction, apply UL-listed firestopping sealant in gaps between sleeves and enclosed conduits and cables. Comply with the requirements of fire-resistant joint sealers in accordance with the applicable Division 7 section.

1. Conduit seals: Install conduit seals for conduit penetrations of slabs on grade and exterior walls below grade as indicated. Tighten sleeve seal screws until sealing grommets have expanded to form watertight seal.

3.2 Installation, Additional Requirements for Raceways

A. General: Comply with the CEC and with the following requirements:

1. Conform to manufacturer’s recommendations for selection and installation of supports.
2. The strength of the support, including attachment to the building or structure, shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 pounds, provide additional strength until there is a minimum of 200 pounds safety allowance in the strength of each support.
   a. Raceway shall be supported and braced per SMACNA “Guidelines for Seismic Restraint Systems and Plumbing Piping Systems.” (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)
3. Install pipe straps, individual and multiple (trapeze-type) raceway hangers and riser clamps as necessary to support raceways. Provide U-channel and associated pipe channel straps, bolts, clamps, attachments, fasteners, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.
   a. Raceway run on surface of structure:
      1) For conduit run on building surface, use two-hole stamped steel pipe straps.
      2) For conduit runs on steel beams, use malleable iron pipe beam clamp bolted to beam.
b. Raceway suspended from structure:
   1) Support parallel runs of horizontal raceways together on trapeze-type hangers.
   2) Support individual horizontal raceway by separate pipe hangers.

4. Support spacing: Maximum spacing shall be as allowed by the CEC.
   a. Additional support required at unsupported boxes and access fittings: Support exposed and concealed raceway within 1 foot of an unsupported boxes and access fittings. In horizontal runs, this support may be omitted where box or access fitting is independently supported and raceway termination is not made with chase nipples or threadless box connectors.
   b. Additional support required for vertical runs: Arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on the raceway terminals. Provide riser clamps for conduit at floor lines.

3.3 Installation, Additional Requirements for Equipment and Enclosures

A. Component Anchorage Requirements:

1. All mechanical, plumbing, and electrical components shall be anchored and installed per the details on the DSA approved construction documents. Where no detail is indicated, the following components shall be anchored or braced to meet the force and displacement requirements prescribed in the 2010 CBC. Sections 1615A.1.12 through 1615A.1.22 and ASCE 7-05 Chapter 6 and 13:

   a. All permanent equipment and components.
   b. Temporary or movable equipment that is permanently attached (e.g. hard wired) to the building utility services such as electricity, gas or water.
   c. Movable equipment which is stationed in one place for more than 8 hours and heavier than 400 pounds are required to be anchored with temporary attachments.

2. The attachments of the following mechanical and electrical components shall be positively attached to the structure but need not be detailed on the plans. These components shall have flexible connections provided between the component and associated ductwork, piping and conduit:

   a. Components weighing less than 400 pounds and have a center of mass located 4 feet or less above the adjacent floor or roof level that directly support the component.
   b. Components weighing less than 20 pounds, or in the case of distributed systems, less than 5 pounds per foot which are suspended from a roof or floor or hung from a wall.

3. For those elements that do not require details on the approved drawings, the installation shall be subject to the approval of the Structural Engineer of Record and the DSA District Structural Engineer. The project inspector will verify that all components and equipment have been anchored in accordance with above requirements.

B. Piping, Ductwork, and Electrical Distribution System Bracing requirements:

1. Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-05 Section 13.3 as defined in ASCE 7-05 Section 13.6.8, 13.6.7, 13.6.5.6, and 2010 CBC, Section 1615A.1.20, 1615A.1.21 and 1615A.1.22.

2. The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the OSHPD Pre-Approvals (OPA #) as modified to satisfy anchorage requirements of ACI 318, Appendix D.
3. Copies of the manual shall be available on the jobsite prior to the start of hanging and bracing of the pipe, ductwork, and electrical distribution systems.

4. The Structural Engineer of Record shall verify the adequacy of the structure to support the hanger and brace loads.

3.4 Field Quality Control

A. Preparation for tests: Provide all jacks, jigs, fixtures, and calibrated indicating scales required for accurate, reliable testing. Obtain the Owner’s Representative and Structural Engineer’s approval before transmitting loads to the structure.

1. Test to 90 percent of rated proof load for fasteners. If fastener fails test, revise all similar fastener installations and re-test until satisfactory results are achieved.

B. Tests: Test pull-out resistance of one of each type, size, and anchorage material for the following fastener types:

1. Expansion anchors.
2. Powder-driven threaded studs.
3. Toggle bolts.

3.5 Cleaning

A. Clean surfaces to be painted.

End of Section 26 05 29
26 05 33- Raceway and Boxes for Electrical Systems

Part 1 – General

1.1 Summary

A. Section includes provision of a mechanically- and electrically-complete conduit system including:
   1. Rigid metal conduit.
   2. Intermediate metal conduit.
   3. Electrical metallic tubing.
   4. Flexible metal conduit.
   5. Liquidtight flexible conduit.
   6. Fittings and conduit bodies; accessories.

B. Related Sections:
   1. General electrical requirements: Section 260501.

1.2 References

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

A. American National Standards Institute
   ANSI C80.1 Specification for Rigid Steel Conduit, Zinc-Coated.
   ANSI C80.3 Specification for Electrical Metallic Tubing, Zinc-Coated.
   ANSI C80.5 Rigid Aluminum Conduit.
   ANSI/NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

B. American Society for Testing and Materials.
   ASTM 123 Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

C. IEEE Institute of Electrical and Electronics Engineers.

D. CEC California Electrical Code (NFPA 70).

E. NECA National Electrical Contractors Association: “Standard of Installation.”

F. NFPA National Fire Protection Association

G. Underwriters Laboratories, Inc.
   UL 1 Flexible Metal Electrical Conduit
   UL 6 Rigid Metal Electrical Conduit.
   UL 360 Liquidtight Flexible Steel Conduit, Electrical.
   UL 514B Fittings for Conduit and Outlet Boxes.
UL 797  Electrical Metallic Tubing.
UL 1242  Intermediate Metal Conduit

1.3  Submittals

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Product data: For all raceway products.

C. Contractor shall be responsible for anchors and connections of electrical work to building structure to prevent damage as a result of earthquake, including the connection and integrity of field-fabricated materials and equipment. All building connections therefore shall be designed to resist seismic forces in conformance with Title 24 of the California Administrative Code.

Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following requirement:

All raceway shall be supported and braced per SMACNA “Guidelines for Seismic Restraint Systems and Plumbing Piping Systems.” (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)

D. Samples: Provide samples upon specific request

E. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches.

F. Substitutions: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and installation methods.

G. Certificates:

1. Labels of Underwriters' Laboratories, Inc. affixed to each item of material.
2. If materials are by manufacturers other than those specified, submit certification what material meets applicable Underwriters' Laboratories, Inc. Standards.

1.4  Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code:"

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation".

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.5  Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, “General Electrical Raceways and Boxes for Electrical Systems
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Requirements.”

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

1.7 Sequencing and Scheduling

A. Coordinate with other Work:

1. Install conduits through roof in time to be flashed prior to roofing application.

Part 2 – Products

2.1 Manufacturers

Subject to compliance with requirements, provide products by the following, or equal:

A. Conduit Bodies:

Adalet-PLM
Appleton Electric
Carlon
Crouse Hinds
Killark Manufacturing
OZ/Gedney
Spring City Electrical Mfg.

2.2 Metal Conduit and Tubing

A. Rigid Metal Conduit: Steel, hot-dipped galvanized including the threads, with an outer coating of zinc bichromate, complete with one coupling and one end thread protector, manufactured in accordance with ANSI C80.1 and UL 6.

1. Threaded, hot-dipped galvanized fittings manufactured in accordance with ANSI C80.4.
2. Where indicated, provide galvanized rigid steel conduit and fittings with polyvinyl chloride (PVC) coating of nominal .020 inch (20 mil) thickness conforming to NEMA Standard No. RN-1, Type A, Robroy Industries, or equal.

B. Intermediate Metal Conduit: Hot-dipped galvanized steel including the threads, manufactured in accordance with UL 1242.

C. Electrical Metallic Tubing: Welded, electro-galvanized thin wall steel tubing, manufactured in
accordance with ANSI C80.3 and UL 797.

1. Maximum size shall be 2 inches.
2. Provide compression type fittings in all areas.
   a. Gland compression type, zinc plated steel body, cadmium plated malleable iron nut, O-Z/Gedney
   b. Indenter type or set screw fitting are not acceptable.

D. Flexible metal Conduit: Hot-dipped galvanized steel interlocking, single-strip type manufactured in accordance with UL1.
   1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for 3/4-inch flexible metal conduit.
   2. Integral copper ground wire on sizes 1-1/4" and smaller.

E. Liquidtight Flexible Conduit: Hot-dipped galvanized steel strip core with extruded liquid-tight polyvinyl jacket. Use O-Z/Gedney Type UAG, or equal.
   2. Connectors: Cadmium plated malleable iron body and nut, cadmium plated steel ferrule, insulated throat, integral cast external ground lug, O-Z/Gedney.

2.3 Conduits Bodies

A. General
   1. Types, shapes, and sizes as required to suit individual applications and CEC requirements. Provide matching gasketed covers secured with corrosion-resistant screws.

B. Metallic Conduit and Tubing
   1. Use metallic conduit bodies. Use bodies with threaded hubs for threaded raceways.

2.4 Accessories

A. General:Reducers, bushings, washers, etc., shall be cadmium plated malleable iron of the shape and dimension best suited for the application.

B. Seals for Walls and Floor Penetrations: Malleable iron body, oversize sleeve, sealing ring, pressure clamp and rings and sealing grommet, hex head cap screws, O-Z/Gedney Type FSK, or equal.

C. Fire Seals: Heat activated intumescent material, elastomeric sealing ring, socket head cap screws, steel pressure discs and flange, O-Z/Gedney Type CFSF, Nelson Flame Seal, or equal.

D. End bells: Hot-dipped galvanized, threaded malleable iron, O-Z/Gedney Type THS, or equal.

E. Bushings:
   1. 1-1/4" and smaller: High-impact thermo-setting phenolic, 150°C, O-Z/Gedney Type "A", or equal.
   2. 1-1/2" and larger: Hot-dipped galvanized with thermosetting phenolic insulation, 150°C, O-Z/Gedney Type "B", or equal.
F. Locknuts:
   1. 1-1/2” and smaller: Zinc plated heavy stock steel, O-Z/Gedney, or equal.
   2. 2” and larger: Cadmium plated malleable iron, O-Z/Gedney, or equal.

G. Hubs: Cadmium plated malleable iron, tapered threads, neoprene "O" ring, insulated throat, O-Z/Gedney, or equal.

H. Expansion Fittings: Hot-dipped galvanized malleable iron with bonding jumpers.
   1. Linear: O-Z/Gedney Type AX and TX, or equal.
   2. Linear, with deflection: O-Z/Gedney Type AXDX, or equal.

I. Escutcheons: Chrome plated sectional floor and ceiling plates, Crane No. 10, or equal.

Part 3 – Execution

3.1 Wiring Method

A. General: The wiring method shall be as follows, except as otherwise noted.

B. Exterior:
   1. Exposed: Rigid steel conduit.
   2. Concealed: Rigid steel conduit.
      a. In or under slab on grade: Nonmetallic conduit, Schedule 40 PVC. Conduit leaving the slab (including exposed conduit riser) shall be rigid steel conduit.

   3. Connection to vibrating equipment, including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment: Liquidtight flexible metal conduit, maximum length 18 inches.

C. Interior:
   1. Exposed: Electrical metallic tubing.
      a. Areas where exposed conduit may be subject to physical damage: Rigid metal conduit.
      b. Damp or wet locations: Rigid metal conduit.
      c. Classified locations: Rigid metal conduit.

   2. Concealed: Electrical metallic tubing.
      a. In or under slab on grade: Nonmetallic conduit, Schedule 40 PVC. Conduit leaving the slab (including exposed conduit riser) shall be rigid steel conduit.
      b. In slab, above grade: Rigid nonmetallic conduit Schedule 40 PVC. Maximum size conduit in slab: 1 inch.

   3. Connection to vibrating equipment, including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment: Flexible metal conduit, maximum length 18 inches.
      a. For moist or humid locations or corrosive atmosphere, or where subject to water spray or dripping oil, grease, or water: Liquidtight flexible metal conduit.
4. Connection to lighting fixtures located in suspended acoustical or metal ceilings: Flexible metal conduit, maximum length 72 inches.
5. Final connections to lighting fixtures which have isolated junction boxes: Flexible metal conduit.
   a. Damp locations: Liquidtight flexible conduit.

3.2 Installation

A. General Requirements:

1. Install electrical raceways in accordance with manufacturer’s written installation instructions, applicable requirements of CEC, and as follows.
   a. Minimum size: 3/4 inch unless otherwise indicated.
   b. Size conduits as indicated on the drawings and as required by the CEC for the number and sizes of wires to be installed into the conduit.
   c. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings. Remove burrs, and swab inside conduits before conductors are pulled in.
   d. Make all conduit joints mechanically tight, electrically continuous, and watertight. Pitch conduits in a manner to avoid creating moisture traps.
   e. Install minimum 3/16" polypropylene pull cords from end-to-end in all empty raceways, tagged with the identification of service intended and location of opposite end. Leave at least 24 inches of pull cord at each end.
   f. Restore wall, ceiling, and floor penetrations to the requirements of the Authority Having Jurisdiction.
   g. Provide supports for raceways as specified in Section 260529, Supporting Devices.
      1) All raceway shall be supported and braced per SMACNA “Guidelines for Seismic Restraint Systems and Plumbing Piping Systems.” (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)
   h. Communications/Signal System Raceways 2-Inch Trade Size and Smaller: In addition to the above requirements, install raceways 2-inch and smaller trade size in maximum lengths at 150 feet and with a maximum of two, 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements.
   i. Provide code sized green grounding conductor in all non-metallic conduit.

2. Complete installation of electrical raceways before starting installation of conductors within raceways.
   a. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose. Cap or plug conduits with standard manufactured accessories as soon as the conduits have been permanently installed in place.

3. Install all conduits at elevations and locations to avoid interference with grading or other work, the structure, finished ceilings, walls. Avoid causing cutting of masonry structural members.
   a. Do not place conduits in close proximity to equipment, systems, and service lines, such as hot water supply and return lines, which could be detrimental to the conduit and its contents. Maintain a minimum 3" separation, except in crossing, which shall be a minimum 1".
      1) Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.
2) Elevation of Raceway: Where possible, install horizontal raceway runs above water and steam piping.

4. Conceal conduit, unless indicated otherwise, within finished walls, ceilings, and floors. Keep raceways at least six (6) inches away from parallel runs of flues and steam or hot water pipes. Install raceway level and square and at proper evaluations.
   a. To prevent displacement, securely support and hold in place all conduits installed in advance of other work and to be concealed in the building structure. Carefully lay out conduits run within the structure, such as floors, beams, walls, to avoid densities excessive for the construction. Relocate those conduits when excessive densities occur.
   b. Run conduits embedded in structural slabs in the middle of the slab below the top and above the bottom reinforcing steel. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab, but in no case less than 1-1/2" cover except where penetration is made. Do not install conduit larger than 1" in slabs. Tie raceways to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Space raceways laterally to prevent voids in the concrete. Where nonmetallic conduit is used, raceways must be converted to Schedule 80 or rigid steel conduit before rising above the floor.
   c. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions except as otherwise indicated. This does not apply to conduits in crawl spaces.

5. Install and neatly rack exposed conduits parallel with and perpendicular to building walls. Do not install exposed diagonal conduit runs.
   a. Run exposed, parallel, or banked raceways together. Make bends in parallel or banked runs from the same center line so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run such as from wall to ceiling and that the raceways be of the same size. In other cases provide field bends for parallel raceways.
   b. Use blockouts for concentrations of conduits in a confined area.
   c. Route and suspend conduits crossing expansion joints to permit expansion, contraction, and deflection utilizing approved fittings to prevent damage to the building, conduits, and supporting devices.
   d. Install exposed raceways parallel and perpendicular to nearby surfaces of structural members and follow the surface contours as much as practical.
   e. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.

6. Concrete Wall or slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.
   a. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.
   b. Use blockouts for concentrations of conduits in a confined area.

7. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.
8. Make bends and offsets so the inside diameter is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
   a. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.
   b. Bends and offsets in 1” and smaller conduits may be done with approved bending devices. Do not install conduits which have had their walls crushed and deformed and their surface finish damaged due to bending.
   c. Run conduits parallel to and at right angles to building lines.
   d. Where space conditions prohibit the use of standard ells, elbows, and conduits, use cast ferrous alloy fittings of such forms and dimensions as best required for application.

9. Do not run conduits exposed on the roof unless approval is obtained from the Owner prior to installation.

B. Other Requirements:

1. Connect motors, equipment containing motors, equipment mounted on an isolated foundation, transformers, and other equipment and devices which are subject to vibration and which require adjustment with flexible metallic conduit from the device to the conduit serving it. Size the flexible conduit length more than 12 diameters, but less than 18 diameters. Rigidly support the points of attachment on each side of the connection. Use external bonding jumpers on sizes 1-1/2” and above.

2. Install escutcheons on all exposed conduits passing through interior floors, walls, or ceilings. Install fire seals on all conduits passing through fire rated partitions. Install wall and floor fire seals on all conduits passing through exterior walls and floors, or use standard galvanized steel pipe sleeves; diameters 12” greater than the outside diameter of the sleeved conduit and fill the annular space with mastic or caulk with lead.

3. Raceway for panelboards:
   a. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 270 degrees.
   b. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.

4. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.

5. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.

6. Terminations:
   a. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.
   b. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.
   c. Install insulated throat threaded hubs on conduits entering enclosures without threaded hubs.
7. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:
   a. Where conduits enter or leave hazardous locations.
   b. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.
   c. Where required by the CEC.

8. Flexible Connections: Use short length (maximum of 6 feet) of flexible conduit for recessed and semi-recessed lighting fixtures, for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet locations. Install separate ground conductor across flexible connections.

9. PVC Coated Rigid Steel Conduit:
   a. Do not store conduit in direct sunlight.
   b. Use pipe straps, no pipe wrenches or channel wrenches, when tightening connections to avoid damaging PVC coating.
   c. Patch all gouges or cuts in the PVC coating after installing conduit. Use manufacturer's recommended patching paste. Build up area to be patched to full mil thickness of coating and feather out paste on sides of damaged area a minimum of 1/2-inch to provide a completely bonded seal.
   d. Field bend conduit with shoes for a mechanical bender sized for the next larger size conduit.
   e. Bends used in or below concrete slabs shall be, rigid steel type elbows, use for all stub-ups with flush floor coupling at transitions.

10. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.

3.3 Field Quality Control

   A. Examine surfaces to which conduits are to be secured for:
      1. Defects which will adversely affect the execution and quality of work.
      2. Deviations from allowable tolerances for the building material.

   B. Do not start work until defects and deviations are corrected.

3.4 Cleaning

   A. Upon completion of installations of raceways, inspect interiors of raceways; clear all blockages and remove burrs, dirt, and construction debris.

3.5 Protection of Finished Work

   A. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.

   B. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.
End of Section 26 05 33
Part 1 – General

1.1 Summary

A. This Section includes:

1. Equipment labels and signs.
2. Identification labeling for raceways, cables, and conductors.
3. Warning and caution signs
4. Operational instruction signs.

B. Electrical identification requirements in this Section may be supplemented in other sections of these specifications.

C. Related Sections:

1. General electrical requirements: Section 260501.
   a. Painting: Section 09900.
2. Color coding of conductors for phase identification: Section 2605019.
3. Refer to other Division 26 sections for additional specific electrical identification associated with specific items.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute.
3. IEEE Institute of Electrical and Electronics Engineers.
4. CEC California Electrical Code (NFPA 70).
5. NEMA National Electrical Manufacturers Association.
6. NFPA National Fire Protection Association
7. UL Underwriters Laboratories, Inc.

1.3 Submittals

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.4 Regulatory Requirements
A. Conform to requirements of NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 Project Record Documents

A. Accurately record actual labeling and identification of electrical equipment, components, and wiring.

1.6 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.7 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.8 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

Part 2 – Products

2.1 Manufacturers

A. Subject to compliance with requirements, provide products by the following:

1. Brady
2. Ideal Industries
3. Markal
4. Panduit
5. Thomas & Betts

2.2 Electrical Identification Products

Identification for Electrical Systems
26 05 53-2
A. Adhesive Marking Labels for Raceway: Pre-printed, flexible, self-adhesive labels with legend indicating voltage and service (Emergency, Power, Lighting, Air Conditioning, Voice and Data Communications, Control, Fire Alarm and Detection.

B. Label Size, as follows:
   2. Raceways Larger than 1-Inch: 1-1/8 inches high by 8 inches long.

C. Color: Black legend on orange background.

D. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.

E. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with preprinted numbers and letter.

F. Plasticized Card Stock Tags: Vinyl cloth with preprinted and field-printed legends to suit the application. Orange background, except as otherwise indicated, with eyelet for fastener.

G. Aluminum-Faced Card Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inches thick, and laminated with moisture-resistant acrylic adhesive. Pre-print legend to suit the application, and punch for tie fastener.

H. Brass or Aluminum Tags: Metal tags with tamped legend, punched for fastener. Dimensions: 2 inches by 2 inches by 19 gauge.

L. Engraved, plastic-laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letter on black face and punched for mechanical fasteners.

J. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.

K. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50 deg F to 350 deg F. Provide ties in specified colors when used for color coding.

Part 3 – Execution

3.1 Installation

A. General:
   1. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.
   2. Install identification devices in accordance with manufacturer's written instructions and requirements of CEC.
   3. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.

B. Identify electrical equipment and enclosures, including but not limited to the following::
1. General
   a. Panelboards
   b. Enclosed switches
   c. Control devices, such as pushbutton- or rotary-selection stations
   d. Contactors
   e. Lighting system relay cabinets
   f. Dimming controls
   g. Power supplies, inverters, and rectifiers
   h. Pull-, junction-, and splice-boxes
   i. Terminal boxes and cabinets
   j. Access doors and panels for concealed electrical items

C. Identify electrical circuits:
   a. On wall surfaces directly external to conduits run concealed within wall.
   b. On all accessible surfaces of concrete envelope around conduits in vertical shafts, exposed at ceilings, or concealed above suspended ceilings.
   c. On entire surface of exposed conduits.

D. Identify Junction, Pull, and Connection Boxes: Code-required caution sign for boxes shall be pressure-sensitive, self-adhesive label indicating system voltage in black, preprinted on orange background. Install on outside of box cover. Also label box covers with identity of contained circuit. Use pressure-sensitive plastic labels at exposed location and similar labels or plasticized card stock tags at concealed boxes.

E. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductor throughout the project secondary electrical system as follows:

<table>
<thead>
<tr>
<th>208/120 Volts</th>
<th>Phase</th>
<th>480/277 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>A</td>
<td>Yellow</td>
</tr>
<tr>
<td>Red</td>
<td>B</td>
<td>Brown</td>
</tr>
<tr>
<td>Blue</td>
<td>C</td>
<td>Orange</td>
</tr>
<tr>
<td>White</td>
<td>Neutral</td>
<td>Gray</td>
</tr>
<tr>
<td>Green</td>
<td>Ground</td>
<td>Green</td>
</tr>
</tbody>
</table>

F. Use conductors with color factory-applied the entire length of the conductors except as follow:

1. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.
   a. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two lap of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.
   b. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and paced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.

G. Power Circuit Identification: Securely fasten identifying metal tags or aluminum wraparound marker bands to cables, feeders, and power circuit in vault, pull boxes, junction boxes, manhole, and switchboard rooms with 1/4-inch steel letter and number tamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-lb test monofilament line or one-piece self-locking Identification for Electrical Systems

26 05 53-4
nylon cable ties.

H. Tag or label conductors as follows:

1. **Future Connections:** Conductors indicated to be for future connection or connection under another contract with identification indicating source and circuit numbers.

2. **Multiple Circuits:** Where multiple branch circuits or control wiring or communications / signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home run) label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by means of coded color of conductor insulation. For control and communication / signal wiring, use color coding or wire / cable marking tape at termination and at intermediate location where conductors appear in wiring boxes, troughs, and control cabinet. Use consistent letter / number conductor designation throughout on wire / cable marking tape.

3. Match identification markings with designations used in panelboards, shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installation.

I. Install equipment/system circuit/device identification as follows:

1. Apply equipment identification labels of engraved plastic-laminate (fastened with self-tapping or threaded screws) on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with a minimum of 1/4-inch-high lettering on 1-1/2-inch-high label (2-inch-high where two lines are required), white lettering in black field. Adhesive letters are not acceptable. Text shall match terminology and numbering shown, if provided. For emergency systems, the background field shall be red and include the word, "EMERGENCY." Apply label for each unit of the following categories of electrical equipment:
   a. Panelboards, electrical cabinets, and enclosures.
   b. Access doors and panels for concealed electrical items.
   c. Pushbutton stations.
   d. Contactors.

   1) Include voltage, continuous current, horsepower or interrupting current, and whether "mechanically-held" or "electrically-held."

   e. Remote-controlled switches.
   f. Dimmers.
   g. Control devices.
   h. Lighting system relay cabinets.

J. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm / signal components, where labeling is specified elsewhere. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

K. Install labels at locations indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

End of Section 26 05 53
26 27 16 – Electrical Cabinets and Enclosures

Part 1 – General

1.1 Summary

A. This Section includes:
   1. Outlet and device boxes.
   2. Pull and junction boxes.
   3. Floor boxes and service fittings.
   5. Hinged door enclosures.

B. Related Sections:

   1. General electrical requirements: Section 260501.

C. The following related items are specified in Section 260533 - Raceways: conduit-body-type electrical enclosures and wiring fittings, wireways, and auxiliary gutters.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

   1. ANSI American National Standards Institute.
      ASTM 123 Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
   3. IEEE Institute of Electrical and Electronics Engineers.
   4. CEC California Electrical Code (NFPA 70).
      NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
      NEMA ICS6 Enclosures for Industrial Controls and Systems.
      NEMA OS1 Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
      NEMA OS2 Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
   6. NFPA National Fire Protection Association
   7. Underwriters Laboratories, Inc.
      UL 50 Electrical Cabinets and Boxes.
      UL 514A Electrical Metallic Outlet Boxes.
      UL 514B Fittings for Conduit and Outlet Boxes.
      UL 514C Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers.
      UL 886 Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

1.3 Submittals

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.
B.  Product data: Boxes, cabinets, and fittings.

C.  Shop drawings: Provide for boxes, cabinets, and enclosures that are to be shop fabricated (non-stock items). For shop fabricated junction and pull boxes, show accurately scaled views and spatial relationships to adjacent equipment. Show box types, dimensions and finishes. For cabinets and hinged enclosures, drawings shall include dimensions, knockout sizes and locations, material types and gauges, finishes, and installation method.

D.  Certificates shall include labels of Underwriters' Laboratories, Inc., and National Electrical Manufacturer's Association affixed to each item.

E.  Record actual locations and mounting heights of outlet-, pull-, and junction-boxes, and cabinets and hinged door enclosures, on project record documents.

1.4 Definitions

A.  Cabinet: An enclosure designed either for surface or for flush mounting and having a frame, or trim in which a door or doors may be mounted.

B.  Device Box: An outlet box designed to house a receptacle device or a wiring box designed to house a switch.

C.  Enclosure: A box, case, or cabinet, or housing for electrical wiring or components.

D.  Hinged Door Enclosure: An enclosure designed for surface mounting and having swinging doors or covers secured directly to and telescoping with the walls of the box.

E.  Outlet Box: A wiring enclosure where current is taken from a wiring system to supply utilization equipment.

F.  Wiring Box: An enclosure designed to provide access to wiring systems or for the mounting of indicating devices or of switches for controlling electrical circuits.

1.5 Quality Assurance

A.  Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B.  Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C.  NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D.  NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E.  Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.6 Delivery, Storage and Handling

Electrical Cabinets and Enclosures

26 27 16-2
A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.7 Project Conditions and Site Conditions

A. Verify that field measurements are as shown on Drawings.

B. Verify locations of boxes, cabinets, and enclosures prior to rough-in.

C. Placement shown on Drawings in approximate locations unless dimensioned. Install as required to complete wiring system.

1.8 Sequencing

A. Install boxes, cabinets, and enclosures in coordination with other work, and at times required to prevent delays in the work and to avoid cutting of masonry units.

Part 2 – Products

2.1 Manufacturers

Subject to compliance with requirements, provide products by the following, or equal:

A. General:

Appleton Electric Company
Hubbell
Steel City
O.Z./Gedney
Hoffman
Circle AW

B. Cabinets:

Circle AW
Hoffman Engineering
Spring City Electrical Mfg.

2.2 General

Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

A. Materials and Finishes:

2. Fasteners for general use: Corrosion-resistant screws and hardware, including cadmium and zinc-plated items.
3. Fasteners for wet or damp locations: Stainless steel screws and hardware.
4. Cast metal for boxes, enclosures and covers: Copper-free aluminum except as otherwise indicated.
5. Exterior finish: Gray-baked enamel for items exposed in finished locations except as otherwise indicated.
7. Fittings for boxes, cabinets, and enclosures: Conform to UL 514B. Malleable iron or zinc-plated steel for conduit hubs, bushings and box connectors.

2.3 Metal Outlet, Device, and Small Wiring Boxes

A. General: Conform to UL 514A and UL 514B. Boxes shall be of type, shape, size, and depth to suit each location and application.
B. Steel Boxes: NEMA OS 1. Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.
C. Cast Aluminum Boxes: Copper-free aluminum with gasketed covers, threaded raceway entries, and features and accessories suitable for each location including mounting ears, threaded screw holes for devices and closure plugs.
D. Cast Iron Boxes: Iron alloy, waterproof, with gasketed covers and threaded raceway entries, and features and accessories suitable for each location including mounting ears, threaded screw holes for devices and closure plugs.

2.4 Pull and Junction Boxes

A. General: Conform to UL 50, for boxes over 100 cubic inches in volume. Boxes shall have bolted-on covers of material same as box, and shall be of the size and shape to suit the application.
B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.
C. Hot-Dip Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanize after fabrication. Cover shall be gasketed.
D. Cast Iron Boxes: Molded of cast iron alloy with gasketed cover and integral threaded conduit entrances.

2.5 Cabinets

A. General: Conform to UL 50.
B. Construction: Sheet steel, NEMA 1 class except as otherwise indicated. Cabinet shall consist of a box and a front consisting of a one-piece frame and hinged door. Arrange door to close against a rabbet placed around the inside edge of the frame, with a uniformly close fit between door and frame. Provide concealed fasteners, not over 24 inches apart, to hold fronts to cabinet boxes and provide for adjustment. Provide flush or concealed door hinges not over 24 inches apart and not over 6 inches from top and bottom of door. For flush cabinets, make the front approximately 3/4 inch larger than the box all around. For surface mounted cabinets make front same height and width as box.
C. Doors: Double doors for cabinets wider than 24 inches. Telephone cabinets wider than 48 inches may have sliding or removable doors.
D. Locks: Combination spring catch and key lock, with all locks for cabinets of the same system keyed.
2.6 Steel Enclosures with Hinged Doors

A. General: Conform to UL 50.

B. Construction: Sheet steel, 16 gauge minimum, with continuous welded seams. NEMA class as indicated, arranged for surface mounting.

C. Doors: Hinged directly to cabinet and removable, with approximately 3/4 inch flange around all edges, shaped to cover edge of box. Provide handle-operated key locking latch. Individual door width shall be no greater than 24 inches. Provide multiple doors where required.

D. Mounting Panel: Provide painted removable internal mounting panel for component installation.

E. Enclosure: NEMA 12, except as indicated. Where door gasketing is required, provide neoprene gasket attached to oil-resistant adhesive, and held in place with steel retaining strips. For all enclosures of class higher than NEMA 1, use hubbed raceway entrances.

2.7 Cast Metal Enclosures with Hinged Doors

A. Copper-free aluminum with bolted, hinged doors. Where used at classified locations, enclosures shall conform to UL and shall be listed and labeled for the classification of hazard involved.

2.8 Molded Nonmetallic Enclosures with Hinged Door

A. General: Molded, glass fiber reinforced high impact strength polyester with bolt or screw-secured doors and solid neoprene gaskets.

Part 3 – Execution

3.1 Application

A. Outlet Boxes and Fittings: Install outlet and device boxes and associated covers and fittings of materials and NEMA types suitable for each locations and in conformance with the following requirements, except as otherwise indicated:

1. Interior dry locations: NEMA type 1, sheet steel.
   a. In dry walls for single and two gang outlets provide 4S and 4D boxes, for 3 or more outlets use masonry boxes.
   b. In block and masonry walls provide masonry boxes of depths required for wall thickness.
   c. In poured concrete and plastered walls provide 4S and 4D boxes for single gang outlets and 2G and 3G-5075 boxes for multiple ganged outlets.
   d. In concrete ceilings provide OCR rings. In other ceilings provide 40 and 40D boxes. Omit covers if standard canopy and device plates entirely cover the ceiling opening.

B. Pull and Junction Boxes: Install pull and junction boxes of materials and NEMA types as follows, except as otherwise indicated:

1. Interior dry locations: NEMA type 1, sheet steel.

2. Locations exposed to weather or dampness: NEMA type 3R, sheet steel.
3. Wet locations: NEMA type 4 enclosures.

C. Hinged Door Enclosures: NEMA type 12, except as indicated.

D. Hinged Door Enclosures Outdoors: NEMA type 3R, with drip hood, factory tailored to individual units.

E. Cabinets: Flush mounted, NEMA enclosure type 1, except as otherwise indicated.

3.2 Installation, General

A. Locations: Install items where indicated and where required to suit code requirements and installation conditions.

B. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs. Provide standard manufactured plugs in unused openings of boxes.

C. Support and fasten items securely in accordance with Division 26 Section “Supporting Devices.”

D. Sizes shall be adequate to meet CEC volume requirements, but in no case smaller than sizes indicated.

E. Remove sharp edges where they may come in contact with wiring or personnel.

F. Do not provide through-the-wall and back-to-back boxes. Provide minimum 24" between outlet boxes on all fire-rated walls.

G. Provide boxes at the terminal of conduit runs to outlets and devices.

H. Center outlets in paneling and in other Architectural features.

I. Locate light fixture outlets in uniform relation with ceiling tiles.

J. Group outlets on circuits with homeruns as indicated on the drawings.

K. Provide plaster rings and covers where required by the building structure.

3.3 Installation of Outlet Boxes

A. Outlets at windows and doors: Locate close to window trim. For outlets indicated above doors, use 6 feet-9 inches mounting height above finished floor and center outlets above the door opening except as otherwise indicated.

B. Column and pilaster locations: Locate outlet boxes for switches and receptacles on columns or pilasters so the centers of the columns are clear for future installation of partitions.

C. Locations in special finish materials: For outlet boxes for receptacles and switches mounted in desks or furniture cabinets or in glazed tile, concrete block, marble, brick, stone or wood walls, use rectangular shaped boxes with square corners and straight sides. Install such boxes without plaster rings. Sawcut all recesses for outlet boxes in exposed masonry walls.

1. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.

2. Where boxes are concealed in exposed concrete unit masonry, use square cornered type boxes, or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of
D. Cast iron boxes: Iron alloy, waterproof, with threaded raceway entries and features and accessories suitable for each location, including mounting ears, threaded screw holes for devices and closure plugs.

E. Mounting: Mount outlet boxes for switches with the long axis vertical or as indicated. Mount boxes for receptacles either vertically or horizontally but consistently either way. Three or more gang boxes shall be mounted with the long axis horizontal. Locate box covers or device plates so they will not span different types of building finishes either vertically or horizontally. Locate boxes for switches near doors on the side opposite the hinges and close to door trim, even though electrical floor plans may show them on hinge side.

1. Provide 3/8 inch studs in ceiling- and wall-mounted lighting fixture outlet boxes where shop drawings of fixtures require and elsewhere as may be required for fixtures.

F. Ceiling outlets: For fixtures, where wiring is concealed, use octagonal outlet boxes, 4 inches by 2 inches deep, minimum.

G. Cover plates for surface boxes: Use plates sized to box front without overlap.

H. Protect outlet boxes to prevent entrance of plaster and debris. Thoroughly clean foreign material from boxes before conductors are installed.

I. Floor boxes: Install in concrete floor slabs so they are completely enveloped in concrete except for the top. Where normal slab thickness will not envelop box as specified above, provide increased thickness of the slab. Provide each compartment of each floor box with grounding terminal consisting of a washer-in-head machine screw, not smaller than No. 10-32, screwed into a tapped hole in the box. Adjust covers of floor boxes flush with finished floor.

3.4 Installation of Pull and Junction Boxes

A. Pull boxes and junction boxes shall be securely mounted to the building structure.

1. Fastenings shall be made by means of not smaller than 3/16" diameter bolts, expansion bolts, or toggle bolts; not smaller than No. 9" x 1" wood screws; or by equivalent fastenings; where exposed to weather or moisture, shall be galvanized. Do not use nails, or wood or fiber inserts in masonry.

2. On masonry or concrete walls, columns or flooring, fastenings shall be made by means of lead expansion shields not smaller than size 3/8" diameter by 5/8" long for use with No. 10-24 round head machine screws. Machine screws shall be not less than 1-1/4" long for installation on ceiling and not less than 1" long elsewhere.

a. Holes for lead expansion shields shall be carefully and accurately drilled, using sharp drills to a depth which will afford the maximum practical engagement of threads (depth equal to screw length not less than 1-1/4" past plaster into solid concrete). Installation shall develop full strength of screw.

B. Pullboxes for concealed wiring shall be mounted flush in walls, partitions, and ceilings, unless otherwise indicated.

1. Use cast iron boxes flush in slab on grade.

C. Box Selection: For boxes in main feeder conduit runs, use sizes not smaller than 8-inches square by 4-
3.5 Installation of Cabinets and Hinged Door Enclosures

A. Installations shall be secure and substantial; cabinets shall be attached to building walls or structure.

B. Mount with fronts, trim, and doors straight and plumb.

C. Install with tops 78 inches above finished floor.

D. Set cabinets in finished spaces flush with walls.

E. Identification: Provide identification nameplates on inside and outside of covers and doors on each cabinet and hinged enclosure, engraved bakelite with 1/4 inch minimum height letters, securely fastened with stainless steel screws. Text shall identify the function of the cabinet or enclosure, for example, “Dimming Panel,” unless otherwise indicated.

3.6 Grounding

A. Electrically ground metallic cabinets, boxes, and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box, or enclosure.

3.7 Cleaning and Finish Repair

A. Upon completion of installation, inspect components. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, abrasions and weld marks. Clean surfaces to be painted.

B. Galvanized finish: Repair damage using a zinc-rich paint recommended by the manufacturer.

C. Painted finish: Repair damage using matching corrosion-inhibiting touch-up coating.

End of Section 26 27 16
26 27 26- Wiring Devices

Part 1 - General

1.1 Summary

A. This Section includes:

1. Receptacles.
2. Snap Switches.
3. Incandescent Lamp Dimmer-Switches.
5. Wall Plates.
6. Floor Service Outlets.
8. Telephone/Power Poles.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. CEC California Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association: "Standard of Installation"
6. NEMA National Electrical Manufacturers Association
7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.
   UL 20 General Use Snap Switches
   UL 94.3 UL Standard for Safety Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
   UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
   UL 498 Molded-Case Circuit Breakers and Circuit Breaker Enclosures
   UL 1010Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations
   WD 1 General Requirements for Wiring Devices
   WD 6 Wiring Device-Dimensional Requirements

1.3 Submittals

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Product Data: Submit for each type of product specified.

C. Installation instructions: Manufacturer's written installation instructions for wiring devices.
Include instructions for storage, handling, protection, examination, and preparation of Product.

D. Samples: Provide samples under specific request.

1.4 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

Part 2 - Products

2.1 Manufacturers

A. Subject to compliance with requirements, provide products by the following: Pass and Seymour

2.2 Wiring Devices

A. General: Provide wiring devices, in types, characteristics, grades, colors, and electrical ratings for applications indicated which are UL listed and which comply with NEMA WD 1 and other applicable UL and NEMA standards. Verify color of all device plates with Project Architect or Interior Designer prior to placing order.

B. Receptacles: UL 498 and NEMA WD 6. Straight blade, two-pole, three-wire grounding type, except as otherwise indicated below:

1. Device shall be specification grade. Acceptable manufacturer is Pass & Seymour Plug Tail PT8300 type (no known equal). Provide all similar devices of same manufacturer, unless indicated otherwise. All device colors shall be from the full range of manufacturer standard color options as selected by the architect. This selection will be made during the drawing review process.
Convenience receptacles shall be 20 Amp (not 15 Amp).

2. Wiring Devices:

   a. Receptacle #PT5362A-White
   b. I.G. Receptacle #IG5362A-IG-White
   c. G.F.C.I. Receptacle #PT2095NA PTRA6STRNA Right Angle Connector – White
   d. Simplex Clock Hanger Receptacle #S3713-White
   e. Single Pole Switch #PT20AC1-White
   f. Double Pole Switch #PT20AC2-White
   g. Three Way Switch #PT20AC3-White
   h. Four Way Switch #PT20AC4-White
   i. Pilot Light Switch “On” #PS20AC1CPL-White
   j. Pilot Light Switch “Off” #PS20AC1CSL-White
   k. Project Screen Switch #1251-White
   l. Keyed Switch #OS20AC1KWHITE (Non-Decora)
   m. Door Jam Switch #1201 Steel with Bronze Coating

C. Dimmer Switches: Solid-state dimmer switches, mount in outlet boxes as indicated and in accordance with the following:

   1. Incandescent Lamp Dimmer: Modular type, 120-volts, 60-Hz, switch poles and wattage as indicated, with continuously-adjustable rotary knob or toggle, anodized aluminum face, with soft-tap or other quiet on-off switch. Equip with electromagnetic filter to eliminate noise, RF and TV interference, and 5-inch minimum wire connecting leads. Derate dimmer switch per manufacturer’s recommendations where dimmers are ganged together.

   2. Fluorescent Lamp Dimmer: Full-wave modular type AC dimmer for fluorescent fixtures; wattage and voltage ratings as indicated, and electromagnetic filter to eliminate noise, RF and TV interference. Construct with continuously-adjustable trim potentiometer with adjustment of low and dimming, anodized heat sinks, with quiet on-off switch and 5-inch minimum wire connecting leads. To ensure coordination with dimming type ballasts in fixtures, specific dimming device shall be approved for use in writing by the ballast manufacturer.

2.3 Wiring Device Accessories

A. Wall Plates: Single and combination, of types, sizes, and with ganging and cutouts as indicated. Provide plates which mate and match with wiring devices to which they are attached, and are from the same manufacturer. Provide metal screws for securing plates to devices with screw heads colored to match finish of plates. Wall plate color shall be as selected by Architect / Engineer. Provide wall plate color to match wiring devices except as otherwise indicated. Provide wall plates with engraved legend where indicated. Conform to requirements of Section 260553, “Electrical Identification.”

   1. Interior Areas: Smooth, high-impact resistant plastic, of the same manufacturer as the device.

      a. Voice, data, or video communications system outlets: Same as for wiring devices except with 3/8 inch or 1 inch rubber grommets as required.
      b. Surface mounted outlet boxes: Zinc coated sheet steel rounded edges, same size as outlet box.
      c. Kitchen and food preparation areas: Polished stainless steel type, 0.40 inches thick.

Part 3 – Execution

3.1 Installation
A. Install wiring devices and accessories as indicated, in accordance with manufacturers written instructions, applicable requirements of the CEC, and in accordance with recognized industry practices to fulfill project requirements.

1. Mount switches and receptacles in vertical position in building interiors.
2. Mount receptacles with weatherproof plates in horizontal position.
3. Install receptacles mounted vertically so that the ground contact falls on the top position, and horizontally mounted receptacles with neutral pole in top position.
4. Individually Mounted Dimmers: Install in accordance with manufacturer’s ventilation clearance requirements.

B. Coordinate with other Work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other Work.

C. Install wiring devices only in electrical boxes which are clean; free from building materials, dirt and debris.

D. Install wiring devices after wiring work is completed.

E. Install wallplates after painting work is completed.

F. Install telephone/power service poles - in accordance with final furnishings arrangement - plumb, true, and secure.

G. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer’s published torque tightening values for wiring devices. Where manufacturers’ torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A. Use properly-scaled torque indicating hand tool.

3.2 Inspection

A. Inspect boxes into which wiring devices are to be installed for defects which affect the quality and execution of work.

B. Do not start work until defects are corrected.

3.3 Preparation

A. Determine where types of wiring devices are to be installed.

B. Verify devices are of correct size, capacity, type, and NEMA configuration.

3.4 Adjustment

A. Align device and cover plate vertically and horizontally assuring flush fitting.

3.5 Protection

A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.6 Labeling

A. All wiring decide plates on the project shall be labeled with panel and circuit number(s) utilizing a Brother P-Touch labeling system utilizing ½” tape (yellow on black) or equal by Herman-Tellerman or
Panduit. Locate label on the concealed side of the wiring device plate. Handwritten labels are unacceptable.

B. The following device plates shall be engraved:

1. Key operated switches, switches with Pilot Lights and Switches for the control of motors, heaters and ventilators. Engraving shall be black and occur on the exposed side of the plate and indicate the motor, heater or ventilator controlled.

3.7 Field Quality Control

A. Testing: Prior to energizing circuits, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energizing, test wiring devices and demonstrate compliance with requirements, operating each operable device at least six times.

B. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.

End of Section 26 27 26
26 28 01-Low-Voltage Circuit Protective Devices

Part 1 - General

1.1 Summary

A. This Section Includes:

1. Circuit breakers and fuses, rated 600 volts and below.
   a. Also included: enclosed circuit breakers for independent mounting.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 6.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. Institute of Electrical and Electronics Engineers
   IEEE 242 Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
4. CEC California Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association "Standard of Installation"
6. National Electrical Manufacturers Association
   NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum)
   NEMA AB 1 Molded-Case Circuit Breakers
   NEMA FU 1 Low Voltage Cartridge Fuses
   NEMA KS 1 Enclosed Switches
7. NFPA National Fire Protection Association
8. UL Underwriters Laboratories, Inc.
   UL 98 Enclosed and Dead-Front Switches
   UL 198C High-Interrupting-Capacity Fuses, Current-Limiting Type Fuses
   UL 198E Class R Fuses
   UL 198F Plug Fuses
   UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
   UL 486B Wire Connectors for Use with Aluminum Conductors
   UL 489 Molded-Case Circuit Breakers and Circuit Breaker Enclosures
   UL 943 Ground-Fault Circuit Interrupters
   UL 977 Fused Power-Circuit Devices

1.3 Submittals

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings: Submit shop drawings and or brochures to include but not limited to minimum melting and
total clearing time charts for all fuses.

C. Product Data: Submit for each type of product specified. Include manufacturer's bulletins, and minimum melting and total clearing time charts for each type of fuse.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates:

1. Labels of UL listing, fixed to each item of material.

1.4 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.5 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

1.7 Coordination

A. For equipment furnished by the Owner, or under other Divisions: Size fuses in accordance with the California Electrical Code.

Part 2 - Products

Low- Voltage Circuit Protective Devices
26 28 01-2
2.1 Manufacturers

A. Circuit Breakers:
   1. General Electric Co.
   2. or Existing manufacturer to match existing panelboard manufacturer

B. Fuses:
   1. Bussmann only.

2.2 Materials and Fabrication

A. Circuit Breakers:
   1. Circuit Breakers: Molded case, quick-make, quick-break, thermal-magnetic, trip-free with individual inverse time tripping mechanism on each pole. Terminal lugs rated for copper and aluminum conductors. Minimum 10,000 amperes interrupting capacity, RMS symmetrical short circuit rating shall be required. All breakers shall meet or exceed the maximum available fault current as indicated on single line diagram.
   a. Use magnetic-only circuit breakers for motor applications.
   b. Provide Class A (5ma sensitivity) breakers where GFI type breakers are required.
   c. Provide "HACR" type circuit breakers for HVAC loads. Ratings shall be as indicated on the drawings.
   d. No tie handle on multi-pole circuit breaker is accepted.
   e. Provide ambient compensated type breaker where the breaker is installed in the ambient in excess of 40 degrees C (104 degrees F).

Part 3 - Execution

3.1 Applications

A. Types: Mains, Feeders and Branch Circuits.
   1. 600 Amps and Below: Dual-element construction (current limiting, time-delay and high interrupting capacity) providing thermal protection for both fuse and fuseholder. Interrupting rating shall be 300,000 amperes RMS symmetrical and peak let-thru current and energy let-thru values shall not exceed the values established by Underwriters' Laboratories Standard for Class RK-1 fuses. Fuses shall be Bussmann "Low Peak YellowTM" in color and shall be Bussmann Low-Peak Dual Element Fuses, types LPN-RK (250 volts) or LPS-RK (600 volts). The fuses shall have separate overload and short-circuit elements. The fuses shall incorporate a spring activated thermal overload element having a 284 degree Fahrenheit melting point alloy and shall be independent of the short-circuit clearing chamber. Fuses shall be "Low Peak YellowTM". CAUTION labels to alert the end user of the engineered level of protection of the electrical equipment, shall be field installed by the electrical contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure. These labels are available with the spare fuse cabinet (SFC) and are also available upon request from Bussmann.

B. Special Applications:
   1. Fluorescent fixtures shall be protected by Bussmann fuses GLR or GMF with holder HLR. They shall have individual protection on the line side of the ballast. A fuse and holder shall be mounted within or as part of the fixture. Size and type of fuse to be recommended by the ballast manufacturer.

Low-Voltage Circuit Protective Devices
26 28 01-3
2. All other ballast-controlled lighting fixtures shall be protected by Bussmann fuses type KTK or FNQ with holders HEB, HPF, or HPS. They shall have individual protection on the line side of the ballast. Fuse and holder shall be mounted in a location convenient for changing fuses. Holder shall be mounted in protected location or be an in-line waterproof holder. Size and type of fuse to be recommended by the ballast manufacturer or as indicated on plans.

3.2 Installation

A. Set adjustable circuit breakers with trips as indicated.

B. Provide separate neutral conductors for circuits protected by GFI breakers.

C. Provide Class RK1 fuses for lighting loads, 0-600 amps:
   1. For fluorescent ballasts - Type GLR.
   2. For other ballasts and control circuits - Type KTK.

3.3 Labeling and Identification

A. Provide engraved plastic nameplates with 1/4-inch minimum height letters indicating:
   1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards and motor control centers.
   2. Circuit designation of panel or device controlled on circuit breakers, individually enclosed.

B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

End of Section 26 28 01
26 28 16- Enclosed Switches and Circuit Breakers

Part 1 - General

1.1 Summary

A. This Section Includes:

1. Enclosed safety switches for use on feeders and branch circuits, and disconnect switches for motors and equipment.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
3. IEEE Institute of Electrical and Electronics Engineers.
4. CEC California Electrical Code (NFPA 70).
5. NECA National Electrical Contractors Association "Standard of Installation".
6. National Electrical Manufacturers Association
   NEMA KS 1 Enclosed Switches
7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.
   UL 98 Enclosed and Dead Front Switches
   UL 198C High-Interrupting Capacity Fuses; Current Limiting Type
   UL 198E Class R Fuses
   UL 977 Fused Power Circuit Devices

1.3 Submittals

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements".

B. Shop Drawings: Include enclosure dimensions, type, electrical ratings, fuse provision, installation instructions, and nameplate nomenclature.

C. Product Data: Submit for each type of product specified.

D. Operating, Maintenance, and Instructional Data: Manufacturers’ written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.
E. Samples: Provide samples upon specific request.

F. Certificates: Labels of UL listing, fixed to each item of material.

1.4 Quality Assurance

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation".

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.5 Delivery, Storage and Handling

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements".

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

1.7 Coordination

A. For equipment furnished by the Owner, or under other Divisions: Size fuses in accordance with the California Electrical Code.

Part 2 - Products

2.1 Acceptable Manufacturers

A. Alley Bradley

B. Furnas

C. Cutler-Hammer

D. Siemens

E. General Electric

2.2 Materials

Enclosed Switches and Circuit Breakers

26 28 16-2
A. For single phase motors under 2 horsepower Allen Bradley Bulletin 600 single phase manual switch, toggle type, with locking attachment, neon pilot light, heater elements sized per motor nameplate rating, NEMA 1 enclosure indoors, NEMA 4 enclosure exterior, in damp and wet locations, flush and surface as specified for outlet boxes.

B. For other 250 volt equipment: NEMA Type HD, General Electric Type TH, fusible and non-fusible as required by NEC, with cover interlocks, with cabinets, with threaded hubs. Refer: Section 262816.

C. Provide heavy duty type, quick-make, quick-break disconnects with cover interlocks.

D. Provide NEMA Type 1 enclosure for dry locations, provide the proper enclosure for other locations as indicated.

E. Provide motor rated toggle switches where indicated.

F. Provide Bryant #3003 disconnect for 3 phase motors up to 5 horsepower.

**Part 3 - Execution**

3.1 Inspection

A. Inspect building structure to which disconnects are to be secured for defects which affect the execution and quality of work.

B. Do not start work until defects are corrected.

3.2 Preparation

A. Carefully measure and lay out exact locations maintaining working clearances required by the California Electrical Code.

3.3 Installation

A. Provide disconnects where indicated and where required by the California Electrical Code.

B. Install within sight of equipment served.

C. Provide final connection to equipment served.

D. Provide nameplate secured to cabinet with designation of equipment served, operating voltage, and circuit designation.

3.4 Labeling and Identification

A. Provide engraved plastic nameplates with 1/4 inch minimum height letters indicating:

1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards and motor control center.
2. Circuit designation of panel for device controlled on disconnects which are individually enclosed.

B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

End Of Section 26 28 16
26 51 10- Interior Lighting

Part 1 - General

1.1 Summary

A. This Section Includes:

1. Lighting fixtures (for interior applications).
2. Illuminated exit signs.
3. Lighting fixture components and accessories.

B. Lighting Fixtures - Required Types and Characteristics: Applicable information on the type and characteristics of lighting fixtures required are indicated herein, shown on the plans (including the use of lighting fixture schedules), and tabulated in other Sections of these Specifications.

C. Related Sections:

1. General electrical requirements: Section 260501.

1.2 References

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. American National Standards Institute
   ANSI C78.379 Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification and Beam Patterns
   ANSI C82.1 Ballasts for Fluorescent Lamps - Specifications
   ANSI C82.4 Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type)
2. ASTM American Society for Testing and Materials
3. Certified Ballasts Manufacturers Association
   Lamp and ballast combinations safety and performance standards
4. IEEE Institute of Electrical and Electronics Engineers
5. CEC California Electrical Code (NFPA 70)
6. NECA National Electrical Contractors Association "Standard of Installation"
7. National Electrical Manufacturers Association
   NEMA WD 6 Wiring Devices - Dimensional Requirements
8. NFPA National Fire Protection Association
10. Underwriters Laboratories, Inc.
    UL 57 Fixtures, Electric Lighting.
    UL 924 Emergency Lighting and Power Equipment
    UL 1570 Fixtures, Fluorescent Lighting.
    UL 1752 Fixtures, High Intensity Discharge Lighting.
    UL 1571 Fixtures, Incandescent Lighting.
    UL 935 Ballast, Fluorescent Lamps.
    UL 1029 Ballast, High Intensity Discharge Lighting.
1.3 **Submittals**

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings: Details of assembly, component dimensions, wiring and interconnection, materials lists, finishes, and installation requirements.

C. Product Data: Submit for each type of product specified. Include manufacturer's product data giving materials, finishes, dimensions, coefficients of utilization, and lamp types for each fixture which is the product of one of the listed acceptable manufacturers.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates:

1. Labels of UL listing, fixed to each item of material.
2. Labels of Certified Ballasts Manufacturers and Electrical Testing Laboratories affixed to each item of material.

1.4 **Quality Assurance**

A. Qualifications of Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years documented experience.

B. Laboratory Testing: Photometric testing shall be by Independent Testing Laboratories, Inc., based on Illuminating Engineering Society published procedures, and shall include candlepower distribution tabulation and zonal cavity coefficient of utilization tabulation.

C. Electrical Component Standard: Components and installation shall comply with NFPA 70, "California Electrical Code."

D. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

E. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

F. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.5 **Delivery, Storage and Handling**

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."
B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.6 Project Conditions or Site Conditions

A. Verify that field measurements are as shown prior to commencing the work.

Part 2 - Products

2.1 Acceptable Manufacturers

A. As indicated herein, and as shown on the Lighting Fixture Schedule.

2.2 Electrical Lighting Fixtures

A. Work covered includes manufacturing, equipping, wiring, and assembling of all lighting fixtures. Provide lighting fixtures complete for each and every light outlet in the type, quality, and size of fixture indicated in lighting fixture schedule.

B. The lighting fixtures shown on fixture schedule are marked with the corresponding type of letter, indicating thereby the particular type of fixture to be installed on the respective outlets.

C. Include a lighting fixture on every light outlet shown, unless otherwise indicated to be omitted. If the type of lighting fixture is not specifically noted, provide without extra cost to the Owner, a lighting fixture of the same type called for under a similar condition elsewhere on the Contract Drawings.

D. Catalog No. on the lighting fixture schedule are for the purpose of indicating the general type, quality, and size of fixtures that will be required. The use of Catalog Nos. for a lighting fixture does not necessarily include all accessories that may be required for a complete and operational installation.

E. All luminaries and other lighting equipment delivered to the job complete, wired and including all supporting means, such as plaster frames, supports, hangers, canopies, sockets, holds, all current or voltage modifiers, such as ballasts, starters, all light control materials; specifically diffusers, louvers, lenses, reflectors and refractors.

F. All lighting fixtures constructed and installed in accordance with local building codes and directives by the NFPA and shall bear the label of approval of the U.L. All materials new and of best grade of approved manufacturing standards. Workmanship of highest order to assure trouble-free operation and durability of equipment. Lighting fixtures constructed by labor agreeable with that employed on the project.

G. Lighting fixtures to be designed for highest relative efficiency and service. Maintenance to be simple and relamping possible without use of special tools.

H. Provide all light-sources, lamps and other light-producing media called for and suitable for specified equipment and functions.

2.3 Fluorescent Lighting Fixtures

A. Fluorescent luminaries to use not less than No. 16 gauge SF-2 wire. No splice or tap located within a fixture arm, stem or chain. Wire continuous from lamp socket, or from internally mounted ballast, to splice with building wire whether splice box is mounted on fixture or attached to building.

B. Fluorescent lampholders, white plaster, designed for spring loaded contacts or Bi-Pin contacts, as required, for specified lamp requirements.
C. Fluorescent lighting fixture body parts, comprising the lighting fixture housing, reflectors, wire channels, end plates, ballast housing, and similar body parts, to be made of extruded aluminum, galvanized stampings, or bonderized steel, as indicated in the lighting fixture schedule. Wire-ways to have adequate wiring space, accessible after fixture installation. Housing adequately ventilated where required. All screws and nuts have rust-proof finish.

D. All fluorescent lighting fixtures supplied with ballasts wired for the branch circuit wiring.

E. Where recessed fluorescent lighting fixtures are installed in ceiling finished with acoustical tile or grid system, the lighting fixture shall conform to the patterns indicated on the Architectural Reflected Ceiling Plan.

F. The final installation must present a symmetrical appearance, with all lighting fixtures free of any damage and thoroughly clean.

G. Provide all additional means necessary to support lighting fixtures that would put excessive stress on the ceiling system.

H. Lighting fixtures mounted end-to-end and used as a raceway to be mechanically bonded together to insure continuity of ground. Lighting fixtures used as "feed through" to have wireways of adequate size.

I. All plastic lens of shielding for fluorescent lighting fixtures to be made from 100% virgin acrylic unless otherwise specified.

J. Temperature around ballast and in fixture housing shall not exceed 90 degrees C. with ambient room temperature at 27 degrees C.

K. Fluorescent lighting fixtures exposed to outside temperatures supplied with 0 degree F. ballasts.

2.4 Lighting Fixture Notes

A. Recessed lighting fixtures in plaster or drywall ceilings to be furnished with plaster frames.

B. Lighting fixtures recessed in furred ceiling installed so that they can be removed from below the ceiling without damage to the ceiling.

C. Recessed lighting fixtures to be installed with metal bar hangers for attaching to ceiling supports. Lighting fixtures not supported directly from ceiling, provide galvanized steel wire as required for supporting lighting fixture from structure. No wood or other combustible material to be used for supporting fixtures.

D. Provide stems with swivel joints and canopies for all suspended lighting fixtures. Finish of all exposed parts to match that of the associated fixture, unless otherwise noted. Design to conform to Drawings. Wiring to pendant fixtures contained within stems. Wire entry by means of heavy malleable iron hickeys.

E. A canopy to be furnished for each stem and all canopies to match for each fixture type, as shown.

F. Ascertain type of ceiling construction for each fixture and provide suitable frames and fixture accessories to suit. Furnish substantial mounting frames or plaster rings for all recessed and semi-recessed lighting fixtures indicated or required. All frames made of galvanized steel with extra cross members where required to insure maintenance or proper opening dimensions during installation.

2.5 Lamps

A. Provide energy saving lamps for all fixtures as manufactured by Sylvania as specified in Fixture Schedule.
2.6 Ballasts

A. Electronic ballasts shall be Magnetek "Triad" series or equal by Advance, E.B.T. or Motorola. Electronic ballasts shall be high-frequency, full-output, U.L. listed and ETL certified, class "P" high power factor, with an "A" sound rating or better. All electronic ballasts shall have less than 10% total harmonic distortion, shall have a maximum lamp current crest factor of 1.7, and shall be warranted for parts and replacement labor for one full year from the date of installation. Ballasts for 1-, 2-, 3-, or 4- lamp combinations shall be used as specified in the lighting fixture schedule.

B. Magnetic fluorescent ballast shall be energy saving type General Electric Maxi-Miser II or equal Universal, Advance.

C. Ballast for fixtures installed outdoors, shall be exterior type for 0 degrees F starting.

D. Ballast for H.I.D. fixtures shall be high power factor type (minimum 0.9). Starting amount shall not exceed operating current.

E. Rapid-start fluorescent fixtures shall be furnished with ETL and U.L. approved high power factor "P" rated ballasts complete with automatic reset thermal protection. All ballasts shall be acoustically rated "A".

F. Temperature rise of the ballasts in fixtures not to exceed 45 degrees C on test and mounted in the fixture housing and secured in place by means of bolts, screws, lock washers and nuts.

G. Ballasts for magnetic fluorescent lamps shall be one or two lamp type only. Where one lamp fixtures are used in continuous rows, two lamp ballasts utilized except where odd lamps occur at end of rows. Ballasts have a power factor of 90% or higher and operate at not higher than 120% of rated current nor rated line voltage. All ballasts carry a 2-year guarantee for material and labor on replacement. Guarantee period starts after Architect's acceptance in writing of lighting installations.

H. All ballasts shall have power factor not less than 0.9.

2.7 Materials

A. Outlet Boxes: Refer to Section 260526.

B. Conduits: Refer to Section 260533.

C. Wires and Cables: Refer to Section 260519.

D. Fixtures: Of types scheduled, type letter referring to designation on the Drawings.

E. Lamps:

2. Incandescent: Inside frosted, 130 volts, of sizes scheduled.
3. Fluorescent:

   a. 32 watt lamps

      1) Equal to Osram-Sylvania FO32/741/ECO
      2) Rated not less than 2850 lumens output after 100 hours.

4. Provide 5% spare lamps to the district for each type of lamp.
F. Accessories:

1. Manufacturer's standard mounting rings, trim flanges, hanger bars, spacers, supports, plaster frames of nonferrous material or cadmium plated steel. Do not use painted steel plaster frames.

Part 3 – Execution

3.1 Inspection

A. Inspect Architectural drawings and specifications, including ceiling alternates, to determine ceiling material to be installed.

B. Inspect Architectural reflected ceiling plans.

C. Inspect installed ceiling components for defects affecting the quality and execution of work.

3.2 Preparation

A. Verify ceiling material and alignment.

B. Lay out exact locations of fixtures in accordance with reflected ceiling plans, fixtures' and switches' outlet boxes and supports.

C. Provide outlet boxes and conduit.

D. Provide appropriate hardware and fixture accessories to support from ceiling system.

3.3 Installation

A. Installation of all lighting fixtures done by experienced electrician. Lighting fixtures not installed where finished coat of paint has been applied to ceiling and walls until paint is thoroughly dry. Verify ceiling type with architectural plan and provide all necessary framing and mounting hardware.

B. Contractor to be responsible for proper coordination of all lighting fixture locations. Provide support for all lighting fixtures mounted on or recessed in hung ceiling. Confer with Ceiling Contractor and other trades to coordinate lighting systems.

C. Lighting fixtures to be rigidly mounted to fixture stud in outlet boxes. Malleable iron hickeys or extension pieces provided where required.

D. Provide suitable coverplate or canopy for each lighting fixture outlet box where the lighting fixture does not provide a suitable cover.

E. Lighting fixture to be installed in suspended T-Bar ceiling shall be attached to the ceiling grid with an attachment device with a capacity capable to resist a force equal to the weight of the light fixture acting in any direction. Lighting fixtures shall be supported directly from the structure above by hangers capable of supporting the weight of the fixture with #12 galvanized steel wire from all 4 corners.

F. Verify all ceiling heights and clearances if mounting height is not indicated on plans or in lighting fixture schedule, or if lighting fixture is relocated because of a conflict with another trade. A mounting height for the lighting fixture is to be submitted for review.
G. Each lighting fixture completely wired in an approved manner with No. 14 AWG copper stranded wire, 600 volt, with type SF-2 insulation; recessed lay-in lighting fixtures furnished with 7 feet No. 14 SF wire and 6 feet Greenfield, 4 feet when installed in an air plenum.

H. Circuit wiring running through the lighting fixtures to be No. 12 AWG with type SF insulation. No joints in the wires other than those absolutely required. Provide wires of sufficient length for making approved connections at the light outlets and at the lampholders or ballasts.

I. Joints and splices within lighting fixtures to be either soldered and taped with plastic electrician's tape or secured by wire nuts or indent type lug fasteners.

J. Protect the lighting fixtures from damage during their unloading or removal, storage or installation, any broken fixtures, lenses, etc. must be replaced with new parts, without any additional expense to the Owner, undue delay or inconvenience.

K. Upon completion of the installation of the lighting fixtures and lighting equipment, they must be in first-class operating order and in perfect condition as to finish, etc. Check for proper operation and appearance, alignment of fixtures and proper placement of lenses, louvers, lamps and other light-controlling or modifying appurtenances.

L. Where special lighting effects, flood or spotlighting is involved, perform final adjustment under the direct supervision of Architect.

M. Cleaning: Immediately prior to occupancy, damp clean all lenses, lighting fixture trims, reflectors, clean lamps or install new lamps as directed, with lenses and fixtures free of labels.

N. Use of Lighting Fixtures: As soon as any portion of lighting fixture work is ready for operation, the Owner shall have the right to operate the same under the supervision of the Contractor. This shall in no way be interpreted to mean the acceptance of such part of the installation or relieve the Contractor of his responsibility for the complete work or any part thereof.

O. Color and type of finish of all lighting fixtures as approved by the Architect.

P. Install fixtures and accessories in accordance with manufacturer's recommendations and industry standard practice.

Q. Coordinate work of this section with that of other trades.

R. Provide lighting fixtures, lamps, switches, and control systems, and wiring.

S. If designation omitted on drawings, provide same type fixture employed in rooms of similar usage (contact this engineer for final direction).

T. Provide spacers for fixtures mounted on low density ceiling material.

U. Provide plaster frames for recessed fixtures in plaster ceilings.

V. Install fixtures in fiber decking and formboard so outlet boxes and openings will not be sight exposed.

W. Prepare fixtures and trim required to be painted.

X. Outlet boxes locations on drawings are diagrammatic only. Position outlet boxes to coincide with suspension hangers and knock-outs.
Y. Install in accordance with manufacturer's instructions, submittal data, and details on drawings.

3.4 **Adjustment and Cleaning**

A. Adjust lamp positions for desired effects.
   1. Adjust lamp positions for desired effects.
   2. Align fixtures with building walls and tile joints.

B. Cleaning
   1. Remove dirt, grease, and foreign materials from fixtures.
   2. Remove fingerprints, smudges, and dirt from fixtures' lenses and lamps.

End of Section 26 51 10
27 00 00 – Structured Cabling System (SCS)

Part 1 – General

1.1 Scope of Work

A. The work under this section includes all design, material, equipment, supplies, labor, testing, and accessories required to furnish and install a complete Structured Cabling System (SCS) as specified herein. The SCS shall be defined as all cables, equipment, products, etc, as mentioned in these specifications. (Please note, for this project, that the SCS encompasses more than just voice and data cabling.)

B. It is the intent of these Specifications for the Contractor to design, provide and install a complete, fully operational, and tested system.

C. All miscellaneous system components including, but not limited to, cables, termination equipment, punch blocks, patch panels, ladder racks, backboards, equipment racks, J-hooks, support, seismic bracing as required and any other related items shall be furnished and installed complete under this section, such that the system shall perform all functions listed herein in compliance with all of the specified requirements.

D. Schedule is paramount to the project’s success. With this, the structured cabling contractor will have to continually work with the team to facilitate expeditious design, procurement, and construction processes.

E. Provide all necessary labor, material, and equipment, including but not limited to the following:

1.2 Related Work, Standards, Documents and Publications

A. Each agency's relative codes, standards, and recommended practices apply to the voice / data cabling systems and their components as specified herein:

1. Building Industry Consulting Service International (BICSI)

2. Comite Consultatif Internationale de Telegraphique et Telephonique (CCITT)

3. Telecommunications Industry Association (TIA) and American National Standards Institute (ANSI).
   b. TIA-526-14-B-2010 (OFSTP-14), Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; IEC 61280-4-1 Edition 2, Fibre-Optic Communications Subsystem Test Procedure- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement.

h. ANSI/TIA-569-C–2012, Telecommunications Pathways and Spaces.

i. ANSI/TIA/EIA-598-C–2005, Optical Fiber Cable Color Coding


k. ANSI/TIA-607-B-2011, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications


o. ANSI/TIA-1005-A–2012, Telecommunications Infrastructure Standard for Industrial Premises


4. Federal Communications Commission (FCC)

   a. FCC Part 68 – Connection of Terminal Equipment to the Telephone Network

5. American Society for Testing and Materials (ASTM)


6. Insulated Cable Engineers Association (ICEA)

   a. Communications Wire and Cable for Premises Wiring.


   a. IEC 61935.1-2006 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Installed Wiring

   b. IEC 61935.2 - 2006 Generic Cabling Systems - Specification for the testing of balanced communication cabling in accordance with ISO/IEC 11801 Patch Cords and Work Area Cords

8. Institute of Electrical and Electronics Engineers (IEEE)

   a. IEEE 802 Specification for Local Area Networks


9. International Organization for Standardization (ISO)


10. National Fire Protection Association (NFPA)


    b. NFPA-75 Standard for the protection of information technology equipment 2009

11. National Electrical Manufacturers Association (NEMA)
12. Occupational Safety and Health Administration (OSHA)
13. Underwriters Laboratories Standards (UL)
14. Intetek Testing Services ETL SEMKO (ETL)
15. National Electrical Code (NEC)

B. The Contractor shall be responsible for obtaining and utilizing the latest Structured Cabling, Architectural, and Electrical plans.

1.3 General Requirements

A. Manufacturer: The term “manufacturer” shall be defined as the company, or group of companies, that actually produces the products meeting the requirements of Section 2 of this document. The manufacturer shall have a minimum of seven- (7) year’s experience in manufacturing products of this type and shall be ISO 9001 Certified. The products, summarized in this specification, shall be supplied by a single manufacturer.

B. Contractor: The term “Contractor” shall be defined as the company, or group of companies, that designs and installs the products per Section 3 of this document. The Contractor selected to provide the installation of this system shall be certified by the manufacturer in all aspects of design, installation and testing of the products described herein.

1. The installing contractor shall hold a valid State of California C-7 Low-Voltage license, shall have completed at least ten (10) projects of equal scope, shall have been in business of furnishing and installing systems of this scope and magnitude for at least five (5) years, and capable of being bonded to assure the District’s Representative of performance and satisfactory service during the guarantee period.
2. The installing contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work.
3. All work shall be performed under the supervision of a company accredited by the manufacturer and such accreditation must be presented.
4. The installing contractor shall be a manufacturer’s authorized/certified installer of the specific product and warranty station for the equipment offered and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment through the warranty period. The Contractor must be certified by the manufacturer a minimum of 180 days prior to bid opening.
5. The Contractor selected for this Project must adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
6. The installing contractor shall own and maintain tools and equipment necessary for successful installation and testing of all installed material and/or equipment to include but shall not be limited to; fiber optic cable and Category 6e metallic premise distribution systems and have personnel who are adequately trained in the use of such tools and equipment.
7. The Contractor shall have the capability to produce the AutoCAD, BIM, and PDF documentation as required elsewhere in this specification and to produce final as-build drawings in AutoCAD, BIM and PDF as required.

1.4 General Submittal Requirement

A. Submittals shall be presented and formatted per the guidelines in Division 1.

B. All cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part
1.5 Pre Installation Submittal Requirements

Per the schedule as agreed to between the District and the Contractor, the Contractor shall submit the following:

A Submittal Binder: Submit eight (8) copies and one (1) PDF of the complete Submittal Binder to the District for review. The binder shall consist of an index page and four major sections with each section separated by index tabs. Each page in the binder shall be numbered sequentially and shall be summarized in the index.

1. The first section shall be the "title sheet" which shall include the submittal date, project title and address, name of the contractor, and name of the District.
2. The second section shall contain an index including the page number, product Manufacturer, product part number, product description, and corresponding specification section number or drawing sheet number where that product is referenced. Also listed in the index shall be each item of test equipment to be used to test the optical fiber and copper components. Include all patch cords and other specialized components.
3. The third section shall contain original manufacturer cut sheets for all of the materials that meet the requirements listed in Section 2 of this specification and all materials described on the construction drawings. Also include manufacturer’s cut sheets for all testing equipment to be used for completion of the project. All pages shall be numbered sequentially corresponding to the index. On each cut-sheet, provide an indicating arrow next to each part number of proposed material.
4. The fourth section shall contain Cabling System Construction Documents and plans. These documents and plans shall be based on information shown in the drawings and prescribed in these specifications. They shall show quantities and part numbers for all components including patch panels, cables, conduit, cabinets and equipment racks, WiFi locations, all data outlets, BDF/MDF/IDF locations, card reader locations, clock locations, splices, splice cases and all other associated components. Documents shall include a specification section, riser and cabling diagrams with material lists, overall floorplans, enlarged floorplans of MDF/BDF/IDF rooms, MDF/BDF/IDF rack and applicable wallfield elevations, outlet faceplate details of all outlet varieties, and any documentation required for obtaining required permits and for construction.

B Component Samples and Mock-ups

Provide one full size installation sample mock-up of each of the following components for approval. All samples are to be fully labeled per these specifications.

1. Optical Fiber Cable Samples: Provide a 24” length of each type of optical fiber cable being used as a part of this installation; each sample shall be complete with strength members, outer jacket and all elements. The outer jacket shall be stripped back 12” from one end of the sample to allow the individual fiber sub-cable groups to be inspected for all cables. Each color-coded sub-cable jacket shall be stripped back 6” from the end of the cable to allow its individual elements to be inspected. Label each cable as detailed in this specification. The sample shall show all the cable markings, including part numbers, manufacturer, and lengths.
2. Copper Cable Samples: Provide a 24” length of each type and color of copper cable being used as a part of this installation. Provide color samples for each system color and a matrix to detail which color is to be used for each system. The outer jacket shall be stripped back 6” from one end of the sample to allow the individual pairs to be inspected for all cables. Label each cable as detailed in this specification. The sample shall show all the cable markings, including part numbers,
3. Category 6e Patch Panel: Provide a Category 6e patch panel. This shall consist of the specified patch panel, fully loaded, complete with all associated components. The patch panel shall be fully loaded with the maximum number of cables dressed into the patch panel and terminated as described in this specification. All strain relief shall be provided as part of the sample. A 36” length of each cable shall be dressed and attached to the strain relief with “hook and loop” straps per these specifications. The unit shall be fully labeled as detailed in these specifications.

4. Outlet Samples.
   a. Provide a full sized mock-up of each communications outlet type, as listed below. The sample is intended to represent a typical communications outlet and shall include all associated parts to make a complete sample. Provide bushings and strain relief for the distribution cable jacket, demonstrating how the cable shall be secured. Label the outlet and each connector as detailed in this specification.
   b. Provide samples of the following outlet configurations:
      (1) Wall-mounted outlet - provide the faceplate, terminated communications outlets, the electrical backbox, and a 96” length of the relevant cable(s), in wall supports, strain relief equipment and bushings.
      (2) Furniture outlet – provide faceplate, bezel, outlets, cable and labeling installed in a modular furniture baseboard or beltline raceway sample. The Contractor shall obtain a sample of the modular furniture system baseboard or beltline raceway where the outlet will be installed from the furniture system vendor. If the modular furniture system has not been selected or finalized, the Contractor shall proceed with all other tasks or phases of the project, but shall not place an order for furniture system faceplates, bezels, etc., until furniture system samples are available and this mock-up has been accepted by the District. The District shall not be held responsible for any re-stocking, re-ordering or other fees and charges resulting from ordering parts prior to mock-up acceptance.

5. Installation shall not proceed until the sample mock-ups have been inspected and approved by the District. Sample mock-ups are intended to represent the components that are to be installed as part of this project; therefore, they are to be provided with all associated components and labeling required for the final installation. Upon acceptance, the mock-ups will be used as the standards by which the quality of work on the project by the Contractor shall be judged. Any installation that does not meet this standard shall be replaced or re-worked by the installing contractor as approved by the District at no additional cost to the District. All samples will be retained by the District. The District shall not be held responsible for project delays resulting from delays in sample mock-up approval, and shall not withhold approval without cause.

1.6 Post Installation Submittal Requirements

Within fifteen (15) calendar days after the completion of work, the Contractor shall submit the following:

A. Record Documentation
   1. Final Test Results
      Test results for each cable indicating tests performed, results obtained, equipment used for testing along with documentation of last calibration/certification and values measured. Test results shall be provided in electronic format with the associated application (if required) for viewing.
   2. As-Built Drawings: Contractor shall provide a complete set of professionally drafted "E" size (30" x 42"), unless otherwise noted, including reproducible bond as-built drawings and drawings in both AutoCAD (latest version) and PDF format.
      a. MDF, BDF and IDF Diagrams - Including:
         (1) Cable routing.
(2) Position of all components and apparatus.
(3) Detailed layout of the wallfield(s).
(4) Labeling plan with IDs
(5) Complete rack layout for each rack including port and patch ID numbers.

b. Work Area Floor Plans - Including:
   (1) Detailed cable routes.
   (2) Labeled workstation locations. Labels to match approved workstation faceplate labels.

c. Cross Connect Documentation - Including:
   (1) Cross-connect records for all voice, and data devices.

d. Riser Distribution Plan.
e. Cable Tray, Conduit, and Raceway Plans (if applicable).

B. As-Built Documentation Display in each MDF, BDF & IDF.

Install a complete, professionally drafted as-built floor plan in color in each MDF, BDF & IDF mounting frame. Each floor plan, generated on AutoDesk AutoCAD and printed in color, shall depict all jack locations in each modular furniture cubicle and all other areas. Also depicted shall be in-building Wi-Fi antennae, CATV jack locations or any other communications outlet cables by the installing contractor. All jack locations shall be color coordinated with the District’s labeling scheme as described elsewhere in this specification.

C. Provide to District one set of PDFs on CD ROMs containing all post installation submittals.

D. Warranty Documentation:

Contractor shall present to District all warranty General and Specific Warranty Documents per Warranty Specifications Sections. Warranty shall commence after final acceptance of System by District.

1.7 General System Product, Installation and Overall System Warranty

A. Prior to District acceptance, the Contractor shall provide to the District’s Project Manager, a manufacturers product and performance warranty. This will require a submittal of the required pre-job certification registration forms as well as the required project closing information. The District will only acknowledge acceptance upon submittal of a valid manufacturer’s warranty.

B. The warranty shall commence from the date of the District’s final written acceptance of the completed project.

C. All conditions for obtaining the manufacturers warranty shall be the sole responsibility of the Contractor.

D. The Contractor shall maintain a competent service organization through the complete warranty period, and shall if requested, submit a service maintenance agreement to the District after the end of the warranty period.

E. A typewritten notice shall be posted at the equipment rack that shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be laminated and mounted neatly and securely attached to the inside of the door.
1.8 Specific System Product, Installation and Overall System Warranty

A. A twenty (20) year Extended Product Warranty and Application Assurance for the voice / data wiring system shall be provided as follows:

1. 20 Year Extended Product Warranty
   a. The 20 Year Extended Product Warranty shall ensure against product defects, that all approved cabling components exceed the specifications of ANSI/TIA/EIA 568-C and ISO/IEC 11801, exceed the attenuation and NEXT requirements of ANSI/TIA/EIA 568-C and ISO/IEC 11801 for cabling channels, that the installation will exceed the loss and bandwidth requirements of ANSI/TIA/EIA 568-C and ISO/IEC 11801 for fiber channels, for a twenty (20) year period. The warranty shall apply to all passive SCS components.
   b. The 20 Year Extended Product Warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for a twenty (20) year period.

2. 20 Year Application Assurance
   a. The 20 Year Application Assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future, up to 10Mbps parallel transmission schemes, by recognized standards or user forums that use the ANSI/TIA/EIA 568-C or ISO/IEC 11801 component and channel specifications for cabling, for a twenty (20) year period.

3. System Certification
   a. Upon successful completion of the installation and subsequent inspection, the District’s Project Manager shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

4. Warranty/Contractor Qualifications shall be applicable as follows:
   - Commscope/SYSTIMAX – Provide SCS Warranty, including requirement that all work shall be performed and tested by a SYSTIMAX-Certified SCS Contractor
   - Berk-Tek Leviton – Provide BLT Warranty, including requirement that all work shall be performed and tested by Berk-Tek Leviton Technologies BLT-Certified Contractor
   - TE Connectivity/AMP NETCONNECT – Provide TE25 Warranty, including requirement that all work shall be performed and tested by a TE/ND & I-Certified Contractor
   - Panduit/General Cable – Provide PanGen Solution 25 year warranty, including requirement that all work shall be performed and tested by a PanGen Solution Certified Contractor

Part 2 – Products

2.1 Acceptable Manufacturers

A. All equipment listed herein will be by:
1. Structured Cabling System (SCS): Commscope/SYSTIMAX, Berk-Tek Leviton, TE Connectivity/AMP NETCONNECT or Panduit/General Cable
2. Cabinets, Racks, and Ladder tray: Cooper B-line, Chatsworth
3. Horizontal and Vertical wire management: Cooper B-Line, Chatsworth
4. Splice cases: Preformed
5. Assistive Listening System: Williams Sound

B. It is the responsibility of the Contractor to insure that the proposed product meets or exceeds every standard set forth in these specifications and the equipment's technical data sheets.

C. The functions and features specified are vital to the operation of this facility. Therefore, inclusion of a component's manufacturer in the list of acceptable manufacturers does not release the Contractor from strict compliance with the requirements of this specification.

2.2 Outlets

A. For purposes of this document there is no distinction between data, phone, fax, printer or outlets for other peripheral devices. Since all devices use the same structured cabling system and the phone system will be VOIP, all outlets will be referred to as “data” outlets. Unless otherwise noted, all “outlets” will consist of (2) Category 6 cables permanently installed between the outlet location and the nearest BDF or IDF.

B. Locations: As Shown.

C. Faceplates

1. Faceplates shall be white in color unless otherwise noted. All data jacks shall be orange in color.
2. All Faceplates shall be available in single, duplex, triplex, quad-plex, or six-plex arrangement in a single gang configuration.
3. Faceplates shall be available in eighplex arrangement in a dual gang box configuration.
4. Modular furniture faceplates shall be available in single, dual, triple and quad configuration for the District’s modular existing and/or new modular furniture. Faceplates shall be flush-mounted in the modular furniture. Surface mounted boxes/faceplates are unacceptable. The Contractor is responsible for coordinating with the District’s modular furniture contractor to determine faceplate requirements. The installing contractor shall provide and install all parts/fittings necessary to meet the requirements of this section.
5. Wall mounted phone jack faceplates shall be single gang configuration and have two standard phone mounting posts located above and below the jack opening.

D. Data outlets shall consist of one, two or three gang utility outlet boxes equipped with modular faceplates and 8-pin modular (RJ-45) jacks utilizing T568B wiring scheme. All outlet cabling shall terminate on termination blocks at their associated Main Distribution Frame (MDF) / Building Distribution Frame (BDF) / Intermediate Distribution Frame (IDF) Rooms, or as otherwise indicated on the drawings.

E. Category 6 Gigabit modular jacks

1. All Category 6 modular jacks shall meet or exceed Category 6 transmission requirements for connecting hardware, as specified in ANSI/TIA/EIA 568-C Commercial Building Telecommunications Cabling Standard and be part of the UL LAN Certification and Follow-up Program.
2. The Category 6 modular jacks shall be capable of being in a modular patching situation or as a modular telecommunication outlet.
3. The Category 6 modular jacks shall be capable of being installed in any modular faceplate,
modular patch panel, frame, or surface-mounted box without special couplings or adapters.

4. The Category 6 modular jacks shall have improved pair splitters and wider channel for enhanced conductor placement. The outlet shall also have a low-profile wire cap, which protects against contamination and secures the connection. All data jacks shall be orange in color.

### 2.3 Station Cable

A. Category 6e unshielded twisted pair (UTP) cables shall extend between the station location and it’s associated MDF/BDF/IDF and consist of 4 pair, 23 gauge solid insulated wire, and shall terminate on Category 6e modular jacks at each outlet and Category 6 patch panels at MDF/BDF/IDF. Cabling shall be blue.

1. Category 6e UTP, 4 Pair

   a. The high performance Category 6e UTP cable shall be of the traditional round design with mylar separator tape between pairs.

   b. The cable jacket shall comply with Article 800 NEC for use as a plenum when installed in plenum environments. The 4 pair UTP cable shall be UL Listed type CMP (plenum), or CMR (non-plenum).

B. All Category 6 high performance cables shall meet or exceed the following:

#### Electrical Characteristics:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Capacitance</td>
<td>56 nF/m at 1kHz</td>
</tr>
<tr>
<td>Characteristic Impedance</td>
<td>(± 3%) of 100 Ohms 1-550 MHz</td>
</tr>
<tr>
<td>DC Resistance Max</td>
<td>7.61 Ohms/100m</td>
</tr>
<tr>
<td>Positive ACR Max</td>
<td>To 400 MHz-km</td>
</tr>
</tbody>
</table>

#### Physical specifications:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor size</td>
<td>23AWG</td>
</tr>
<tr>
<td>Diameter</td>
<td>.24 to .29” nominal</td>
</tr>
<tr>
<td>Operating temp</td>
<td>-4 F to 140 F</td>
</tr>
</tbody>
</table>

C. A 3’ service loop shall be provided at each end of the station cable.


### 2.4 Category 6e Patch panels (If Required)

A. The termination block shall support the appropriate emerging high-bandwidth applications, including 1 Gbps Ethernet, potentially 1.2 Gbps ATM and 2.4 Gbps ATM, Multi-Tasked Split Screen Computing, Virtual Holographic Video Conferencing, Instant Access Telemedicine, 3D CAD/CAM Engineering, and Internet-Intranet Communications/Commerce, as well as all 77 channels (550 MHz) of analog broadband video, and facilitate cross connection and inter connection using modular patch cords.

B. All Modular jack panels shall be wired to ANSI/TIA/EIA 568-C using T568B wiring.

C. The wiring block shall be able to accommodate 23 AWG cable conductors.

D. The Category 6e modular jack panels shall meet or exceed the Category 6e standards requirements in ISO/IEC 11801 and ANSI/TIA/EIA and shall be UL Listed.
E. A 110 IDC termination block shall provide for the termination of horizontal, equipment, or tie cables.

2.5 Category 6 – Patch/Station Cords

A. Provide Category 6 Modular Patch / Station cords for each assigned port on the patch panel and for each outlet in the station locations. All cords shall conform to the requirements of ANSI/TIA/EIA 568-C Standard. Cords shall be equipped with an 8 pin modular connector on each end and shall conform to the length(s) specified. All cords shall be wired to T568B wiring scheme standard. All cords shall be factory-built by the cabling manufacturer with a molded boot at both ends. Fabrication of cords in the field is prohibited.

B. All patch cords shall exceed ANSI/TIA/EIA and ISO/IEC Category 6/Class E specifications.

C. The patch cord shall have built-in exclusion features to prevent accidental polarity reversals and split pairs.

D. UL Verified for ANSI/TIA/EIA 568-C Electrical Performance

E. Miscellaneous:

1. UL Listed for Fire Safety
2. ISO 9001 Certified Manufacturer
3. FCC Compliant

F. Quantities:

1. Category 6e Workstation and closet patch cords shall be provided for each MDF/BDF/IDF and workstation installed Category 6e cable.
2. One (1) 3’ (minimum length) patch cord shall be provided for each workstation installed cable.
3. Patch cords shall be provided in various lengths (2’, 3’ and 10’) such that a minimum of slack is present at the patch panel to switch connection. All installed Category 6e ports shall be patched.

G. Patch cords shall be from the same manufacturer as the station cabling.

H. All patch cords at workstations and in MDF/BDF/IDF rooms shall be installed and dressed in per the District’s direction.

2.6 Cable Management

A. 6” wide vertical wire managers (VWM) will be required between and on either side of equipment racks. Provide CPI #30095-703 or equal by B-line.

B. Horizontal wire manager (HWM) will be required between each patch panel, switch, or other rack mounted equipment. Provide CPI #30330-719 or equal by B-line.

C. Cable tray shall be used to manage cabling above racks in the BDF/MDF/IDF rooms. Mount cable tray to walls and support from structure. Provide minimum 18” wide U.L. listed cable tray CPI #11275-718 or equal by B-line. Provide radius dropouts where ever cables leave the tray. Bond each tray section to ground per ANSI/TIA-607-B-2011.

2.7 Fire Rated Pathway
A. All penetrations through fire rated partitions shall include a UL Classified firestop system with F and T ratings greater than or equal to the partition’s rating. Penetrations shall be provided sufficient for the number and size of cables penetration the partition plus 20%. Separate penetrations shall be provided for data/voice, security/access control, CATV, and Fire Alarm.

B. The firewall through-penetration shall be a manufactured, UL Classified, firestop device / system designed to allow cables to penetrate fire-rated walls with a built-in fire sealing system that automatically adjusts to the amount of cables installed.

C. The firestopping device shall be capable of installation in new construction or retrofit in existing structures.

D. The device shall be UL Tested and Classified in accordance with ASTM E814 (UL 1479) and with ratings up to and including 2 hours.

E. Manufacturer: Specified Technologies Inc., EZ-Path (#EZDP44) or equal by Wiremold.

2.8 Voice Circuit Terminations in the Telecommunications Closets (If Required)

A. The wiring block shall be 110-type and support Category 3, 5e and 6 applications and facilitate cross connection and interconnection using either cross connect wire or the appropriate category patch cords.

1. The wiring blocks shall be fire retardant, molded plastic consisting of horizontal index strips for terminating 25 pairs of conductors each. These index strips shall be marked with five colors on the high teeth, separating the tip and ring of each pair, to establish pair location. A series of fanning strips shall be located on each side of the block for dressing the cable pairs terminated on the adjacent index strips.

2. The wiring blocks shall accommodate 22- through 26-AWG conductors and shall be able to mount directly on wall surfaces either with or without backboards or on a 24” free-standing frame.

3. Clear label holders with the appropriate colored inserts shall be provided with the wiring blocks. The insert labels shall contain vertical lines spaced on the basis of circuit size (3-, 4-, or 5-pair) and shall not interfere with running, tracing or removing jumper wire/patch cords.

4. The wiring blocks shall be available in 50, 100, and 300 pair sizes. The 100 and 300 pair wiring blocks shall be available with or without legs. The legs allow the cables to pass behind the wiring block and fan out to each side. The space created by the feet, on each side of the block, allows it to be used as a vertical jumper trough. The 50 pair size is not available with legs and shall be utilized for low pair count and/or depth restrictive situations.

5. The wiring block shall be able to accommodate over 500 repeated insertions without incurring permanent deformation and it shall pass the reliability test of no more than one contact failure in 10,000 connections.

6. The 110 wiring blocks shall meet the following specifications:

a. Physical Specifications:

(1). Height:
   25/50-Pair – 1.75 in. (4.45 cm)
   100-Pair – 3.6 in. (9.12 cm)
   300-Pair, 10.8 in. (27.41 cm)

(2). Width:
   With legs: 10.7 in. (27.23 cm)
   Without legs: 8.5 in. (21.60 cm)

(3). Depth:
   With legs: 3.2 in. (8.25 cm)
   Without legs: 1.4 in. (3.60 cm)
Electrical Specifications:
ANSI/TIA/EIA Category 6

7. For each wiring block shown on the drawings, provide and install 110 type 4-pair or 110 type 5-pair connecting blocks for each horizontal index strip on each wiring block. For example, a 300 pair wiring block serving station cables requires 72 4-pair connecting blocks. A 300 pair wiring block serving riser pairs requires 60 5-pair connecting blocks.

8. Product Specification: **Systimax 110A or 110D, Ortronics 110AB, or AMP 610XC**

B. Voice MDF/BDF/IDF Rooms, or as otherwise indicated on drawings, locations shall be equipped with termination blocks for termination of voice station and host cable pairs. Voice cable blocks shall consist of a minimum 100 pair. All blocks shall be securely fastened to the room backboards or equipment racks – see drawings. Provide all required D-rings, Flextray or other approved cable guides as required to provide a neat installation. All cables shall terminate in numerical sequence.

Part 3 – Execution

3.1 General Installation Description

A. The structured cabling system shall consist of any or all of the following subsystems:

1. Work Area Subsystem
2. Horizontal Subsystem
3. Administration Subsystem
4. Support Subsystem

B. Work Area Subsystem: The Work Area Subsystem provides the connection between the information outlet and the station equipment in the work area. The Work Area Subsystem includes:

1. Adapters
2. Faceplates

C. Horizontal Subsystem: The Horizontal Subsystem provides connections from the horizontal cross connect to the information outlets (IOs) in the work areas. It consists of the horizontal transmission media, the associated connecting hardware terminating this media, and IOs in the work area. The Horizontal Subsystem encompasses the active channel (See section on Testing). Each floor of a building shall be served by its own Horizontal Subsystem. The Horizontal Subsystem includes:

1. Horizontal Cabling
2. Jacks
3. Patch Panels
4. Patch Cords
5. Station Cords

D. Administration Subsystem: The Administration Subsystem links all of the subsystems together. It consists of labels, diagrams, drawings, manuals, and tools necessary to manage the Structured Cabling System after installation. The Administration Subsystem includes:

1. Labels
2. As-built drawings
3. Operations manuals
4. Record drawings
5. Test results

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6. **Warranty documents**

E. **Support Subsystem:** The Support Subsystem consists of hardware and equipment required to facilitate and sustain the Structured Cabling System. The Support Subsystem includes the cabling pathways, cabinets, and racks that hold the structured cabling in place. The Support Subsystem includes:

1. Cable tray
2. Ladder Rack
3. Fire Stop systems
4. Conduit
5. Data Equipment Racks
6. Cabinets
7. Vertical and Horizontal Wire Managers
8. Backboards

### 3.2 Installation Requirements

A. All materials shall be new. No used or re-manufactured parts or components shall be accepted.

B. All communications cabling used throughout this project shall comply with the requirements as outlined in the NEC Articles 725, 760, 770, and 800 and the appropriate local codes. All copper cabling shall bear UL listed type CMP (Plenum Rated) and/or CMR (Riser Rated). All fiber optic cabling shall bear OFNP (Plenum Rated) and/or OFNR (Riser Rated). The Design-Build Entity is responsible for installing appropriately rated cable for the environment in which it is installed.

C. **Cable Storage:** Do not roll or store cable reels without an appropriate underlay and the prior written approval of District’s Project Manager.

D. All installation shall be done in conformance with ANSI/TIA/EIA 568-C standards and manufacturers installation guidelines. Ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities.

E. The system must meet all local and other prevailing codes.

F. All cabling installations shall be performed by qualified technicians. The labor employed shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the District’s Project Manager to engage in the installation and service of this system.

G. Special Equipment and Tools: In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a cable manufacturer’s recognized special tool. It shall be the responsibility of the Design-Build Entity to furnish any special installation equipment or tools necessary to properly complete the System. This may include, but is not limited to, tools for terminating cables, testing and splicing equipment for copper/fiber cables, communication devices, jack stands for cable reels, or cable winches.

H. Under no circumstance are "channel locks" or other multi-purpose pliers to be used.

I. The cable’s minimum bend radius and maximum pulling tension shall not be exceeded.

J. No cable is to be pulled through a conduit “L-bend” (condulets).

K. Conduit runs shall not exceed 100 feet or contain more than two 90 degree bends without utilizing appropriately sized pull boxes. Pull boxes are not to be used in lieu of a bend.

L. Reinstate all pull-wires in conduits and ducts after use to facilitate future addition of cables.

M. Cable raceways and conduits shall not be filled greater than the TIA/EIA recommended fill for the particular raceway or conduit size.
N. The use of lubricants (i.e. Yellow 77, Polywater) to facilitate the installation of cables in conduits is highly discouraged, however, if such a lubricant must be used, a lubricant specifically designed for the environment and type of cable being installed shall be used. (E.G. the use of outside plant, low temperature cable lubricants shall not be acceptable in an indoor plenum environment.) Under no circumstances shall cable pulling lubricant be allowed to accumulate on walls, floors, backboards, or other surfaces outside the conduit.

O. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced before final acceptance at no cost to the District.

P. Each station cable shall have 1 meter of service slack configured in an “S” shape via J-hooks at rack or wall field end and 3 feet of service loop at station outlet end. Service slack shall be located within 15’ of the MDF/BDF/IDF as required to maintain a neat and “workmanship like” installation.

Q. The length of each individual run of horizontal cable from the administration subsystem to the information outlet shall not exceed 295-ft (90 m).

R. Each run of cable between the termination block and the information outlet shall be continuous without any joints or splices.

S. All station cable shall be placed in the interior of walls unless otherwise noted or obstructed.

T. Provide bushings, grommets and strain-relief for cables terminating at wall-mounted outlets and patch panels to ensure durable and robust connections. The bushings and grommets are intended to protect the cables from any sharp edges that present a risk to the cables. Ensure that all sharp edges are covered to protect the cables from damage.

U. All cable bundles exiting floor or wall penetrations and running into furniture or casework shall be wrapped in spiral wrap or split-loom tubing to protect the cabling and provide a neat installation.

V. Power Separation: No distribution cabling shall be placed alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus. At no point shall the communications cables be tied to power cables or other building services. Station cables and tie cables installed within ceiling spaces shall be routed through these spaces at right angles to electrical power circuits.

W. Avoid electromagnetic interference (EMI) by maintaining adequate physical separation between telecommunications cabling and possible sources such as, but not limited to, electric motors, electric pencil sharpeners, transformers, fluorescent lights that share distribution space with telecommunications cabling, copiers that share work area space with line cords and terminals, large fax machines and power cords that supports such equipment.

X. All cable or innerduct shall run parallel or at right angles to building wall structures.

Y. Within walls, all cabling shall be installed within conduit to an elevation of + 6” above the accessible ceiling space.

Z. Cable tray shall be provided throughout the core of the building and throughout the telecommunications room. The cable tray shall be basket type and sized per code to accommodate all cabling to be installed plus spare. Cable tray shall be a minimum of 12” wide by 4” deep. Note that all low voltage system cabling including EMS, security, access control, future CCTV, etc. shall route exposed above the ceiling and within the cable tray and each system cable shall be provided with a unique color or ease of service and maintenance.

AA. Mechanical duct work, sprinkler piping, plumbing piping, drain pipes, etc shall not route above the cable tray.

BB. In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, cable bundles shall be supported via "J" hooks attached to the building structure and framework at a maximum of five (5) foot intervals. Minimum 1” wide J-hooks shall be appropriately sized to allow a minimum of
50% spare capacity for future cable installation. The Design-Build Entity shall include all costs in base bid for any additional supports/seismic bracing required by the Local Authority having Jurisdiction.

CC. Cables shall be bundled, in groups of 18 or less, station or other cabling with half inch hook and loop (Velcro®) strips tight enough to hold the bundle together in a cylindrical shape, but not so tight as to deform the cable geometry. It shall be possible to completely rotate all cable ties around all cable bundles. Plenum rated hook and loop ties will be used in all plenum areas. In areas where 2 or more bundles are traveling in close proximity, utilize a Chatsworth Rapidtrak Cable support system or equal.

DD. Cables or J hooks shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.

EE. Cables or J hooks shall not be attached to or supported by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.

FF. Conduit(s) and sleeve(s) shall be of suitable material, sized, installed, fire-stopped, and grounded as required by the NEC, ANSI/TIA/EIA standards and all other applicable codes and standards. Any conduit(s) and sleeve(s) added shall be approved by the District’s Project Manager prior to rough-in.

GG. Removal of the ceiling grid must be coordinated with the District’s Project Manager. All insulation shall be replaced in its original location.

HH. Cabling and Termination Identifications: A numbering and marking scheme must be used to identify all cable and cabling terminations. All cables, regardless of length, shall be marked and/or numbered at both ends. Marking codes and methodologies shall correspond to the instructions in this specification.

II. Ensure that all waste materials are disposed of in a safe manner. Pay particular attention to waste materials produced during the termination of optical fiber cabling. Ensure that all used components and fiber cut-offs are collected in purpose-made containers and disposed of properly.

JJ. Ladder tray mounting brackets shall be screwed to studs or to the properly mounted plywood wall field, not to drywall.

KK. Seismic Requirements: All equipment racks, equipment cabinet enclosures, cable runways, etc. shall be installed according to the local, state and/or federal seismic code.

LL. Cable bundles within the MDF/BDF/IDF shall be dressed into bundles of no more than 18 cables. Maintain each bundle with half inch, hook and loop strips every 18 inches. On completion of installation, neatly run and re-tie all cable bundles in the Closet.

MM. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc.

NN. Conduits: All backbone cabling will run through dedicated conduits. All new conduits will be supplied with a pull string. Existing conduits shall be proven to be clear prior to pulling of cables. Supply pull string and pull rope for the installation of all cables in existing conduits. For all conduits left with available capacity, replace pull strings with ¼-inch pull rope during the course of his work. The installing contractor must seal all conduits with an approved sealing compound.

OO. Use purpose-built pulling grips during cable installation. Do not pull cables by attaching pull wires to cable jackets, elements or reinforcement. The cable pulling tension shall be applied smoothly without jerks. Use strain gauges or equivalent measures to ensure that the maximum manufacturer recommended tensile load rating of the cables is not exceeded during installation.

PP. The number of cables in each conduit shall be controlled to allow for future cable installation and to stay within the manufacturer’s maximum allowable cable pulling tension. Conduit fill ratios shall not exceed the current requirements of the NEC.

QQ. Provide expansion plugs in all ducts/conduits entering the building. Seal all unused ducts/conduits with plugs that allow the pull-string to be tied off on the inside.

RR. All cabling shall be splice free unless otherwise noted on drawings.
SS. All grounds shall consist of #6 AWG copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground. All cable sheaths and splice cases shall be grounded to a Telecommunications Ground Bus. Grounding must be in accordance with the NEC, NFPA, ANSI/TIA-607-B-2011 and all local codes and practices. Bond all metallic sheath communications cables entering the building per manufacturer specifications and NEC 770-33, 800-33 and 800-40.

TT. Each equipment cabinet and rack requires its own dedicated grounding connection to the grounding infrastructure. Grounding infrastructure can consist of either an “aisle ground” conductor placed at the ladder tray above each rack/cabinet, or by providing every rack/cabinet with its own dedicated #6 AWG (min.) green conductor back to the TMGB/TGB. All ground conductor attachments to the TMGB/TGB shall utilize 2-hole compression lugs.

Rack mounted equipment shall be grounded via the chassis, in accordance with manufacturer’s instructions. The equipment chassis shall be bonded to the rack/cabinet using one of the following methods:
1. If the equipment has a separate grounding hole or stud, use a #6AWG ground wire from the chassis ground hole/stud to the rack grounding bus.
2. If the manufacturer suggests grounding via the chassis mounting flanges, use tri-lobular thread-forming screws (not self-tapping or sheet metal screws) to attach the equipment to the rack/cabinet rails. If the equipment mounting flanges are painted, remove the paint and apply an anti-oxidant, or use tri-lobular thread-forming screws and two (2) “Type B” internal-external tooth lock washers to safely ground equipment to the rack.

Bonding of ladder tray sections- Attach bonding straps to each ladder tray section by utilizing either two (2) tri-lobular thread-forming screws (not self-tapping or sheet metal screws) or by using two (2) standard bolts with two (2) “Type B” internal-external tooth lock washers per bolt. If thread-forming screws are not used, remove paint at each connection point and use an approved anti-oxidant prior to attaching the bonding strap.

3.3 Penetrations of Walls Floors and Ceilings

A. Any penetrations through acoustical walls or other walls for cable pathways / cables shall be sealed in compliance with applicable code requirements and as directed by District’s Project Manager.

B. Replace all moisture and fire barrier material in ducts, conduits and other penetrations disturbed during installation of communications cabling.

C. Any penetrations through fire-rated walls for cable pathways / cables shall be sealed by use of a non-permanent fire blanket or other method in compliance with the current edition of NFPA and the NEC or other prevailing code and must be an approved UL Listed system. Do not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. This requirement also applies to maintaining fire ratings of all floors penetrated by conduits or devices designated for use by voice and data cabling.

D. Sealing material and application shall be an approved UL Listed system and shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work. Any openings left unused shall also be sealed as part of this work.

1. Firestopping work shall be performed by a single contractor to maintain consistency and accountability on the project.
2. Firestop installer shall be certified, licensed or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements.
3. All installed through penetration firestops shall be identified via label, or stencil. Label shall state that the fill material around the penetrating item is a firestop, and that it shall not be disturbed.
unless by an authorized contractor. The label shall include the firestop brand name, and the
classified system number for which it was installed.

3.4 Labeling Requirements

A. Labeling: Provide printed labels for all cables and cords, distribution frames, and outlet locations,
according to the specifications. No labels are to be written by hand.

B. Numbers must be assigned to each outlet location using a logical designation convention. Before any
permanent labels are installed on blocks, face plates or cables, a sample label of each various type listed
below must be submitted to District’s Project Manager for written approval to ensure compliance with
the labeling scheme, legibility, etc.

C. Station Faceplate Labeling. The following labeling scheme may be modified at the discretion of the
District:

Example: 21.001

21 IDF location where cable originates (i.e., IDF room “#21”).
001 Station Number

D. Station Outlet Labeling. The following is illustrative of the number convention to be used:

Example: Port A

Port A - 1st Jack

Example: Port B

Port B - 2nd Jack

E. Station Cable Jacket Labeling. All station cables (Voice and Data) will be labeled within six inches of
each termination end (e.g., at both ends, outlet end and BDF / IDF end) using “P-Touch” type, self-
laminating cable markers.

Example: 21.001A

21 IDF location where cable originates (i.e., IDF room “#1”).
001 Station Number

A Cable Identification (“A” for cable #1, “B” for cable #2)

F. Patch Panel Labels, Horizontal. All patch panels will be labeled using self-laminating laser patch panel
label markers.

Example: 001A

001 Station Number
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A. **Cable Identification ("A" for data cable #1, "B" for data cable #2)**

   1. Data cable #1 shall be terminated adjacent to data cable #2 moving left to right and top to bottom.

B. **Testing/Warranty**

   A. The testing is to show that there are no errors, damaged or incorrectly installed components, that the installation is correctly labeled and that all the installed components meet or exceed the criteria detailed in these specifications. Any test that does not show that a component is satisfactorily installed, as per these specifications, shall be repeated. If a test procedure needs to be modified to satisfactorily test some components, the modification shall be submitted for approval of the District’s Project Manager prior to the tests being conducted.

   B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to testing. Any testing performed on incomplete systems shall be redone on completion of the work.

   C. Provide the District's Project Manager with the opportunity to witness all testing. On reasonable request, the installer shall demonstrate that the test procedure competently identifies the fault conditions being tested for.

   D. Complete all of the tests identified in these specifications.

   E. Ensure that all test equipment is in calibration before delivery to site and throughout the testing period. The installer shall be responsible for ensuring that any necessary tests and rework to maintain equipment's calibration status is carried out. Any tests performed on uncalibrated test equipment shall be repeated at the Installer’s cost.

   F. The test documentation shall be available for inspection by the Districts' Project Manager during the installation period and copies shall be submitted to the Districts' Project Manager within fourteen days of completion of tests on cables in each area. The installer shall retain a copy to aid preparation of Record Documents information. See Records Documents details under submittals section.

   G. If on submittal of the Record documentation there are any missing test results or incorrectly named files, the test shall be repeated at the Installer’s expense.

   H. Provide competent, factory-trained engineers and/or technicians, authorized by the manufacturer of the cabling system, to technically supervise and participate during all tests for the systems. Personnel shall be competent in and qualified by experience or training for comprehensive TDR and OTDR operation and troubleshooting, for both copper and optical fiber testing.

   I. Test and certify the cabling system to minimum standards as set forth in the ANSI/TIA/EIA-568-C specifications for Ethernet and for Category 6 cable.

   J. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified usable by the installing contractor before system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feed-through couplers, patch panels, splices, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.

   K. Each Category 6 cable shall be tested using a ANSI/TIA-1152–2009 Category 6 Level IIIe / IEC 61935 Level IIIe or better ETL certified cable tester/analyzer.

   L. Each installed cable shall be tested for installed length using a Time Domain Reflectometer (TDR) device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA-568-C Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

   M. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder. Correction of all damaged...
cables shall include replacing damaged cables with new cables in complete runs, replacing damaged connectors or remaking poor terminations. In-line cable joints, splices or distribution points will not be acceptable except where specified in this document. All damaged cables shall be removed from site.

N. Manufacturer Warranty: Provide a twenty (20) year Extended Product Warranty and System Assurance Warranty for the Category 6 cabling system.

O. **Category 6** data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, and provide results for the following tests:
   1. Attenuation (Insertion Loss).
   2. Return Loss (RL).
   3. Near End Crosstalk (NEXT) – measured at both ends of each cable pair.
   4. Attenuation to Crosstalk Ratio (ACR).
   5. Power Sum Near End Crosstalk (PSNEXT).
   7. Far End Crosstalk (FEXT).
   8. Equal Level Far End Crosstalk (ELFEXT).

**Part 4 – Other Project Requirements**

**4.1 Completion of Work**

A. At the completion of the System, restore to its former condition, all aspects of the project site and on a daily basis, shall remove all waste and excess materials, rubbish debris, tools and equipment resulting from or used in the services provided.

B. Final Punch Walk: The District shall complete a final inspection to determine if all conditions of the scope of work are completed to the District’s satisfaction. A “punch list” will be formulated within (2) days of the punch walk and be presented to the installing contractor for completion prior to final project sign-off by the District. If an item is missed during the punch walk or not included on the “punch list” for any reason, it does not release the Contractor from completing the scope of work as defined in the specification or drawings.

C. Submit complete Record Documentation as outlined in submittals section prior to project sign-off by District.

**4.2 System and/or Network Testing**

A. Upon completion of installation, execute all of the required tests as summarized in this specification. When all such tests have been completed to District’s satisfaction and Manufacturer’s specifications, present to District written notice thereof.

B. Contractor assumes responsibility of assuring that the system and/or network installed operates properly, including any required coordination with other suppliers, vendors, or contractors.

**End of Section 27 00 00**
SECTION 32 12 16 - Asphalt Paving

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Definition

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.3 Submittals

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
   1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
   2. Job-Mix Designs: For each job mix proposed for the Work.

B. Qualification Data: For qualified manufacturer and installer.

C. Material Certificates: For each paving material, from manufacturer.

D. Material Test Reports: For each paving material.

1.4 Quality Assurance

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements for asphalt paving work within the State of California.

   1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

D. Conduct pre-installation meeting at Project site.

   1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
      a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
      b. Review condition of subgrade and preparatory work.
      c. Review requirements for protecting paving work, including restriction of pedestrian traffic during installation period and for remainder of construction period.
d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.5 Project Conditions

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60° F.
2. Tack Coat: Minimum surface temperature of 60° F.
4. Asphalt Base Course: Minimum surface temperature of 40° F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60° F at time of placement.

B. Imprinted Asphalt Paving: Proceed with coating imprinted pavement only when air temperature is at least 50° F and rising and will not drop below 50° F within 8 hours of coating application. Proceed only if no precipitation is expected within two hours after applying the final layer of coating.

PART 2 - Products

2.1 Asphalt Materials

A. Asphalt Binder: AASHTO M 320.

B. Asphalt Cement: ASTM D 3381 for viscosity-graded material, ASTM D 946 for penetration-graded material.


D. Prime Coat: Asphalt emulsion prime coat complying with California DOT requirements.


F. Fog Seal: ASTM D 977 emulsified asphalt.

G. Water: Potable.

H. Undersealing Asphalt: ASTM D 3141, pumping consistency.

2.2 Auxiliary Materials

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Sand: ASTM D 1073, Grade Nos. 2 or 3.

C. Joint Sealant: ASTM D 6690, Type I, hot-applied, single-component, polymer-modified bituminous sealant.
2.3 Mixes

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types."

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Provide mixes complying with composition, grading, and tolerance requirements in ASTM D 3515 for the following nominal, maximum aggregate sizes:
   a. Base Course: 1 inch.
   b. Surface Course: 1/2 inch.

B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 1.

PART 3 - Execution

3.1 Examination

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 Cold Milling

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 1-1/2 inches.
2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Transport milled hot-mix asphalt to asphalt recycling facility.
7. Keep milled pavement surface free of loose material and dust.
3.3 Patching

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.
2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 Repairs

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

3.5 Surface Preparation

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 Placement of Asphaltic Concrete Finished Paving

A. Remove all loose materials from compacted base.
B. Apply tack coat at the rate of 0.05 to 0.25 gallon per sq. yd. to all areas to be paved.
C. Apply tack coat at the rate of 0.5 to 0.10 gallon per sq. yd. to all existing pavement, curbs, gutters, manholes, and the like immediately before asphalt concrete is placed.
D. Adjust frames and covers, if so required, to meet final grades.
E. Spreading Asphaltic Concrete Materials:
   1. Spread material in a manner which requires the least handling.
   2. Spread asphalt concrete to thickness shown on Drawings.
   3. Where thickness of asphalt concrete paving will be three (3) inches or less, spread in one (1) layer.
   4. Where thickness of asphalt concrete paving will be more than three (3) inches, spread in two (2) layers. Surface course shall be a minimum of one (1) inch thick.
F. Rolling:
   1. After material has been spread to proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown.
   2. Roll in at least two (2) directions until no roller marks are visible.

3.7 Hot-Mix Asphalt Placing

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
   1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
   2. Place hot-mix asphalt surface course in single lift.
   3. Spread mix at minimum temperature of 250° F.
   4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
   5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 Joints

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
   3. Offset transverse joints, in successive courses, a minimum of 24 inches.
   4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to A1 MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
   5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
   6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.9 Compaction

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185°F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
   1. Average Density: 96 percent of reference laboratory density according to [ASTM D 6927] [or] [AASHTO T 245], but not less than 94 percent nor greater than 100 percent.
   2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
3.10 **Installation Tolerances**

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: \[1/4\text{ inch}\].
2. Surface Course: \[1/8\text{ inch}\].
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

C. Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch of height indicated above pavement surface.

3.11 **Tolerances**

A. Free from birdbaths.

B. Flatness: Maximum variation of 1/8-inch in six (6) feet.

C. Compacted Thickness: Within 1/4-inch.

D. Variation from True Elevation: Within 1/2-inch.

3.12 **Surface Treatments**

A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.

B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.

1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.13 **Seal Coat**

A. Apply seal coat to hardscape areas in accordance with manufacturer’s instructions in two (2) separate coats. Do not apply seal coat until thirty (30) days after placing of asphaltic concrete paving.

B. Install seal coat strictly with manufacturer’s written directions and recommendations.

3.14 **Field Quality Control**

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. Replace and compact hot-mix asphalt where core tests were taken.

E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

F. Field inspection and testing of granular base and of asphalt concrete paving mix will be performed tests in accordance with Al MS-2.

G. Testing firm to take samples and perform tests in accordance with Al MS-2.

3.15 Protection

A. Immediately after placement, protect pavement under provisions of Section 01 60 00 from mechanical injury for two (2) days.

B. Protect all new placed pavements from landscape irrigation overspray and planter areas soil erosion.

3.16 Flood Test

A. Perform flood test of finished paving after the first seal coat is applied and before the second coat by use of water tank truck.

B. Where water ponds to a depth of more than 1/8-inch, fill or otherwise correct to provide proper drainage.

C. Feather and smooth edge of fill so that the joint between fill and original surface is invisible.

3.17 Disposal

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION 32 12 16
SECTION 32 17 23 – Pavement Marking

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Related Sections include:
   1. Section 03 30 00 “Cast-in-Place Concrete.”
   2. Section 32 12 16 “Asphalt Paving.”

1.2 Submittals

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

B. Lay out markings in place and obtain approval of layout prior to commencement of striping. Notify Owner 72 hours in advance of time approval is required.

1.3 References


B. State of California, Department of Transportation (CALTRANS) Traffic Manual.

1.4 Quality Assurance

A. Conduct pre-installation meeting to comply with requirements in Section 01 31 00 “Project Management and Coordination.” Review project requirements and make adjustments in installation strategies to meet requirements without additional cost or time to Contract.

B. Comply with referenced Building Code for requirements for truncated domes.

C. Verify paving substrate material and provide pavement marking and adhesive materials specifically formulated for each different type of substrate.

D. Comply with requirements of CBC Title 24 and ADA requirements for all markings and tactile warnings.

E. Conform to State of California, Department of Transportation (CALTRANS) Traffic Manual, Chapter 6, Markings, as amended and adopted by authorities having jurisdiction.

F. Perform off-site work in public right-of-way in accordance with requirements of authorities having jurisdiction. For conditions not indicated otherwise on Drawings, conform to Standard Details adopted by authorities having jurisdiction, including Standard Details for Public Works Construction, as emended and adopted by those authorities.
G. Provide applicator regularly engaged in pavement marking, and the use of machine applied painted stripes and other markings, with five years minimum of verifiable experience in applying markings and materials specified.

1.5 Project Conditions

A. Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40° F for oil-based materials and 55° F for water-based materials, and not exceeding 95° F. Maintain paint temperature within these same limits.

B. Newly resurfaced pavement surfaces shall be allowed to fully cure before application of marking materials.

C. Do not apply marking paint when wind velocity causes uncontrollable overspray or excessively rapid drying. Do not apply marking paint in wet weather or conditions.

1.6 Warranty

A. Provide 5 year warranty.

PART 2 - Products

2.1 Pavement Marking Materials


B. Glass Beads: AASHTO M 247, Type 1.

2.2 Truncated Domes

A. Provide surface applied Safety Step TD Truncated Domes by Safety Step TD or approved equal. Provide manufacturer’s recommended exterior grade adhesive, formulated for each type of substrate material encountered.

B. Truncated dome products must comply with referenced edition of Building Code.

C. Color yellow shall comply with Federal Standard 595 B Color No. 33538.

PART 3 - Execution

3.1 Examination

A. Proceed with pavement marking only after unsatisfactory conditions have been corrected. Proceeding with work constitutes contractor’s acceptance of substrate conditions.

3.2 Pavement Marking

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified.

B. Allow asphalt paving to age for a minimum of 30 days before starting pavement marking. Allow concrete to cure for a minimum of 28 days before starting pavement marking. Do not apply pavement
markings, wheel stops or truncated domes to concrete substrates, slurry or seal coats until fully cured and dried.

C. Thoroughly power and hand broom clean surfaces free of dirt, sand, gravel, oil and other foreign matter. Wash down surfaces to dust free condition and allow to thoroughly dry. Provide surface that is clean, dry and satisfactory to paint manufacturer and to satisfy warranty requirements.

D. Layout markings as shown on Drawings. Use guide lines, templates and forms for precise edges and spacings. At off-site and on-site public rights-of-way, obtain review and approval by authorities having jurisdiction, of layout for parking and traffic control markings prior to application of markings.

E. Apply paint to clean dry surfaces to produce pavement markings, of dimensions indicated, with uniform, straight edges using proper masking, stencils, and application equipment to apply marking paint. Striping shall be 4 inches wide minimum, unless noted otherwise. Apply at manufacturer's written recommended rates to provide a minimum wet film thickness of 15 mils for each coat. Apply marking paint in two coats. Broadcast glass beads uniformly into final coat of wet pavement markings at a rate of 6 lb/gal.

F. Provide guide lines and templates as necessary to control paint application. Special precautions shall be taken in marking numbers, letters, and symbols. Edges of markings shall be sharply outlined. Lines shall be straight, or curved as applicable, to within 1/4 inch in 15 feet. Greater deviations shall be removed and lines reapplied. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, pickup, displacement or discoloration by tires of traffic. If there is a deficiency in drying of the markings, painting operations shall be discontinued until cause of the slow drying is determined and corrected.

G. Provide directional arrows, numbering, and lettering in similar manner and with same paint, not necessarily the same color. Paint directional arrows with stencils or other approved method. Strokes of letters to be as indicated. Islands and “No Parking” areas shall have 4 inch stripes as indicated on drawings.

3.3 Truncated Domes

A. Install truncated domes per manufacturer’s written recommendations to lines and extents indicated. Use adhesive properly formulated for each different type of substrate material.

3.4 Protection and Touch Up

A. Remove all paint and adhesive droppings and overspray and repair all damaged or stained surfaces. Do not paint over stains. Remove stains and properly touch up finishes and surfaces.

B. Prevent construction activities over completed markings, except light vehicular and pedestrian traffic.

C. Touch up paint as required to provide clean, straight lines and full coverage of surfaces.

D. Clean up all oil, paint splatters and other stains from surfaces in preparation for Substantial Completion review.

END OF SECTION 32 17 23
SECTION 32 39 20 - Post and Panel Signage

PART 1 - General

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 03 30 00 “Cast-in-Place Concrete.”
2. Section 05 40 00 “Cold-Formed Metal Framing.”
3. Section 07 92 00 “Sealants.”
4. Section 08 11 13 “Steel Doors and Frames.”
5. Section 09 22 16 “Non-Structural Metal Framing.”
6. Section 10 14 00 “Signage.”
7. Section 10 44 00 “Fire-Protection Specialties.”
8. Section 32 12 16 “Asphalt Paving.”
9. Section 32 17 23 “Pavement Marking.”

1.2 Performance Requirements

A. Provide post and panel signs capable of withstanding the effects of gravity loads and wind loads indicated on drawings.

1.3 Submittals

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

B. Sign Schedule: Use same designations indicated on Drawings.

1.4 Quality Assurance

A. Obtain each sign type indicated from one source from a single manufacturer.

B. Comply with the current edition of the “Americans with Disabilities Act (ADA) and California Title 24 Accessibility Regulations.

1.5 Project Conditions

A. Proceed with installation only when existing and forecasted weather conditions permit installation of signs to be performed according to manufacturers' written instructions and warranty requirements.

1.6 Coordination

A. Coordinate installation of anchorages and furnish setting drawings, templates, and directions for installing anchorages and other items that are to be embedded in concrete.
PART 2 - Products

2.1 Materials

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32. Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner. Provide 0.125 inch thick panel with predrilled holes for mounting sign to post.

B. Reflectorized Sign Film: 3M DG reflective sheeting Series 4000 or approved equal.

C. Fabricate posts to lengths indicated. Provide reverse sleeve method with galvanized inserts recommended by manufacturer, sized for close fit inside posts. Size inserts for direct embedment in concrete foundations and to attach sign posts securely and prevent sign from overturning when subjected to normal loading conditions prevailing at Project site. Drill posts and inserts for through bolts for fastening them together. Provide non-corrosive bolts for fastening posts to inserts. Fabricate sign posts from 0.120-inch thick, square galvanized steel tubing. Include post caps and related accessories required for complete installation. Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123.

2.2 Accessories

A. Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance.

PART 3 - Execution

3.1 Examination

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Excavate for sign foundation to elevations and dimensions indicated. Reconstruct subgrade that is not firm, undisturbed, or compacted soil, or that is damaged by freezing temperatures, rain, accumulated water, or construction activities by excavating a further 12 inches, backfilling with satisfactory soil, and compacting to original subgrade elevation.

B. Set reverse sleeves required for installation of signs. Protect portion of sleeve above ground from concrete splatter.

C. Locate signs and accessories where indicated. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance. Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to post.

3.3 Cleaning and Protection

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.