



CALIFORNIA DESIGN WEST ARCHITECTS INC.
2100 19TH STREET
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PROJECT MANUAL

**EL CAPITAN HIGH SCHOOL
STADIUM UPGRADES**
100 FARMLAND AVENUE
MERCED, CA 95348

DSA APP # 02-121369
DSA FILE # 24-H5

MERCED UNION HIGH SCHOOL DISTRICT

Mandatory Pre-Bid Job Walk: April 4, 2024 at 11:30AM.

Prequalification Applications Due: April 18, 2024 by 5:00PM.

Prequalified Contractor List Released: April 25, 2024 by 5:00PM.

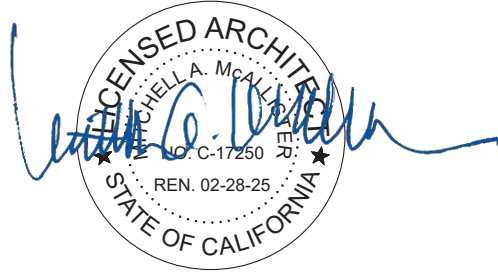
Public Bid Opening: May 2, 2024 at 11:00AM.

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LIST OF CONSULTANTS

ARCHITECT

CALIFORNIA DESIGN WEST ARCHITECTS
2100 19th Street
Sacramento, CA 95818
(916) 446-2466



STRUCTURAL

POINT 2 STRUCTURAL ENGINEERS
3701 Business Dr. Suite 100
Sacramento, CA 95820



MECHANICAL/PLUMBING

WESTON & ASSOCIATES
600 University Ave. Suite 260
Sacramento, CA 95825



ELECTRICAL

M.NEILS ENGINEERING INC.
100 Howe Ave. Suite 235N
Sacramento, CA 95825



10/25/2023

CIVIL ENGINEER

NORTHSTAR ENGINEERING GROUP
620 12TH Street
Modesto, CA 95354



LANDSCAPE ARCHITECT

MTW GROUP
2707 K Street, Suite 201
Sacramento, CA 95816
(916) 369-3990



END OF LIST OF CONSULTANTS.

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT

APP: 02-121369 INC:

REVIEWED FOR

SS FLS ACS

DATE: 01/12/2024

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ADVERTISEMENT FOR BID

PROJECT: El Capitan High School – Stadium Upgrades
Merced Union High School District

Notice is hereby given that sealed bids will be received by the Board of Trustees of the Merced Union High School District of Atwater, California, on **May 2, 2024** at **11:00AM**, at the MUHSD Facilities Planning Department, Attention: Melissa Miller, 2130 Spacecraft Drive, Atwater, CA 95301.

Prequalification: To bid on this Project, the Bidder is required to have been prequalified by the District. The prequalification application can be obtained by going to the Quality Bidders website at <https://www.qualitybidders.com/applications>, under the \$1M and over prequalification tab. The prequalification application must be completed no later than **April 18, 2024**, by **5:00PM**. The District will inform contractors of their prequalification status no later than **April 25, 2024** by **5:00PM**, via Addenda and posted on the Facilities Planning section of the Merced Union High School District's website (<https://www.muhsd.org/departments/district-operations/facilities>).

Bidders may obtain a digital set of complimentary plans and specifications, and contract documents from the Architect of Record: California Design West Architects, 2100 19th Street, Sacramento, CA 95818, (916) 446-2466, Contact Anne Perkins (aperkins@ca-dw.com) and Chelsea Dacpano (cdacpano@ca-dw.com). Bidders may also review bid documents at local Builders.

The work of this bid package is described as follows:

Performance of all work shown on the Drawings, specified and required for the completion of the Stadium Upgrades project. Project to include site demolition, grading, earthwork, landscape and irrigation, asphalt paving, concrete paving, architectural, structural, mechanical, plumbing, electrical, synthetic track, bleachers, fencing, field lighting, scoreboard, and other work as necessary or indicated to construct The Project.

Mandatory Pre-Bid Job Walk: There is a mandatory pre-bid conference for this project on **April 4, 2024** at **11:30AM**. Attendees to meet at the track at El Capitan High School, 100 Farmland Avenue, Merced, CA 95348.

Each bid must strictly conform with and be responsive to the Contract Documents as defined in the General Conditions, exclusions will not be accepted.

Bidders shall be licensed California contractors and shall comply with the State Labor Code. Prevailing wage rates are required. A 10% bid bond will be required.

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

The successful bidder must possess the specified Contractor's license that is valid and active for each Bid Package listed below at the time of submitting a bid. The Contractor's California State License number shall be clearly stated on the bidder's proposal. Subcontractors shall be licensed pursuant to California law for the trades necessary to perform the Work called for in the Contract Documents.

Qualified Disabled Veteran Business Enterprises (DVBE) are encouraged to participate in this project. Where applicable, bidders must be the requirements set forth in Public Contract Code section 10115 et seq., Military and Veterans Code section 999 et seq. and California Code of Regulations, Title 2, Section 1896.60 et seq. regarding Disabled Veteran Business Enterprise (DVBE) Programs. Applicable forms are included in this Bid Package for use by bidders. Each Bidder shall complete and submit the Disabled Veteran Business (DVBE) Participation statement with its bid.

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.

Bidders shall enter into a contract ten (10) days after receipt of "Notice of Award". The cost of all bonds shall be included in the bid and paid for by the Contractor. Contractors shall be a licensed California contractor and shall comply with the State Labor Code which requires setting forth in this document the following sections:

All Contractors and Sub-Contractors who submit bids must be registered with the Department of Industrial Relations (D.I.R.). It shall be the Contractor's responsibility to pay the general prevailing rate of per diem wages and the general prevailing rate in the locality in which this public works is to be performed for each craft, classification or type of work needed for this project. Prevailing wage rates are available from the Director of the Department of Industrial Relations. It shall be the Contractor's responsibility to know and abide by the requirements which include, but are not limited to, the requirement to keep accurate payroll records (Labor Code Division 2, Part 7, Chapter 1, Article 3, §1771, 1773.1, 1775, 1776, 1777.5, 1810, 1811, 1815). Per Education Code Section 45125.2, Contractor employees who may come in contact with students are subject to a Fingerprinting and Criminal Background Check.

Per Section 1735, no discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

The work required in the bidding documents is subject to liquidated damages as outlined in the General Conditions.

IMPORTANT DATES

Mandatory Pre-Bid Job Walk: April 4, 2024 at 11:30AM.

Requests for Information / Substitution Requests Due: April 15, 2024 by 5:00PM. Send to Shane Trump (strump@ca-dw.com), Anne Perkins (aperkins@ca-dw.com), and Chelsea Dacpano (cdacpano@ca-dw.com).

Prequalification Applications Due: April 18, 2024 by 5:00PM.

Request for Information / Substitution Request Responses: April 23, 2024 by 5:00 PM.

Prequalified Contractor List Released: April 25, 2024 by 5:00PM.

Final Addenda Issued (if needed): April 26, 2024 by 5:00 PM.

Public Bid Opening: May 2, 2024 at 11:00AM.

Board Meeting: May 8, 2024

Estimated Project Duration: June 10, 2024 to September 10, 2025.

Advertised Dates: March 22, 2024, March 28, 2024

END OF AD FOR BID.

SECTION 00 13 13 – PREQUALIFICATION SUPPLEMENTAL NOTICE

NOTICE TO CONTRACTORS

1. Effective January 1st, 2014, school districts in California that use any state funds to finance the construction of their local schools will be required to prequalify the general contractors, mechanical contractors, electrical contractors, and plumbing contractors (MEP) that seek to bid or negotiate a district's construction projects. (Public Contract Code section 20111.6) Mechanical, electrical and plumbing contractors subject to this requirement are those with any of the following license classifications: C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 and C-46. AB 1565 was passed in 2012 and takes effect for all projects awarded after January 1st, 2014. School districts with an average daily student attendance of 2,500 or less, and projects that have a projected expenditure of \$1,000,000 or less, are exempted from AB 1565.
2. It is mandatory that all General Contractors, Mechanical/Plumbing Subcontractors, and Electrical Subcontractors fully complete each part of this Prequalification Questionnaire, provide all materials requested herein, and be approved by the District in order to bid on all District construction projects that are projected to exceed an expenditure of \$1,000,000.
3. If two or more businesses intend to perform a construction project as a joint venture, each entity within the Joint Venture must be separately prequalified.

FILING OF PREQUALIFICATION SUBMITTALS

Prequalification: To bid on this Project, the Bidder is required to have been prequalified by the District. The prequalification application can be obtained by going to the Quality Bidders website at <https://www.qualitybidders.com/applications>, under the \$1M and over prequalification tab. The prequalification application must be completed no later than **April 18, 2024**, by **5:00PM**. The District will inform contractors of their prequalification status no later than **April 25, 2024** by **5:00PM**, via Addenda and posted on the Facilities Planning section of the Merced Union High School District's website (<https://www.muhsd.org/departments/district-operations/facilities>).

If there are any questions regarding the prequalification process, please contact the Merced Union High School District's Facilities and Planning Department at (209) 325-2245.

TERM OF PREQUALIFICATION

The term of the Prequalification is 12 months from the date of the District's notice to the applicant. The applicant may renew the prequalification by filing an updated Prequalification Questionnaire via the process in effect at the time.

To bid on a District project subject to the Prequalification Requirement, the applicant must be prequalified on the day bids are accepted. If the District delays the initial bid day for a project to a date after the expiration of the applicant prequalification term, the applicant is nonetheless prequalified for that specific project.

APPEALS PROCEDURE

The following procedures apply when an applicant that is denied prequalification wishes to challenge that denial.

An applicant that is denied prequalification has the right to appeal that denial unless the applicant failed to complete the Prequalification Questionnaire and provide the documents identified in the Prequalification Questionnaire.”

Contractor’s costs for the appeal shall be undertaken at the Contractor’s expense.

The Contractor initiates an appeal by delivering to the District a written notice requesting a hearing and setting forth in general terms the basis of the appeal. The Contractor must deliver the written notice to the same location that it delivered the Prequalification Submittal. The Contractor must deliver such written notice within 5 business days following the date of the District’s Notice that the District denied prequalification. The Contractor waives its right to appeal the District’s decision if it fails to deliver the notice within 5 business days.

The Deputy Superintendent for the Merced Union High School District, or their designee, will conduct a hearing on the appeal no later than 5 business days following the Contractor’s delivery of the written notice of appeal. The hearing conducted by the Director will be informal and is not an evidentiary hearing. At the hearing, the Contractor will be given the opportunity to present information and reasons in opposition to the District’s determination. The Director will consider all evidence, information and arguments submitted by the Contractor relevant to the District’s determination, the District’s response to such evidence, information and arguments, and any other information the Director deems relevant.

Within 5 business days following the hearing, the Deputy Superintendent for the Merced Union High School District, or their designee, will provide a written decision whether the Contractor is qualified or not qualified. The written decision is the final determination of the issue, and the Contractor shall have no further administrative appeals.

The procedure and time limits set forth above are mandatory and the Contractor’s sole and exclusive remedy in the event of protest. Failure to comply with these procedures shall constitute a waiver of any right to further pursue the protest, including filing a Government Code claim or legal proceedings.

END OF PREQUALIFICATION SUPPLEMENTAL NOTICE.

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.1 SECURING DOCUMENTS

- A. Drawings and Specifications are available from California Design West Architects. Plans and Specifications for this project are being distributed free of charge, in electronic format only. Please contact Anne Perkins (aperkins@ca-dw.com) and Chelsea Dacpano (cdacpano@ca-dw.com), to obtain copies.

1.2 PREQUALIFICATION

- A. Contractors to review Section 00 13 13 – Prequalification Supplemental Notice. All contractors required to be prequalified must follow the described procedures for their bid to be deemed responsive.

1.3 DOCUMENTS / FORMS REQUIRED TO BE SUBMITTED WITH BIDS

- A. The following forms, along with any associated items note on the forms, must be completed and submitted with each bid from a General Contractor for the bid to be deemed responsive. For description of each item, refer to Part 1.4 – Bids, below.

1. Section 00 41 00 – Bid Form
2. Section 00 43 13 – Bid Bond
3. Section 00 43 36 – Designation of Subcontractors
4. Section 00 45 11 – Contractor’s Statement
5. Section 00 45 19 – Non-Collusion Declaration
6. Section 00 45 20 – Iran Contracting Act Certification
7. Section 00 45 26 – Workers’ Compensation Certification
8. Section 00 45 30 – DVBE Documentation
9. Section 00 45 40 – Contractor and Grantee Compliance with Economic Sanctions Imposed in Response to Russia’s Actions in Ukraine

1.4 BIDS

- A. Bids to receive consideration shall be made in accordance with the following instructions:
1. The District invites bids on the form attached to be submitted at the time and place stated in the Advertisement for Bids. Bids shall be submitted on the prescribed Bid forms and completed in full. All bid items and statements shall be properly filled out. Numbers shall be stated both in words and in figures where so indicated. The signatures of all persons signing the bid shall be in permanent ink. Prices, wording and notations must be in ink or typewritten. Erasures or other changes shall be noted over by signature of the bidder.
 2. All bids shall be made on the bid form provided, and the complete bid, together with any and all additional materials as required by the Contract Documents, shall be enclosed in a sealed envelope, addressed and delivered to the designated location and must be received on or before the time set forth in the Advertisement for Bids. All envelopes containing bids shall be sealed and plainly marked with the bidder’s name, address, and

telephone number. The District reserves the right to reject any bid if all of the above information is not furnished. It is each bidder's sole responsibility to ensure its bid(s) is timely delivered and received at the location designated in the Advertisement for Bids. Any bid received at the designated location after the scheduled closing time for receipt of bids shall be returned to the bidder unopened.

3. No bid will be considered which makes exceptions, changes, or in any manner makes reservations to the terms of the drawings or specifications, except that explanations or alternate bids may be made on a separate sheet attached to the bid form. They will not, however, be considered in determining low bid.
4. Questions regarding documents, discrepancies, omissions, or doubt as to meanings shall be referred immediately to the Architect who will send written instructions clarifying such questions to each bidder. Oral responses will not be binding on the Owner or Architect or any Construction Manager.
5. Each bid must give the full business address of the bidder and be signed by bidder with bidder's usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.
6. Pursuant to the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California, which are hereby incorporated and made a part hereof, every bidder shall set forth in its bid:
 - a. The name and location of the place of business of each subcontractor who will perform work or labor or render service to the bidder in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the bidder, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half (1/2) of one percent (1%) of the bidder's total bid.
 - b. The portion of the Work which will be done by each such subcontractor. If the bidder fails to specify a subcontractor for any portion of the Work to be performed under the Contract in excess of one-half (1/2) of one percent (1%) of the bidder's total bid, the bidder agrees to perform that portion itself. The successful bidder shall not,

without the consent of the Owner:

- i. Substitute any person as subcontractor in place of the subcontractor designated in the original bid.
 - ii. Permit any subcontract to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.
 - iii. Sublet or subcontract any portion of the Work in excess of one-half (1/2) of one percent (1%) of the total bid as to which the original bid did not designate a subcontractor.
7. All contractors must be registered with D.I.R.
 8. The Director of Industrial Relations of the State of California, in the manner provided by law, has ascertained the general prevailing rate of per diem wages and the rate for legal holidays and overtime work. The Contractor must pay for any labor therein described or classified in an amount not less than the rates specified. Copies of the required rates are on file at the Owner's business office and are available to any interested party on request.
 9. All bids must be accompanied by a completed Noncollusion Declaration.
 10. Bids must be accompanied by a certified check, cashier's check, or bidder's bond, for an amount not less than ten percent (10%) of the amount of the base bid, made payable to the order of the Owner. If a bidder's bond accompanies the bid, said bond shall be secured by an Admitted Surety (an insurance organization authorized by the Insurance Commissioner to transact business of insurance in the State of California during this calendar year) and satisfactory to the Owner. Said check or bond shall be given as a guarantee that the bidder will enter into the Contract if awarded the Work, and in case of refusal or failure to enter into said Contract, the check or bond, as the case may be, shall be payable to the Owner and retained as liquidated damages.
 11. Bids must comply with DVBE requirements.
 12. Bids must be accompanied by a completed Economic Sanctions form.
 13. Bids shall be sealed and submitted as indicated in the Advertisement to Bidders.
- 1.5 WITHDRAWAL OF BIDS
- A. Bids may be withdrawn by bidders prior to the time fixed for the submittal of bids. A successful bidder shall not be relieved of the bid unless by consent of the Owner or bidder's recourse to Public Contract Code §5100 et seq.
- 1.6 OPENING OF BIDS
- A. Opening of bids shall be as soon after the hour set as will be possible; opening and declaration to be as set forth in the Advertisement to Bids. Any and all bidders will be

permitted to attend.

1.7 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- A. At its own expense and prior to submitting its bid, each bidder shall visit the site of the proposed work and become fully acquainted with the conditions relating to the construction and labor so that the facilities, difficulties, and restrictions attending the execution of the work under the Contract are fully understood. Bidders shall thoroughly examine and be familiar with the drawings and specifications. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, addendum, or other document or to visit the site and become acquainted with conditions there existing shall not relieve any bidder from obligations with respect to the bid or to the Contract. The submission of a bid shall be taken as evidence of compliance with this Paragraph. Bidders shall not, at any time after submission of the bid, dispute, complain, or assert that there were any misunderstandings with regard to the nature or amount of work to be done.
- B. If any prospective bidder is in doubt as to the true meaning of any part of the Contract Documents, or finds discrepancies in, or omissions from the drawings and specifications, a written request for an interpretation or correction thereof may be submitted to the Architect. The bidder submitting the request shall be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will only be made by addendum duly issued, and a copy of such addendum will be mailed or delivered to each Contractor receiving a set of the Contract Documents. No person is authorized to make any oral interpretation of any provision in the Contract Documents, nor shall any oral interpretation be binding on the District. If discrepancies on drawings, or in specifications, or conflicts between drawings and specifications are not covered by addenda, bidder shall include in the bid methods of construction and materials resulting in the higher bid.
- C. Pursuant to Public Contract Code section 1104: 1) bidders shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, except on clearly designated design build projects; 2) however, bidders shall be required to review architectural or engineering plans and specifications prior to submission of their bids and to report any errors and omissions to the Architect or Owner; and 3) the review shall be confined to the bidder's capacity as a bidder and not as a licensed design professional.

1.8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

- A. The form of Agreement between Owner and Contractor which the successful bidder will be required to execute, if awarded the Work, is a part of this Bid Package.

1.9 ADDENDA OR BULLETINS

- A. Any addenda or bulletins, issued during the time of bidding, shall form a part of the drawings and specifications loaned to the bidder for the preparation of its bid, shall be covered in the bid, and shall be made a part of the Contract Documents. All addenda or bulletins shall be signed by the Architect and approved by the Division of State Architect.

1.10 EVIDENCE OF RESPONSIBILITY

- A. Upon the request of Owner, a bidder shall submit promptly to the Owner or its designee satisfactory evidence showing the bidder's financial resources, the bidder's experience in the type of work required by the Owner, the bidder's organization available for the performance of the Contract, and any other required evidence of the bidder's or its subcontractor's qualifications to perform the proposed Contract. The Owner may consider such evidence before making its decision awarding the proposed Contract. Failure to submit evidence of the bidder's or its subcontractors' responsibility to perform the proposed Contract may result in rejection of the bid.

1.11 LISTING SUBCONTRACTORS

- A. Each bidder shall submit with his bid, on the form furnished with the Contract Documents, a list of the names and locations of the places of business of each subcontractor who will perform work or labor or render service to the bidder in or about the Project, or a subcontractor who under subcontract to the bidder, specially fabricates and installs a portion of the work, in an amount in excess of one-half of 1 percent of the bidder's total bid as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100, et. seq.). 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.

1.12 AWARD OF CONTRACT

- A. Rejection of any or all bids, to contract work with whomever and in whatever manner, to abandon work entirely, and/or to waive any informality in receiving of bids is reserved as the right of the Owner. Before the Contract is awarded, the Owner may at its sole discretion, require from the proposed Contractor on the Project further evidence of the reasonable qualifications of such contractor to faithfully, capably, and reasonably perform such proposed Contract and may consider such evidence before making its decision on the award of such proposed Contract.
- B. The Contract shall be awarded to the lowest responsible and responsive bidder as interpreted by the Owner and specified herein and shall be entered into by the successful bidder within ten (10) days after the mailing, faxing or delivering of the Notice of Award of Contract. Owner reserves the right, without any liability, to cancel the award of any bid at any time before the full execution of the Agreement between Owner and Contractor.

1.13 EXECUTION OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

- A. The Agreement between Owner and Contractor shall be signed by the successful bidder in as many originals as the Owner deems necessary and returned, together with the Contract bonds, insurance certificates, additional insured endorsement, declarations page and Independent Contractor Student Contact Form, within ten (10) days after the mailing, faxing or delivering of the Notice of Award of Contract. If the successful bidder does not comply with this paragraph, Owner may award the Contract to the next lowest bidder or otherwise proceed as allowed by law.

1.14 CONTRACT BONDS

- A. Two bonds, as itemized below and in the forms presented in these Contract

Documents, shall be furnished by the successful bidder on the Project at the time of entering into the Contract and filed with the Owner before the successful bidder commences any work on the Project. They shall be in the form of surety bonds issued by an Admitted Surety (an insurance organization authorized by the Insurance Commissioner to transact business of insurance in the State of California during this calendar year) and satisfactory to the Owner. Surety's assets must exceed its liabilities by at least the amount of the bond.

1. Performance Bond: A Performance Bond in the amount of one hundred percent (100%) of the Contract Sum to insure Owner during construction and for one year after completion against faulty or improper materials or workmanship and to assure Owner of full and prompt performance of the Contract.
2. Payment Bond: A Payment Bond (Labor and Material) in the amount of one hundred percent (100%) of the Contract Sum in accordance with the laws of the State of California to secure payment of any and all claims for labor and materials used or consumed in performance of this Contract.

1.15 DRAWINGS, SPECIFICATIONS AND ADDENDA OR BULLETINS

- A. Contract Documents for the project and for bidding, consist of Plans, Specs, Addenda, and any Bulletins or Clarifications, issued by the Architect and/or Owner.

1.16 SUBSTITUTION OF MATERIALS

- A. The Contractor must ensure that the proposed substitutions by the Contractor or its subcontractors are submitted to the Architect's office a minimum of fourteen (14) calendar days prior to the Bid Opening for review and possible approval of any equipment or materials thought to be equal to or better than those specified in the drawings or specifications. An addendum will be issued seven (7) calendar days prior to Bid Opening, including all equipment and materials deemed equivalent to those specified and approved by the Architect. Submittals shall include comparative spec-data of the specified equipment or material and the proposed substitution as set forth in the Contract Documents. Submittals without this information will be automatically rejected.

1.17 PAYMENTS

- A. Payments to the Contractor on account of the Contract shall be made in accordance with the terms of the Contract Documents.

1.18 TAXES

- A. The Owner is generally exempt from payment of Federal Excise Tax on materials. The Owner will furnish exemption certificates to the Contractor to be used to obtain materials ordinarily subject to Federal Excise Tax without payment of the tax. Bidder shall deduct Federal Excise Taxes from their bid prices before submitting bids, so that such taxes will not be included in the Contract Sum.

1.19 EARLY TERMINATION

- A. Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, the Owner may upon thirty (30) days' notice, order work on the Project to cease. The Owner will remain obligated to pay for the work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the work has not been done.

1.20 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Time is of the essence in this Contract, and the time of completion for this Project shall be as stated in Section 01 10 00 – Summary of Work.
- B. Should said Work not be completed within the time limit as may be extended as herein provided, damages will be sustained by the Owner. It is understood and agreed that it is and will be impracticable or extremely difficult to determine the actual amount of damages which the Owner will sustain in the event of and by reason of such delay, and it is therefore agreed that the Contractor will pay the Owner the sum of One Thousand Dollars and No Cents (\$1,000.00) per calendar day for each and every day's delay beyond the time specified as and for liquidated damages; in case the Contractor fails to make such payment, the Owner may deduct the amount thereof from any money due or that may become due the Contractor under the Contract. Should such money not be sufficient to cover the agreed liquidated damages, the Owner shall have the right to recover the balance from the Contractor or its sureties.

END OF SECTION.

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SECTION 00 31 19 – EXISTING CONDITIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. This document describes existing conditions at or near the Project, and use of information available regarding existing conditions. This document shall not be considered part of the Contract Documents. Refer to the General Conditions for definition(s) of terms used herein.

1.2 REPORTS AND INFORMATION ON EXISTING CONDITIONS

- A. Documents providing a general description of the Site and conditions of the Work may have been collected by the Merced Union High School District (“District”), its consultants, contractors, and tenants. These documents may, but are not required to, include previous contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding underground facilities.
- B. Information regarding existing conditions may be inspected at the District office or the Construction Manager’s offices, if any, and copies may be obtained at cost of reproduction and handling upon Bidder’s agreement to pay for such copies. These reports, documents, and other information are not part of the Contract Documents. These reports, documents, and other information do not excuse Contractor from fulfilling Contractor’s obligation to independently investigate any or all existing conditions or from using reasonable prudent measures to avoid damaging existing improvements.
- C. Information regarding existing conditions may also be included in the Project Manual but shall not be considered part of the Contract Documents.
- D. Prior to commencing this Work, Contractor and the District’s representative shall survey the Site to document the condition of the Site. Contractor will record the survey in digital videotape format and provide an electronic copy to the District within fourteen (14) days of the survey.
- E. Contractor may also document any pre-existing conditions in writing, provided that both the Contractor and the District’s representative agree on said conditions and sign a memorandum documenting the same.
- F. The reports and other data or information regarding existing conditions and underground facilities at or contiguous to the Project are the following:
 - 1. Original Construction Drawings.
 - 2. Survey of Site.
 - 3. Hazardous Material Report(s).
 - 4. Geotechnical / Geohazards Report(s).

1.3 USE OF INFORMATION

- A. Information regarding existing conditions was obtained only for use of District and its consultants, contractors, and tenants for planning and design and is not part of the

Contract Documents.

- B. District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any information regarding existing conditions. Bidder represents and agrees that in submitting a bid it is not relying on any information regarding existing conditions supplied by District.
- C. Under no circumstances shall District be deemed to warrant or represent existing above-ground conditions, as-built conditions, or other actual conditions, verifiable by independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform as a condition to bidding and Bidder should not and shall not rely on this information or any other information supplied by District regarding existing conditions.
- D. Any information shown or indicated in the reports and other data supplied herein with respect to existing underground facilities at or contiguous to the Project may be based upon information and data furnished to District by the District's employees and/or consultants or builders of such underground facilities or others. District does not assume responsibility for the completeness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information.
- E. District shall be responsible only for the general accuracy of information regarding underground facilities, and only for those underground facilities that are owned by District, and only where Bidder has conducted the independent investigation required of it pursuant to the Instructions to Bidders, and discrepancies are not apparent.

1.4 INVESTIGATIONS/SITE EXAMINATIONS

- A. Before submitting a bid, each Bidder is responsible for conducting or obtaining any additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site or otherwise, that may affect cost, progress, performance, or furnishing of Work or that relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or that Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of Contract Documents.
- B. On request, District will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a bid. Bidders must fill all holes and clean up and restore the Site to its former condition upon completion of its explorations, investigations, tests, and studies. Such investigations and Site examinations may be performed during any and all Site visits indicated in the Notice to Bidders and only under the provisions of the Contract Documents, including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work, and District's prior approval.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 00 33 25 – PRE-BID MATERIAL SUBSTITUTION REQUEST

Projects: El Capitan High School – Stadium Upgrades

Owner: Merced Union High School District

1. The undersigned bidder or proposer requests the following substitutions for the Owner's consideration. All requested substitutions must be listed on this form. All substitution requests shall be submitted in compliance with the Contract Documents, especially the Instructions to Bidders and General Conditions.
2. Please complete this table for each request, attaching additional sheets as necessary:

SPECIFIED PRODUCT OR MATERIAL	DRAWING NUMBER OR SPECIFICATION SECTION	PROPOSED SUBSTITUTION

3. For each requested substitution, the bidder or proposer must provide sufficient proof that the requested substitution is equal to the specified product or material in every respect. This includes, but is not limited to, product data, details, manufacturer's cut sheets, etc., as applicable for the substitution. Attach to this form when returning to Architect.
4. All bids or proposals should be calculated and submitted based on substitution requests already approved by addendum and based on the assumption that other substitution requests have not been approved.
5. Bidder or proposer hereby certifies that the requested substitutions are equal or better in all respects to what is specified and will perform satisfactorily under the conditions and use indicated in the Contract Documents, unless otherwise noted.

SUBMITTED BY:

COMPANY NAME

NAME

DATE

EMAIL

END OF PRE-BID MATERIAL SUBSTITUTION REQUEST FORM.

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SECTION 00 41 00 – BID FORM

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

Owner: **MERCED UNION HIGH SCHOOL DISTRICT**
2130 SPACECRAFT DRIVE
ATWATER, CA 95301

Pursuant to and in compliance with all Contract Documents, prepared by California Design West Architects, relating to the Project:

EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES

_____, the Undersigned Bidder, having become thoroughly familiar with the terms and conditions of the Contract Documents and with local conditions affecting the performance and the costs of the Work at the location where the Work is to be done, hereby proposes and agrees to enter into an agreement to fully perform the Work within the time stated in strict accordance with the Contract Documents (including the furnishing of any and all labor, materials, tools, expendable equipment, and utility and transportation services necessary to fully perform the Work and complete it in a workmanlike manner) for the total sum of:

BASE BID: Based upon all work required to satisfactorily complete the work indicated in the related Plans and Specifications complying with the Division of the State Architect.

Dollars

Amount in words

(\$ _____)

ADDENDA

Contractor acknowledges receipt of the following addenda:

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

INSURANCE

(1) Our Public Liability and Property Damage Insurance is placed with:

(2) Our Workers' Compensation Insurance is placed with:

(3) Our Builders' "All Risk" Insurance is placed with:

REPRESENTATIONS

The California Business and Professions Code section 7028.15, provides that a licensed contractor shall not submit a bid to a public agency unless its contractor's license number appears clearly on the bid, the license expiration date is stated, and the bid contains a statement that the representations made therein are made under penalty of perjury. Any bid not containing this information, or a bid containing information which is subsequently proven false, shall be considered non-responsive and shall be rejected by the public agency.

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SECTION 00 43 13 – BID BOND

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

KNOW ALL MEN BY THESE PRESENT,

That we, _____, the undersigned Bidder, as Principal and _____, as Surety, are hereby held and firmly bound unto the Merced Union High School District ("District"), in the penal sum of _____ Dollars (\$_____), being at least ten percent (10%) of the total amount of the bid, for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the Principal has submitted to the District a certain bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the construction of:

EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES

in strict accordance with Contract Documents.

NOW, THEREFORE,

- a. If said bid shall be rejected, or, in the alternative;
- b. If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of agreement attached hereto and shall execute and deliver Performance and Payment Bonds in the forms attached hereto (all properly completed in accordance with said bid), and shall in all other respects perform the agreement created by the acceptance of said bid;

Then this obligation shall be void, otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract on the call for bids, or to the Work to be performed hereunder, 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 WITNESS WHEREOF, the above-bounden parties have executed this instrument under several seals this _____ day of _____, _____, the name and corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Bidder:

Principal's Name

By: _____
Signature

Printed Name and Title

Business Address

(Corporate Seal)

Surety:

Surety's Name

By: _____
Signature of Attorney-In-Fact for Surety

Printed Name

Business Address

Telephone Number

(Corporate Seal)

IMPORTANT:

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

THIS IS A REQUIRED FORM.

Any claims under this bond may be addressed to:

(Name and Address of Surety)

(Name and Address of agent or representative for
service of process in California if different from above)

(Telephone Number of Surety and agent or
representative for service of process in California).

END OF BID BOND.

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SECTION 00 43 36 – DESIGNATION OF SUBCONTRACTORS

MUST BE COMPLETED AND SUBMITTED WITH BID.

Each bidder shall set forth below the name and the location of the mill, shop or office of each subcontractor and the license number of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the Work or improvement to be performed under these specifications, in an amount in excess of one-half of 1 percent (0.5%) of the bidder's total bid, and the portion of the Work which will be done by each subcontractor.

Failure to provide this information in a legible manner may result in the rejection of an otherwise acceptable bid.

If the Contractor fails to specify a subcontractor for any portion of the work to be performed under the Contract, the Contractor shall be deemed to have agreed to perform such portion itself, and shall not be permitted to subcontract that portion of the Work except under the conditions hereinafter set forth.

Subletting or subcontracting of any portion of the Work as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the legislative body of the Owner.

NOTE: Reproduce page two of this section for additional listings needed beyond the length of this form.

CONTRACTOR: _____

PORTION OF WORK	NAME OF SUBCONTRACTOR & PHONE NUMBER	LOCATION OF SUBCONTRACTOR	LICENSE NUMBER	DIR #

SECTION 00 45 11 – CONTRACTOR’S STATEMENT

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

I understand the District has the right to accept or refuse any or all bids and that this bid may not be withdrawn for a period of Ninety (90) Days after the date set for the Opening.

The Undersigned agree(s) to sign the proposed Articles of Agreement and furnish the required Bonds and Certificates of Insurance within ten (10) days after notification by District of the acceptance of this bid. If the Undersigned defaults in executing and delivering the above-named Agreement, Bonds and Certificates of Insurance, the accompanying bid bond and the money payable thereon shall become and remain the property of the District.

The Undersigned agree(s) to complete the specified work in the time specified in Article 4 of the Agreement. The Undersigned agrees to pay the sum of One Thousand Dollars and No Cents (\$1,000.00) as liquidated damages for each calendar day in excess of that time that the work remains incomplete. If the Undersigned fails or refuses to pay, the amount of liquidated damages will be deducted from the amount of compensation to be paid to the Undersigned for each calendar day beyond the time specified in Article 4 of the Agreement.

The names of all persons interested in the foregoing bids as principals are:

Licensed in accordance with an act for the registration of contractors, and with license number

SIGN HERE: _____
Signature of Bidder

END OF SECTION.

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SECTION 00 45 19 – NON-COLLUSION DECLARATION

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

Project: **EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES**
MERCED UNION HIGH SCHOOL DISTRICT
2130 SPACECRAFT DRIVE
ATWATER, CA 95301

The contractor and/or the sub-contractors, as applicable, shall comply with the California Public Contract Code Section 7106, which is worded as follows:

"Any public works contract of a public entity shall include an affidavit, in the following form:

State of: _____)
County of: _____) ss.

_____, being first duly sworn, deposes and says that he or she
(Name)

Is _____ of _____,
(Title) (Contracting Firm Name)

the party making the foregoing bid that the bid is not made in the interest of, or on the behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that 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, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and , further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown there, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereto to effectuate a collusive or sham bid.

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID.

The undersigned:

(Name)

_____ of _____

(Title)

(Contracting Firm Name)

says that he or she has read the foregoing statement and attests under penalty of perjury to the fact that the enclosed bid is in no way collusive, a sham bid or a fixed bid as described above.

Subscribed and sworn to before me this _____ day of _____, 20__.

My commission expires: _____.

END OF NON-COLLUSION DECLARATION.

SECTION 00 45 20 – IRAN CONTRACTING ACT CERTIFICATION

(PUBLIC CONTRACT CODE SECTIONS 2202-2208)

MUST BE COMPLETED, SIGNED, AND SUBMITTED WITH BID.

Project: **El Capitan High School – Stadium Upgrades**, between the Merced Union High School District (“District”) and _____ (“Contractor” or “Bidder”).

Prior to bidding on or submitting a proposal for a contract for goods or services of \$1,000,000 or more, the bidder/proposer must submit this certification pursuant to Public Contract Code section 2204.

The bidder/proposer must complete only one of the following two options:

To Complete Option 1: Check the corresponding box and complete the certification below.

To Complete Option 2: Check the corresponding box, complete the certification below, and attach documentation demonstrating the exemption approval.

- OPTION 1** Bidder/Proposer is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services (“DGS”) pursuant to Public Contract Code section 2203(b), and we are not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.
- OPTION 2** Bidder/Proposer has received a written exemption from the certification requirement pursuant to Public Contract Code sections 2203(c) and (d). *A copy of the written documentation demonstrating the exemption approval is included with our bid/proposal.*

CERTIFICATION

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to the OPTION selected above. This certification is made under the laws of the State of California.

Printed Company Name / Financial Institution

Federal ID Number (or N/A)

Signature

Printed Name

Printed Title

Date Executed

END OF SECTION.

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SECTION 00 45 26 – WORKERS’ COMPENSATION CERTIFICATION

FORM MUST BE COMPLETED, SIGNED, AND SUBMITTED WITH BID.

Project: **El Capitan High School – Stadium Upgrades**, between the Merced Union High School District (“District”) and _____ (“Contractor” or “Bidder”).

Labor Code section 3700, in relevant part, provides:

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

- a. By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state; and/or
- b. By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

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

Printed Contractor Name

Signature

Printed Name

Printed Title

Date Executed

END OF SECTION.

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**SECTION 00 45 30 – DISABLED VETERAN BUSINESS ENTERPRISES (DVBE)
DOCUMENTATION**

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

This (DVBE) Documentation form is required from all successful bidders pursuant to the requirements of California Education Code Sections 17076.11. The District has established a participation goal for Disabled Veteran Business Enterprises (DVBE) of 3 percent per year of the funds expended by the District for construction and modernization projects.

The Contractor shall provide this completed documentation to the District with their Bid identifying any DVBE's for work required under this Agreement, **or** shall provide the completed Prime Bidder Good Faith Effort Worksheet with their Bid (see attached).

I acknowledge that I am aware of the provisions of Education Code Section 17076.11 and hereby certify that the following information is true in relation with this contract.

Contractor Company Name

Date

Contractor Signature

Project: **EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES**

Final Contract Amount: _____

Disabled Veteran Business Enterprise	License No.	Amount
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

END OF SECTION.

PART II—ADVERTISEMENTS

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

Attach copies of advertisements to this form.

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

PART III—DVBE SOLICITATIONS

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

IF THE DVBE...	THEN...	AND...
was selected to participate	check "YES" in the "SELECTED" column, include the applicable dollar amount in Part III of the "Prime Bidder Certification of Disabled Veteran" form.	include a copy of their DVBE letter from OSD.
was not selected to participate	check "NO" in the "SELECTED" column	state why in the "REASON NOT SELECTED" column.
did not respond to solicitation	check the "NO RESPONSE" column.	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED THIS SECTION MUST BE COMPLETED	NO
	YES	NO		

Important Note

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

CERTIFICATION

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

SIGNATURE OF CHIEF EXECUTIVE OFFICER	DATE
--------------------------------------	------

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SECTION 00 45 40 – CONTRACTOR AND GRANTEE COMPLIANCE WITH ECONOMIC SANCTIONS IMPOSED IN RESPONSE TO RUSSIA’S ACTIONS IN UKRAINE

MUST BE COMPLETED, SIGNED AND SUBMITTED WITH BID.

Pursuant to California State Executive Order N-6-22 (Order) issued on March 4, 2022 imposing economic sanctions against Russia and declaring support of Ukraine, Merced Union High School (MUHSD) shall terminate any contract with any individual or entity that is in violation of the Order or that is subject to economic sanctions therein, and shall not enter a contract with any such individual or entity while the Order is in effect. The EO is located at <https://www.gov.ca.gov/wp-content/uploads/2022/03/3.4.22-Russia-Ukraine-Executive-Order.pdf>.

This notice under the EO that as a contractor, vendor or grantee, compliance with the economic sanctions imposed in response to Russia’s actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website (<https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/ukraine-russia-related-sanctions>). Failure to comply may result in the termination of contracts or grants, as applicable.

Contractor shall provide a written report to Merced Union High School District (MUHSD) within the first month of construction regarding compliance with economic sanctions and steps taken in response to Russia’s action in Ukraine, including but not limited to, desisting from making new investments in, or engaging in financial transactions with Russia or Russian entities, and directly providing support to Ukraine, while the Order is in effect. Contractor to provide this report / statement on company letterhead and shall be signed by an authorized company representative.

CERTIFICATION

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder/proposer to these requirements.

Printed Company Name

Signature

Printed Name

Printed Title

Date Executed

END OF SECTION.

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Merced Union High School District

Superintendent Alan Peterson

3430 A Street, Atwater, CA 95301

Mailing: PO Box 2147 Merced, CA 95344

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209.325.2242 • Fax 209.385.8057

Manager of Risk Management
Derek Daley

Risk Management Assistant
Jennifer Oshana

INSTRUCTIONS FOR INSURANCE

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

1. In the absence of contrary written instructions from the Owner, the Contractor, at the Contractor's expense, shall obtain and maintain insurance at all times during the prosecution of the Contract, in companies and through agencies approved by the Owner, and with limits not less than those stated hereinafter. Any required insurance shall not contain any exclusion that applies to the type of work performed by the Contractor under the Contract Documents.
2. Acceptance of the Certificates of Insurance shall not relieve or decrease the liability of the Contractor.
3. The Insurance required must be written by a Best Key Rating Guide "A" VII or better rated carrier admitted to write insurance in the state where the work is located at the time the policy is issued.
4. Certificates of Insurance shall be submitted from the policies authenticated by the proper office of the Insurer evidencing, in particular, those insured, the extent of the insurance, the location of and the operations to which the insurance applies and (30) day NOTICE OF CANCELLATION of the policy.
5. All Contractors' insurance policies shall name the Owner, CM, Architect, Inspector, the State of California, their officers, employees, agents, volunteers and independent contractors as additional insured per CG 20 37 as this endorsement includes coverage for Completed Operations.
6. Insurance coverage shall not be less than the following:
 - a. Workers' Compensation
 - i. State workers' compensation statutory benefits-policy limits of not less than \$2,000,000.00
 - ii. Employer's Liability-policy limits of not less than \$1,000,000.00

- b. Commercial General Liability coverage must be written on an occurrence as v. a claims made form with policy limits of not less than \$1,000,000.00 per occurrence and \$2,000,000.00 aggregate per project on BI (bodily injury) and PD (property damage) and include coverage for the following:
 - i. Premises-operations
 - ii. Contractual liability
 - iii. Products liability
 - iv. Completed operations
 - v. Where appropriate, coverage provided should include X (explosion), C (collapse), and U (underground excavation) coverages for property damage hazards
 - vi. Personal injury
 - c. Comprehensive Auto Liability insurance with limits of not less than \$1,000,000.00 CSL, BI and PD, including coverage for owned, non-owned and hired autos.
 - d. Bonds
 - i. U.S. Treasury listed
 - ii. CA admitted
 - iii. Bonding capacity equal or greater than project scope
 - e. Other Insurance. The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.
 - f. Contractor's Pollution Liability Shall be written on an "occurrence" as opposed to "claim made" basis policy limits not less than \$1,000,000.00 per occurrence and \$2,000,000.00 annual aggregate.
 - i. Where appropriate, coverage shall include "asbestos abatement"
 - ii. Coverage will be indicated on an appropriate Certificate of Insurance
 - g. Course of Construction (COC)/Builders Risk Insurance As deemed appropriate, such coverage shall be obtained and maintained for the life of the contract.
 - i. For new construction for which the District/Agency is acting as its own construction manager, a COC endorsement may be added to the member's property coverage through SISC
 - ii. When a general contractor is used for new construction, the contractor shall effect and maintain Builder's Risk coverage through a Best Key Guide "A" VII or better-rated property liability carrier with limits consistent with and to the extent of any co-insurance penalty requirement provided for in the policy.
 - 1. Such Coverage shall include the Contractors interest in items of labor and materials in connection therewith whether in or adjacent to the insured structure
 - 2. Coverage shall also include materials in place or to be used as part of the permanent construction, including surplus materials, shanties, protective fences, bridges, or temporary structures; miscellaneous materials and supplies incident to the work, and such scaffolding, staging, towers, forms and equipment as are not owned or rented by the contractor, the costs of which are included in the contract.
7. The Contractor shall not commence work nor shall it allow any Subcontractor to commence work until all required insurance and certificates have been obtained and delivered in duplicate to the Owner for approval.

SECTION 00 46 45 – ESCROW AGREEMENT FOR SECURITY DEPOSITS

THIS ESCROW AGREEMENT made this _____ day of _____, 20____, is entered into and by and between **Merced Union High School District** whose address is 2130 Spacecraft Drive, Atwater, CA 95301, hereinafter called "Owner", _____ whose address is _____, hereinafter called "Contractor" and _____ whose address is _____ hereinafter called "Escrow Agent."

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

1. Pursuant to Section 22300 of the Public Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner in the form of Exhibit `A' within ten 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 Contract between the Owner and Contractor. Securities shall be held in the name of _____, and shall designate the Contractor as the beneficial owner.
2. The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agents holds securities in the form and amount specified above.
3. Alternatively, the Owner may make payments directly to Escrow Agent in the amount of retention for the benefit of the Owner until such time as the escrow created hereunder is terminated.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the escrow account. These expenses and payment terms shall be determined by the Contractor and Escrow Agent.
5. The Interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization form Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.
7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days written notice in the form of "Exhibit C" to the escrow agent from the Owner of the default, the escrow agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner in the form of Exhibit `B' certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.
9. Escrow Agent shall rely on the written notifications from the Owner and Contractor pursuant to Sections (4) to (6), inclusive of this agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows: At the time the Escrow Account is opened, the Owner and Contractor shall delivery to the Escrow Agent a fully executed counterpart of this Agreement.

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

On behalf of the Owner:

Title

Name

Signature

On behalf of the Contractor:

Title

Name

Signature

On behalf of the Escrow Agent:

Title

Name

Signature

EXHIBIT A – CERTIFICATION OF DEPOSIT OF SECURITIES

_____, as Escrow Agent in that certain Escrow Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works Project between the _____ Merced Union High School District, a political subdivision of the State of California (referred to as Owner) and _____, (referred to as Contractor) and _____, a state or federally chartered bank (referred to as Escrow Agent), dated _____, hereby certifies to the Owner that the said Escrow Agent has received from the specified Contractor, securities eligible for investment under Section 22300 of the Public Contract Code having a value of not less than \$ _____. The said Escrow Agent agrees to hold said contractor until such time as the said Escrow Agent has received notification from the Owner's architect that the construction contract has been accepted and the Escrow Agent is authorized to release the securities. The Escrow Agent further certifies that upon written demand by the Owner's architect, the Escrow Agent shall cause sufficient securities to be sold from those so deposited by the said Contractor and shall pay to the Owner the amount specified in the demand, provided such demand does not exceed the amount specified as the minimum value of the securities herein.

Date: _____, at _____, California.
A state or federally chartered bank

By: _____

EXHIBIT B – AUTHORIZATION TO RELEASE SECURITIES DEPOSITED BY CONTRACTOR

To: Escrow Agent

You, as Escrow Agent in that certain Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works Project between the Merced Union High School District, a political subdivision of the State of California (referred to as Owner), _____, (referred to as Contractor), and _____, a state or federally chartered bank (referred to as Escrow Agent) dated _____ are hereby authorized to release to the aforesaid escrow agreement, except that you shall be required to retain as security and pursuant to the terms of the said escrow agreement securities having a value of not less than \$_____, until such time as you may be further notified by the Owner's architect as to further release or as to sale.

Dated: _____

_____ A political division of the State of California

By: _____
Owner

EXHIBIT C – NOTIFICATION OF FAILURE OF PERFORMANCE

DEMAND FOR SALE OF SECURITIES AND DEMAND FOR PAYMENT

You, as Escrow Agent in that certain Escrow Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works Project between the Merced Union High School District, a political subdivision of the State of California (referred to as Owner), _____, _____ (referred to as Contractor), and _____, a state or federally chartered bank (referred to as Escrow Agent) dated _____ are hereby notified that the said Contractor has failed to perform all or part of that certain construction contract described in the said escrow agreement after having been given written notice of lack of performance. you are hereby directed to cause to be sold securities deposited by the said Contractor with you and in accordance with the escrow agreement, said securities having a minimum value of _____, and to deliver forthwith to the Owner's architect the sum of \$ _____. Any remaining securities deposited pursuant to the terms of the said escrow agreement shall be retained by you pursuant to further written notice by the Owner's architect.

Dated: _____

_____ A political division of the State of California

By: _____
Owner

END OF SECTION 00 43 45.

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SECTION 00 52 00 – AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement made and entered into this ____ day of _____, 2023, between the Merced Union High School District ("District") and _____ ("Contractor").

Contractor and District agree as follows:

ARTICLE 1 – THE PROJECT

Contractor agrees to obtain all necessary permits and licenses as are required by law, furnish all labor and materials, including required tools, implements, and appliances and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, material, men, subcontractors, artisans, machinists, teamsters, and laborers required in the bid proposal, all in strict compliance with the Drawings, and other Contract Documents, required for the Project:

EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES

All in strict compliance with the plans, drawings, and specifications prepared by:

California Design West Architects, Inc.
2100 19th Street
Sacramento, CA 95818
(916) 446-2466

Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, transportation, and other facilities and services necessary for the proper execution and completion of the Project. The Contractor shall at all times enforce strict discipline and good order among Contractor's employees and shall not employ on the Project any unfit person or anyone not skilled in the task assigned.

ARTICLE 2 – CONTRACT DOCUMENTS

The Contractor and the District agree that the advertisement (Notice to Bidders), Non-collusion Declaration Form, the Bid Form, the General Conditions, the Instructions to Bidders, the specifications, the drawings, and the addenda and bulletins thereto, together with this Agreement, form the contract documents. The specifications and drawings are intended to compliment, so that any work exhibited in the drawings and not mentioned in the specifications, or vice versa, is to be executed the same as if both mentioned in the specifications and set forth in the drawings to the true intent and meaning of the said drawings and specifications, when taken together.

ARTICLE 3 – CONTRACTOR'S LICENSE

Contractor shall have, and maintain in good standing, a contractors license appropriate to the work during the entire term of this Project.

ARTICLE 4 – COMPLETION DATE/NOTICE TO PROCEED

Time is of the essence in this Agreement and the time of completion for the Project shall be _____ (____) calendar days, from _____, with an anticipated completion date of _____.

If the Notice to Proceed is issued more than ten (10) but less than one hundred twenty (120) days after the Notice of Award, Contractor's sole remedy shall be an extension to the Completion Date, measured by the number of days beyond ten (10) it took to issue the Notice to Proceed. Contractor shall not be entitled to any monetary damages or other compensation for lost profit or overhead or for increased cost of performance.

The term "day" as used in the Contract Documents shall mean calendar day.

ARTICLE 5 – CONTRACT SUM

The contract sum is the total amount payable by District to Contractor for the performance of work under the contract documents, after receipt of properly documented and submitted Applications for Payment. The contract sum is _____ (\$ _____), unless modified in accordance with the contract documents.

ARTICLE 6 – LIQUIDATED DAMAGES

- a. The time limit specified in Article 4 is of the essence of the Agreement. The Contractor shall complete the Project by the date specified in Article 4 unless District agrees in writing to an extension of time.
- b. Failure to complete the Project within the time and in the manner provided for by the Contract Documents shall subject the Contractor to liquidated damages. For purposes of liquidated damages, the concept of substantial completion shall not constitute completion and is not part of the Contract Documents. The actual occurrence of damages and the actual amount of the damages which the District would suffer if the Project were not completed within the specified times set forth are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the District would suffer in the event of delay include, but are not limited to, loss of the use of the Project, disruption of school activities, costs of administration, inspection, supervision and the loss suffered by the public within the District.
- c. Accordingly, the parties agree that the amount herein set forth shall be presumed to be the amount of damages which the District shall directly incur upon the failure of the Contractor to complete the Project within the time specified: One Thousand Dollars and No Cents (\$1,000.00), plus the extra inspection costs incurred by the District, during or as a result of each calendar day by which completion of the Project is delayed beyond the completion date.
- d. If the Contractor becomes liable for liquidated damages under this section, the District, in addition to all other remedies provided by law, shall have the right to withhold any and all retained percentages of payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this section has been finally determined. If the retained percentage is not sufficient to discharge all liabilities of the Contractor incurred under this Article, the Contractor and its sureties shall continue to remain liable to the District until all such liabilities are satisfied in full.
- e. If the District accepts any work or makes any payment under this Agreement after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of completion and liquidated damages.

ARTICLE 7 – EARLY COMPLETION

Regardless of the cause therefore, the Contractor may not maintain any claim or cause of action against the District for damages incurred or claimed to be incurred as a result of its failure or inability to complete its work on the Project in a shorter period than established in Article 4 of this Agreement, the District having established such period as a reasonable time within which to perform the work on the Project.

ARTICLE 8 – PAYMENT

The District agrees to pay the Contractor in current funds for the satisfactory performance of the Agreement the amount proposed in this bid, including approved change orders, and to make payments on account thereof as follows: Ninety percent (90%) of the value, proportionate to the amount of the Agreement, of labor and materials incorporated in the Project up to the first day of that month as estimated by the District or the Architect, less the aggregate of previous payments. On substantial completion of the Contractor work and obligations under this Agreement, a sum sufficient to increase the total payments to ninety percent (90%) of the contract price, and thirty-five (35) days after the notice of completion has been recorded, provided the Project to be fully completed and the Agreement fully performed, the balance due under the Agreement. The payment of progress payments by the District shall not be construed as an acceptance of the work done up to the time of such payments. The entire Project is to be subjected to inspection and approval of District or Architect to defects not obvious upon inspection during the progress of the work at the time when it shall be claimed by the Contractor that the Agreement is completed. The District or Architect shall exercise all reasonable diligence in the discovery, and report to the Contractor as the Project progresses, materials and labor which are not satisfactory to the District, so as to avoid unnecessary trouble and cost to the Contractor in making good defective parts or work.

In accordance with the provisions of Public Contract Code section 22300, the District shall at the request and expense of the Contractor permit the substitution of securities or the payment of funds equivalent to the amount of monies withheld as retention from progress payments.

ARTICLE 9 – TERMINATION FOR CAUSE

The District and Contractor may terminate the Agreement as provided in the General Conditions.

ARTICLE 10 – PERFORMING A PORTION OF THE WORK

If the Contractor fails to correct defective work or persistently fails to carry out the work in accordance with the Contract Documents, the District, by written order, may order the Contractor to stop the work, or any portion thereof, until the cause of such order has been eliminated. The District shall not have any duty to stop the work for the benefit of the Contractor or any other person or entity. If the District chooses to correct or carry out the work itself, it shall normally give the Contractor seven (7) days to commence and continue correction of such default or neglect with diligence and promptness. If, however, the condition constitutes an emergency which may subject the District to penalties or termination of the Project by outside jurisdictional agencies, the District may do so without notice to the Contractor. In either case, an appropriate change order shall be issued, deducting, from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's and consultants' additional services made necessary by such default, neglect, or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor and its surety shall pay the District the difference.

ARTICLE 11 – USE OF SUBCONTRACTORS

Contractor agrees that, as required by State law and the Instruction to Bidders, all subcontractors which will perform work on this project shall be listed on the List of Subcontractors form, provided with the contract documents.

ARTICLE 12 – PREVAILING WAGE RATES

The Project is a public work and all work shall be performed as a Public Work and pursuant to the provisions of section 1770 et seq. of the Labor Code which are hereby incorporated by reference and made a part hereof. The Director of the Department of Industrial Relations of the State of California has determined the general prevailing rates or wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8.

The rate of prevailing wage for any craft, classification or type of workmanship to be employed on this Project is the rate established by the applicable collective bargaining agreement which rate so provided is hereby adopted by reference and shall be effective for the life of this Agreement or until the Director of the Department of Industrial Relations determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement.

It shall be mandatory upon the Contractor herein and upon any subcontractor to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement. The Contractor shall forfeit a penalty for each calendar day, or portion thereof, during which each worker was paid less than the stipulated prevailing rate for such work or craft in which such worker is employed for any work done under the Agreement by him or by any subcontractor under him, the amount of which is to be determined in accordance with Labor Code section 1775.

In addition to said penalty and pursuant to said section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each workman for each calendar day or portion thereof for which each workman was paid less than the stipulated prevailing wage rate shall be paid to each workman by the Contractor.

The Contractor and each subcontractor shall keep or cause to be kept an accurate record showing the names and occupants of all laborers, workers and mechanics employed by him in connection with the execution of this Agreement of any subcontract there under, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the District, its officers and agents and to the representatives of the Division of Labor Law Enforcement of the State Department of Industrial Relations. Attention is directed to the provisions in section 1777.5 and section 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him.

Public works projects shall be subject to compliance monitoring and enforcement by the Department of Industrial Relations. A contractor or subcontractor shall not be qualified to submit a bid or to be listed in a bid proposal subject to the requirements of Public Contract Code section 4104 unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code. A contractor or subcontractor shall not be qualified to enter into, or engage in the performance of, any contract of public work (as defined by Division 2, Part 7, Chapter 1 (§§1720 et seq.) of the Labor Code) unless currently registered and qualified under Labor Code section 1725.5 to perform public work.

ARTICLE 13 – WORKING HOURS

In accordance with the provisions of sections 1810 to 1815 of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, eight (8) hours labor shall constitute a days work, and no laborer, workman, or mechanic in the employ of the Contractor, or any subcontractor, doing or contracting to do any part of the work contemplated by this Agreement, shall be required to or permitted to work more than eight (8) hours in one calendar day or forty (40) hours during any one calendar week unless such work is compensated at the lawful overtime rate set forth in section 1815. The Contractor and each subcontractor shall also keep an accurate record showing the names and actual hours worked of all workers employed by him in connection with the work contemplated by this Agreement, which record shall be open at all reasonable hours to the inspection of the District, or its officers or agents and to the Chief of the Division of Labor Statistics and Law Enforcement of the Department of Industrial Relations, his deputies or agents; and it is hereby further agreed that Contractor shall forfeit as a penalty to District the sum of twenty-five dollars (\$25.00) for each laborer, workman or mechanic who is required or permitted to labor more than eight (8) hours a day or forty (40) hours a week in violation of this stipulation.

ARTICLE 14 – EMPLOYMENT OF APPRENTICES

Contractor agrees to comply with all provisions of the law regarding the employment of apprentices. (Labor Code sections 1773.3, 1777.5, 1777.6, and 3077 et. seq.) These sections, which are hereby incorporated and made a part hereof, require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than one (1) apprentice for each five (5) journeyman hours, unless and exemption is granted, and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public work solely on the grounds of race, religious creed, color, national origin, ancestry, sex, or age. Only apprentices, as defined in Labor Code section 3077, who are in training under written apprenticeship agreements will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions for all apprenticeable occupations rests with the Contractor.

ARTICLE 15 – DSA OVERSIGHT PROCESS

The Contractor must comply with the applicable requirements of the Division of State Architect (“DSA”) Construction Oversight Process (“DSA Oversight Process”), including but not limited to (a) notifying the District’s Inspector of Record/Project Inspector (“IOR”) upon commencement and completion of each aspect of the work as required under DSA Form 156; (b) coordinating the Work with the IOR’s inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the District, District’s Architect, any Construction Manager, any laboratories, and the IOR to meet the DSA Oversight Process requirements without delay or added costs to the Project.

Contractor shall be responsible for any additional DSA fees related to review of proposed changes to the DSA-approved construction documents, to the extent the proposed changes were caused by Contractor’s wrongful act or omissions. If inspected work is found to be in non-compliance with the DSA-approved construction documents or the DSA-approved testing and inspection program, then it must be removed and corrected. Any construction that covers unapproved or uninspected work is subject to removal and correction, at Contractor’s expense, in order to permit inspection and approval of the covered work in accordance with the DSA Oversight Process.”

ARTICLE 16 – FORCE MAJEURE

The parties to the Agreement shall be excused from performance there under during the time and to the extent that they are prevented from obtaining, delivering or performing by unusually severe weather, act of God, fire, strike, loss or shortage of transportation facilities, lockout, commandeering of materials, products, plants, or facilities by the Government, act of a separate contractor, or action or inaction of the part of the Division of the State Architects, when satisfactory evidence thereof is presented to the other party, provided that it is satisfactorily established that the nonperformance is not due to the fault or neglect of the party not performing. Any delay caused by any factor(s) listed hereunder shall be grounds for an extension of time, measured in length by the amount of delay actually suffered by Contractor as a result thereof but shall not be grounds for any increase in compensation to the Contractor, whether for home, office, general or administrative expenses, field expenses, increased costs of materials or labor, or any other thing. A Contractor seeking an extension of time as a result of acts beyond the Contractor's control, must present the request for an extension of time to the District within five (5) calendar days of the commencement of the act causing the delay. A Contractors' failure to provide notice of a request for an extension of time results in an irrevocable waiver by Contractor.

ARTICLE 17 – INSURANCE

By this statement the Contractor represents that it has secured the payment of Workers' Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. The Contractor shall supply the District with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the District will receive thirty (30) days' notice of cancellation. Contractor shall provide the insurance set forth in the General Conditions, and as listed below. The amount of general liability insurance shall be \$1,000,000.00 per occurrence for bodily injury, personal injury and property damage and \$2,000,000.00 aggregate, and a \$1,000,000.00 umbrella policy.

ARTICLE 18 – INDEMNIFICATION AGAINST LIABILITY

The Contractor will defend, indemnify and hold harmless the District, its governing board, officers, agents, trustees, employees and others as provided in the General Conditions.

ARTICLE 19 – MISCELLANEOUS PROVISIONS

- a. Entire Agreement: This Agreement constitutes the entire agreement between the parties and supersedes any prior agreement between the parties, oral or written, including the District's award of the project to Contractor, unless such agreement is expressly incorporated herein. The District makes no representations or warranties, express or implied, not specified in this Agreement. The Agreement is intended as the complete and exclusive statement of the parties' agreement pursuant to Code of Civil Procedure section 1856.
- b. Execution of Other Documents: The parties to this Agreement shall cooperate fully in the execution of any and all other documents and in the completion of any additional actions that may be necessary or appropriate to give full force and effect to the terms and intent of this Agreement.
- c. Binding Effect: Contractor, by execution of this Agreement, acknowledges that Contractor has read this Agreement, understands it, and agrees to be bound by its terms and conditions. This Agreement shall inure to the benefit of and shall be binding upon the Contractor and District and their respective successors and assigns.

- d. Severability: If any provision of this Agreement shall be held invalid or unenforceable by a court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof.
- e. Amendments: The terms of this Agreement shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement signed by the parties and approved or ratified by the District's Governing Board.
- f. Assignment of Agreement: The Contractor shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of the surety on the payment bond, the surety on the performance bond and the District.
- g. Written Notice: Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified first class mail to the last business address known to him who gives the notice.
- h. Attorneys' and Architects' Fees: In any legal action or proceeding arising out of this Agreement, or to enforce the terms of this Agreement, the prevailing party shall be entitled to recover all reasonable attorneys' and architects' fees, costs and expenses incurred therein.
- i. If the School District retains legal counsel to assist in resolution of any dispute which arises during the performance or closeout of this Project and notice is given as specified herein, the parties' reasonable attorneys' and architects' fees shall be paid by the parties in the same proportion as the disputed compensation is resolved. "Disputed compensation" shall include disputed payment of contract funds, payment which is requested pursuant to change order requests, liquidated damages, and payment demanded pursuant to indemnification rights.
- ii. Notice that a party demands payment for its attorneys' and architects' fees pursuant to this provision shall be given by sending a notice by certified mail to other party which cites this provision and informs the other party that all attorneys' and architects' fees which are incurred more than five (5) days after the date of mailing will be subject to division and allocation pursuant to this Article.
- i. Anti-discrimination: It is the policy of the District that in connection with all work performed under purchasing contracts there shall be no discrimination against any prospective or active employee engaged in the Project because of race, color, ancestry, nation origin, sex or religious creed. Therefore, the Contractor agrees to comply with applicable federal and California laws including, but not limited to, the California Fair Employment and Housing Act. In addition, the Contractor agrees to require like compliance by all subcontractors employed on the Project by him.
- j. Execution in Counterparts: This Agreement may be executed in counterparts such that the signatures may appear on separate signature pages. A copy, or an original, with all signatures appended together, shall be deemed a fully executed Agreement.
- k. Governing Law and Venue: The Contract shall be governed by the laws of the State of California. Any action or proceeding seeking any relief under or with respect to this Agreement shall be brought solely in the Superior Court of the State of California for the County of Merced, subject to transfer of venue under applicable State law, provided that nothing in this Agreement shall constitute a waiver of immunity to suit by District.

SECTION 00 61 13 – PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we _____
_____ as Principal, and _____ as Surety,
are held and firmly bound unto **MERCED UNION HIGH SCHOOL DISTRICT**, in the County of
Merced, State of California, hereinafter called the "Owner", in the sum of
_____ Dollars (\$_____) for the
payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators,
and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such, that whereas the Principal entered into a certain contract with
the Owner, the terms of which are incorporated herein by reference, dated _____, for
construction of:

EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES

NOW, THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings,
covenants, terms, conditions, and agreements of said Contract during the original term of said
Contract and any extensions thereof that may be granted by the Owner, with or without notice to the
Surety, and during the life of any guaranty or warranty required under the Contract, and shall also
well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreement of
any and all duly authorized modifications of said Contract that may hereafter be made, then this
obligation is to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of
time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or
the specifications accompanying the same, shall in any way affect its obligation on this bond, and it
does hereby waive notice of any such change, extension of time, alteration or addition to the terms
of the Contract, or to the Work, or to the specifications.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their
several seals this _____ day of _____, _____ hereto affixed and these presents
duly signed by its undersigned representative, pursuant to authority of its governing body.

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

Individual Principal

Business Address

(Affix Corporate Seal)

Corporate Principal

Business Address

(Affix Corporate Seal)

Corporate Surety

Business Address

(Affix Corporate Seal)

By _____

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

The total amount of premium charged is _____.

The above must be filled in by Corporate Surety.

END OF SECTION.

SECTION 00 61 16 – PAYMENT BOND

The Merced Union High School District ("District") and _____ ("Principal") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to construct:

EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES

WHEREAS, the Agreement between the District and the Principal dated _____, and all of the documents attached to or forming a part of the Contract Documents, are hereby referred to and made a part hereof; and

WHEREAS, the Principal is required by the Agreement, before entering upon the performance of the work, to file a good and sufficient bond with the body by whom the Contract is awarded to secure the claims arising under the Agreement.

NOW, THEREFORE, the Principal and the undersigned _____ ("Surety"), as Corporate Surety, hereby bind themselves, their heirs, executors, administrators, successors, assigns, jointly and severally, unto the District for the use and benefit of all persons provided under Civil Code Section 3248, subdivision (b) in the sum of _____ Dollars (\$ _____).

THE CONDITION OF THIS OBLIGATION is that if the Principal or a subcontractor, or their heirs, executors, administrators, successors, or assigns fails to pay any of the persons named in Civil Code section 3181, or any of the amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor that the sureties will pay for the same. Additionally, Surety shall pay all court costs, expenses and reasonable attorney's fees as fixed by the Court associated with any suit brought upon this bond.

IT IS HEREBY EXPRESSLY STIPULATED AND AGREED that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

IT IS FURTHER EXPRESSLY STIPULATED AND AGREED that no change, extension of time, alteration, or addition to the terms of said contract or the specifications accompanying the same, shall in any manner affect the Surety's obligations on this bond, and the Surety does hereby waive notice of any such change, extension, alteration or addition.

THE PROVISION OF Civil Code Sections 2819 and 2845 are waived herein by this reference.

SHOULD THE CONDITION of this bond be fully performed, this obligation shall become void; otherwise the obligation shall remain in full force and effect.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety

This _____ day of _____ 20__.

Notary Seal

Principal

Surety

By: _____
Attorney-in-Fact

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

The total amount of premium charged is _____.

The above must be filled in by Corporate Surety.

Merced Union High School District

By: _____

END OF SECTION.

SECTION 00 65 13 – CERTIFICATE OF COMPLIANCE

TO: THE GOVERNING BOARD OF THE MERCED UNION HIGH SCHOOL DISTRICT

I CERTIFY THAT:

1. Each employee who may have contact with pupils has been fingerprinted;
2. The Department of Justice has provided a report on the criminal background of each employee;
3. No employee who may come into contact with pupils has been convicted of a crime as defined in Education Code section 45125.1; and
4. Attached is a list of the names of each employee who may come into contact with pupils.

CONTRACTOR

PROJECT

PRINT NAME

SIGNATURE

DATE

(SUBMIT WITH AWARD OF CONTRACT)

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SECTION 00 72 00 – GENERAL CONDITIONS

ARTICLE 1 - GENERAL INFORMATION

1.1 BASIC DEFINITIONS

1.1.1 The Contract Documents

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to bid, instructions to bidders, notice to bidders, the Bid Form, Payment Bond, Performance Bond, required insurance certificates, additional insured endorsement and declarations page, Designation of Subcontractors, Noncollusion Affidavit, and the Fingerprinting Notice and Acknowledgment and Independent Contractor Student Contact Form, other documents referred to in the Agreement, and Modifications issued after execution of the Agreement. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Architect. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, material or equipment suppliers in any one shall be binding as if specified in all.

1.1.2 The Contract

The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor.

1.1.3 The Work

The Work shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents. It shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work with Owner's representatives, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents. The "Site" refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work.

1.1.4 The Project

The Project is the total construction of the Work performed in accordance with the Contract Documents in whole or in part and which may include construction by the Owner or by separate contractors.

1.1.5 The Drawings

The Drawings are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections,

details, schedules, and diagrams as drawn or approved by the Architect.

1.1.6 **The Specifications**

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

1.1.7 **The Project Manual**

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

1.2 **EXECUTION, CORRELATION AND INTENT**

1.2.1 **Correlation and Intent**

1.2.1.1 **Documents Complementary and Inclusive:** The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. Any item of work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both.

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

1.2.1.3 **Conflicts.** In the event there is a discrepancy between the various Contract Documents, the Agreement shall control. Without limiting Contractor's obligation to identify conflicts for resolution by the Architect, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.4 **Conformance With Laws.** Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall be amended in writing to make such insertion or correction.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities affecting the construction and operation of the physical plant of the Project, all

quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, Contractor shall promptly notify Architect and Owner in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project. Where requirements of the Contract Documents exceed those of the applicable building codes and ordinances, the Contract Documents shall govern.

If, as and to the extent that Public Contract Code section 1104 is deemed to apply after the Award of the Contract, Contractor shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, notwithstanding any other provision in the Contract Documents, except to the extent that Contractor discovered or should have discovered and reported any errors and omissions to the Architect or Owner, including but not limited to as the result of any review of the plans and specifications by Contractor required by the Instructions to Bidders or other Contract Documents, whether or not actually performed by Contractor.

1.2.1.5 **Ambiguity.** Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify Architect and Owner in writing of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Sum or the time for performance. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Contract Sum or the time for performance. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.

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

1.2.2 Addenda and Deferred Approvals

1.2.2.1 **Addenda.** Addenda shall govern over all other Contract Documents. Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be signed by Architect of Record, and approved by the Department of the State Architect ("DSA").

1.2.2.2 **Deferred Approvals.** The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Re

gulations, shall take precedence over any previously issued addenda, drawing or specification. The Contractor shall be responsible for the timely submittal, coordination, and processing of deferred approval items and for obtaining DSA approval so as not to delay the completion of the project. Delays associated with a failure to comply with this requirement shall not be considered as a valid basis for a delay claim.

1.2.3 Specification Interpretation

1.2.3.1 **Titles.** The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of work to be performed by any trade.

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

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

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

1.2.3.5 **Abbreviations.** In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as "Contractor shall," "shall be," etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.

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

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

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

1.2.3.9 **Absence of Modifiers.** In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

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

The Drawings, Specifications, and other documents prepared on behalf of the Owner are instruments of the services of the Architect and its consultants and are the property of the Owner. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, upon request upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's property interest or other reserved right. All copies made under this license shall bear appropriate attribution and the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.

ARTICLE 2 - OWNER

2.1 **DEFINITION**

The term "Owner" means the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative.

2.2 **INFORMATION AND SERVICES REQUIRED OF THE OWNER**

2.2.1 **Intentionally Left Blank**

2.2.2 **Site Survey**

When required by the scope of the Project, the Owner will furnish, at its expense, a legal description or a land survey of the Site, giving, as applicable, grades and lines of streets, alleys, pavements, adjoining property, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries, and contours of the Site. Surveys to determine locations of construction, grading, and site work shall be provided by the Contractor.

2.2.3 **Soils**

2.2.3.1 **Owner Furnished Services.** When required by the scope of the Project, the Owner will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required and deemed necessary by the Architect or as required by lo

cal or state codes. Such services with reports and appropriate professional recommendations shall include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

2.2.3.2 Contractor Reliance. Test borings and soils reports for the Project have been made for the Owner to indicate the subsurface materials that might be encountered at particular locations on the Project. The Owner has made these documents available to the Contractor and the Contractor has studied the results of such test borings and information that it has as to the subsurface conditions and Site geology as set forth in the test borings and soils reports. The Owner does not assume any responsibility whatsoever with respect to the sufficiency or accuracy of the borings made, or of the logs of the test borings, or of other investigations, or of the soils reports furnished pursuant hereto, or of the interpretations to be made beyond the location or depth of the borings. There is no warranty or guarantee, either express or implied that the conditions indicated by such investigations, borings, logs, soil reports or other information are representative of those existing throughout the site of the Project, or any part thereof, or that unforeseen developments may not occur. At the Owner's request, the Contractor shall make available to the Owner the results of any Site investigation, test borings, analyses, studies or other tests conducted by or in the possession of the Contractor of any of its agents. Nothing herein contained shall be deemed a waiver by the Contractor to pursue any available legal right or remedy it may have at any time against any third party who may have prepared any report and/or test relied upon by the Contractor.

2.2.4 Utility Survey

When required by the scope of the Project, the Owner will furnish, at its expense, all information regarding known existing utilities on or adjacent to the Site, including location, size, inverts, and depths.

2.2.5 Information

Upon the request of the Contractor, Owner will make available such existing information regarding utility services and Site features, including existing construction, related to the Project as is available from Owner's records. The Contractor may not rely upon the accuracy of any such information, other than that provided under Sections 2.2.2 and 2.2.4 (except that the Contractor may not rely upon and must question in writing to the Owner and the Architect any information which appears incorrect based upon Contractor's Site inspection, knowledge of the Project, and prior experience with school projects), unless specifically stated in writing that the Contractor may rely upon the designated information.

2.2.6 Existing Utility Lines

2.2.6.1 Assessment. These subparagraphs shall not be construed to preclude assessment against the Contractor for any other delays in completion of the Work. Nothing in these subparagraphs shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site.

2.2.6.2 Notification. If the Contractor, while performing work under this Contract, discovers utility facilities not identified by the Owner in the Contract plans or specifications, Contractor shall immediately notify the Owner and the utility in writing.

2.2.6.3 Underground Utility Clearance. It shall be Contractor's sole responsibility to

timely notify all public and private utilities serving the Site prior to commencing work. The Contractor shall notify and receive clearance from any cooperative agency, such as Underground Service Alert, in accordance with Government Code section 4216, et seq. Contractor shall promptly provide a copy of all such notifications to the Owner.

2.2.7 Easements

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

2.2.8 Reasonable Promptness

Information or services under Owner's control will be furnished by the Owner with reasonable promptness. The Owner shall not be liable for any delays caused by factors beyond the Owner's control including but not limited to DSA's or any other local, State or federal agency's review of bids, change order requests, RFI's or any other documents.

2.2.9 Copies Furnished

The Contractor will be furnished such copies of Drawings and Project Manuals as are stated in the Contract Documents.

2.2.10 Duties Cumulative

The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein, and especially those in Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion), and Article 11 (Insurance and Bonds).

2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work, which is not in accordance with the requirements of the Contract Documents as required by paragraph 12.2, or persistently fails to carry out Work in accordance with the Contract Documents, the Owner, after providing Notice pursuant to paragraph 2.4, by written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work or any portion thereof, until the cause for such order has been eliminated. The right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails (within a seven-day period after receipt of written notice or the time period expressly stated in the written notice from the Owner) to commence and continue correction of such default or neglect with diligence and promptness, the Owner may correct such deficiencies without prejudice to other remedies the Owner may have. In such case, the Contractor will be invoiced the cost of correcting such deficiencies, including compensation for additional professional and internally generated services and expenses made necessary by such default, neglect, or failure. The invoice amount shall be deducted from the next payment due the Contractor. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 - THE CONTRACTOR

3.1 DEFINITION

The Contractor is the person or entity identified as such in the Agreement and is referred to

throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative. To the extent that any portion of the Work is provided with the Contractor's own forces, any reference to Subcontractors shall be equally applicable to the Contractor.

3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 Contractor

The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters. If any of the Work is performed by contractors retained directly by the Owner, Contractor shall be responsible for the coordination and sequencing of the Work of those other contractors so as to avoid any impact on the Project Schedule pursuant to the requirements of Article 6. Specific duties of the Contractor shall be in accordance with Title 24 of the California Code of Regulations. Contractor shall fully comply with any and all reporting requirements of Education Code sections 17309 and 81141 in the manner prescribed by Title 24.

3.2.2 Contractor Responsibility

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

3.2.3 Obligations not Changed by Architect's Actions

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

3.2.4 Contractor Responsibility for Readiness for Work

The Contractor shall be responsible for inspection of Work already performed under the Contract Documents to determine that such portions are in proper condition to receive subsequent work.

3.3 SUPERINTENDENT

3.3.1 Full Time Superintendent

The Contractor shall provide a competent superintendent and assistants as necessary, all of whom shall be reasonably proficient in speaking, reading and writing English and, who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

3.3.2 Staff

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

3.3.3 Right to Remove

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

3.4 LABOR AND MATERIALS

3.4.1 Contractor to Provide

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

3.4.2 Quality

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of such quality as required to satisfy the standards of the Contract Documents. The Contractor shall, if requested, promptly furnish satisfactory evidence as to kind and quality of all materials and equipment. All labor shall be performed by workers skilled in their respective trades, and shall be of such quality so that work in accordance with the standards of construction set forth in the Contract Documents will result.

3.4.3 Replacement

Any work, materials, or equipment, which does not conform to these requirements or the standards set forth in the Contract Documents, may be disapproved and rejected by the Owner, in which case, they shall be removed and replaced by the Contractor at no cost to the Owner.

3.4.4 Discipline

The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract in accordance with paragraph 5.5.1 including, but not limited to, Subcontractors, and material or equipment suppliers retained for the Project.

3.5 WARRANTY

The Contractor warrants to the Owner and Architect that material and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty does not cover damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 TAXES

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

3.7 PERMITS, FEES AND NOTICES

3.7.1 Payment

The contractor shall be responsible for the following:

3.7.1.1 Obtain and pay for permits and service charges required in installation of Work.

3.7.1.2 The Contractor shall arrange for and secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and are legally required by any authority having jurisdiction over the Project.

3.7.1.3 Arrange for utility connections and pay charges incurred, including water meter and meter box and gas meter.

3.7.1.4 The cost of all permits will be reimbursed to the Contractor. The reimbursement will be a direct cost of payment by the Owner without additional fees, service charges, or interest. Should the Contractor fail to observe the applicable Codes as noted in the contract documents and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, the Contractor shall remove such work without cost to the Owner, and replace it in accordance with such ordinance or code.

3.7.1.5 Owner shall be responsible for all testing and inspection as required by the DSA on-Site or within the distance limitations set forth in paragraph 13.5.2, unless a different mileage range is specified in the Contract Documents.

3.7.2 Compliance

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work.

3.7.3 Contract Documents

The Contractor shall carefully study and compare the Agreement, general conditions, drawings, specifications, addenda and modifications and shall at once report to the Architect any error, inconsistency or omission it may discover. The Contractor shall do no work without proper drawings and specifications or interpretations. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect and the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

3.7.4 Responsibility

If the Contractor performs Work that it knows, or should have known, is contrary to any law, statute, ordinance, building code, rule or regulation, the Contractor shall assume full responsibility for such Work, for all delays attributable thereto, and shall bear the attributable cost of correction or Project delay.

3.8 ALLOWANCES

3.8.1 Contract

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such

persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against whom the Contractor makes reasonable and timely objection.

3.8.2 **Scope**

3.8.2.1 **Prompt Selection.** Materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay to the Work.

3.8.2.2 **Cost.** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the Site and all required taxes, less applicable trade discounts, etc., as delineated in paragraph 7.7.4.

3.8.2.3 **Cost Included in Contract Sum.** Contractor's costs for unloading and handling at the Site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances.

3.8.2.4 **Contract Sum Adjustment.** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual cost and the allowances under paragraph 3.8.2.2 and the change in the Contractor's costs under paragraph 3.8.2.3.

3.9 **CONTRACTOR'S CONSTRUCTION SCHEDULES**

3.9.1 **Requirements**

The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and the Architect's information the construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents and shall comply with all of the scheduling as required by Division 1 of the Specifications.

3.9.2 **Failure to Meet Requirements**

Failure of the Contractor to provide proper schedules as required by this paragraph may, at the sole discretion of Owner, constitute either grounds to withhold, in whole or in part, progress payments to the Contractor, or a breach of contract allowing Owner to terminate the Agreement between Owner and Contractor.

3.10 **DOCUMENTS AND SAMPLES AT THE SITE**

The Contractor shall maintain at the Site for the Owner one applicable copy of Titles 19 and 24 (Parts 1-5) and record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required submittals. These documents shall be available to the Architect and shall be delivered to the Architect for delivery to the Owner upon completion of the Work.

3.11 **RFI, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES**

3.11.1 **Submittals Defined**

3.11.1.1 **Shop Drawings.** The term "shop drawings" as used herein means drawings, diagrams, schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and in

cludes: illustrations; fabrication, erection, layout and setting drawings; manufacturer's standard drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents. The Contractor shall obtain and submit with the shop drawings all seismic and other calculations and all product data from equipment manufacturers.

"Product data" as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work. As used herein, the term "manufactured" applies to standard units usually mass-produced, and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop drawings shall: establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

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

3.11.1.3 **Contractor's Responsibility.**

Contractor shall obtain and shall submit to Architect all required shop drawings and samples in accordance with Contractor's "Schedule for Submission of Shop Drawings and Samples" as required in Division 1 of the Specifications with such promptness as to cause no delay in its own Work or in that of any other contractor, Owner or subcontractor but in no event later than ninety (90) days after the execution of the Agreement. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule. Each Subcontractor shall submit all shop drawings, samples, and manufacturer's descriptive data for the review of the Owner, the Contractor, and the Architect through the Contractor. By submitting shop drawings, product data, and samples, the Contractor or submitting party (if other than Contractor) represents that it has determined and verified all materials, field measurements, field conditions, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. At the time of submission, any deviation in the shop drawings, product data, or samples from the requirements of the Contract Documents shall be narratively described in a transmittal accompanying the submittal. However, submittals shall not be used as a means of requesting a substitution, the procedure for which is defined in paragraph 3.11.4, "Substitutions." Review by Owner and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper shop drawings in accordance with the Contract Documents. Contractor shall stamp, sign, and date each submittal indicating its representation that the submittal meets all of the requirements of the Contract Documents. Any submission, which in Architect's opinion is incomplete,

contains numerous errors, or has been checked only superficially by Contractor will be returned unreviewed by the Architect for re-submission by the Contractor.

3.11.1.4 **Extent of Review.** In reviewing shop drawings, the Architect will not verify dimensions and field conditions. The Architect will review and approve shop drawings, product data, and samples for aesthetics and for conformance with the design concept of the Work and the information given in the Contract Documents. The Architect's review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission and the Architect has given specific written approval. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in shop drawings or schedules, for proper fitting of the Work, or from the necessity of furnishing any Work required by the Contract Documents, which may not be indicated on shop drawings when reviewed. Contractor and Subcontractors shall be solely responsible for determining any quantities, whether or not shown on the shop drawings. Allow for a minimum of 14 (fourteen) days review period.

3.11.2 **Drawing Submission Procedure**

3.11.2.1 **Transmittal Letter and Other Requirements.** All shop drawings must be properly identified with the name of the Project and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" on the submissions, all qualifications, departures, or deviations from the Contract Documents, if any. Shop drawings, for each section of the Work, shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Only shop drawings required to be submitted by the Contract Documents shall be reviewed.

3.11.2.2 **Copies Required.** Each submittal shall include one (1) legible, reproducible vellum and five (5) legible prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: manufacturers' descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; wiring diagrams and controls; schedules; all seismic calculations and other calculations; and other pertinent information as required.

3.11.2.3 **Corrections.** The Contractor shall make any corrections required by Architect and shall resubmit as required by Architect the required number of corrected copies of shop drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required submittals of shop drawings, product data, or samples are subject to charge to the Contractor pursuant to paragraph 4.4.

3.11.2.4 **Approval Prior to Commencement of Work.** No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by Owner and approved by Architect unless specifically directed in wr

iting by the Owner. All such portions of the Work shall be in accordance with approved shop drawings and samples.

3.11.3 Sample Submissions Procedure

3.11.3.1 **Samples Required.** In case a considerable range of color, graining, texture, or other characteristics may be anticipated in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics, which will be present in the finished products; and products delivered or erected without submittal and approval of full range samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications, samples shall be submitted in duplicate. All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted, and the date and shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number for identification of each item. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.11.3.2 **Labels and Instructions.** Samples of materials, which are generally furnished in containers bearing the manufacturers' descriptive labels and printed application instructions, shall, if not submitted in standard containers, be supplied with such labels and application instructions.

3.11.3.3 **Architect's Review.** The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the appropriate action in compliance with the Architect's standard procedures.

3.11.3.4 **Record Drawings and Annotated Specifications.** The Contractor will prepare and maintain on a current basis an accurate and complete set of Record Drawings showing clearly all changes, revisions, and substitutions during construction, including, without limitation, field changes and the final location of all mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features, and Annotated Specifications showing clearly all changes, revisions, and substitutions during construction. A copy of such Record Drawings and Annotated Specifications will be delivered to Owner in accordance with the Schedule prepared by Contractor. In the event of a specification that allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the Record Drawings and Annotated Specifications as often as necessary to keep them current but no less often than weekly. The Record Drawings and Annotated Specifications shall be kept at the Site and available for inspection by the Owner, Inspector and the Architect. On completion of the Contractor's portion of the Work and prior to Application for Final Payment, the Contractor will provide one complete set of Record Drawings and Annotated Specifications to the Owner, certifying them to be a complete and accurate reflection of the actual construction conditions of the Work.

3.11.3.5 **Equipment Manuals.** Contractor shall obtain and furnish three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in proper order, indexed, and placed in three-ring binders. At the completion of its Work, the Co

Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Final Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in proper order, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the Owner through the Architect.

3.11.3.6 **Owner's Property.** All shop drawings and samples submitted shall become the Owner's property.

3.11.4 Substitutions

3.11.4.1 **One Product Specified.** Unless the Specifications state that no substitution is permitted, whenever in the Contract Documents any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article, which shall be substantially equal or better in every respect to that so indicated or specified and will completely accomplish the purpose of the Contract Documents.

3.11.4.2 **Two or More Products Specified.** When two or more acceptable products are specified for an item of the Work, the choice will be up to the Contractor. Contractor shall utilize the same product throughout the Project. If a timely substitution request as set forth in Section 3.11.4.3 is not provided and an "or equal" substitution is requested, the Owner may consider the substitution if the product specified is no longer commercially available. If the Owner allows the substitution to be proposed pursuant to such an untimely request, the Contractor will be responsible for the professional fees incurred by the Architect or Architect's consultants in reviewing the proposed substitution which fees may be deducted from progress payments to Contractor.

3.11.4.3 **Substitution Request Form.** Requests for substitutions of products, materials, or processes other than those specified must be made on the Substitution Request form available from the Owner prior to the date of the bid opening. Any Requests submitted less than fourteen (14) days prior to the date of the bid opening will not be considered, except as noted in paragraph 3.11.4.2. A Substitution Request must be accompanied by evidence as to whether or not the proposed substitution: is equal in quality and serviceability to the specified item; will entail no changes in detail and construction of related work; will be acceptable in consideration of the required design and artistic effect; will provide no cost disadvantage to Owner; and will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts. The burden of proof of these facts shall be upon the Contractor. The Contractor shall furnish with its request sufficient information to determine whether the proposed substitution is equivalent including but not limited to all drawings, specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the Owner in determining whether the proposed substitution is acceptable. The final decision shall be the Owner's. The written approval of the Owner, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. Owner may condition its approval of the substitution upon delivery to Owner of an extended warranty or other assurances of adequate performance

of the substitution. All risks of delay due to the Division of the State Architect's, or any other governmental agency having jurisdiction, approval of a requested substitution shall be on the requesting party.

3.11.4.4 **List of Manufacturers and Products Required.** The Subcontractor shall prepare and submit to the Contractor within thirty (30) days of execution of the Subcontract comprehensive lists, in quadruplicate, of the manufacturers and products proposed for the Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for Contractor's or Architect's preliminary approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of the Contractor and the Architect.

3.11.5 **Deferred Approvals**

Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All risks of delay due to the Division of the State Architect's, or any other governmental agency having jurisdiction, approval of a deferred approval shall be on the requesting party.

3.12 **CUTTING AND PATCHING**

3.12.1 **Scope**

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

3.12.2 **Consent**

The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. All cutting shall be done promptly, and all repairs shall be made as necessary.

3.12.3 **Structural Members**

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

3.12.4 **Subsequent Removal**

Permission to patch any areas or items of the Work shall not constitute a waiver of the Owner's or the Architect's right to require complete removal and replacement of the areas of items of the Work if, in the opinion of the Architect or the Owner, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents. Any costs caused by defective or ill-timed cutting or patching shall be borne by the person or entity responsible.

3.13 **CLEANING UP**

3.13.1 **Contractor's Responsibility**

The Contractor shall keep the Site and surrounding area free from accumulation of waste material or rubbish caused by operations under the Contract. The Site shall be maintained in a neat and orderly condition. All crates, cartons, paper, and other flammable waste materials shall be removed from Work areas and properly disposed of at the end of each day. The Contractor shall remove from and about the Site the waste materials, rubbish, tools, construction equipment, machinery, and materials no longer required for the Work.

3.13.2 **Failure to Cleanup**

If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so, without prior notice to the Contractor and the cost thereof shall be invoiced to the Contractor and deducted from the next progress payment. Each Subcontractor shall have the responsibility for the cleanup of its own Work. If the Subcontractor fails to clean up, the Contractor must do so.

3.13.3 **Construction Buildings**

When directed by the Owner or the Architect, Contractor and Subcontractor shall dismantle temporary structures, if any, and remove from the Site all construction and installation equipment, fences, scaffolding, surplus materials, rubbish, and supplies belonging to Contractor or Subcontractor. If the Contractor does not remove the tools, equipment, machinery, and materials within fifteen (15) days after completion of its Work, then they shall be deemed abandoned, and the Owner can dispose of them for its own benefit in whatever way it deems appropriate. Contractor shall pay for any costs to dispose of the items.

3.14 **ACCESS TO WORK**

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

3.15 **ROYALTIES AND PATENTS**

3.15.1 **Payment and Indemnity**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims of infringement of patent rights and shall hold the Owner and the Architect harmless and indemnify them from loss on account thereof but shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer is required by the Contract Documents. However, if the Contractor has reason to believe the required design, process, or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

3.15.2 **Review**

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

3.16 **INDEMNIFICATION**

3.16.1 **Scope: Contractor**

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, the Inspector of Record, the State of

California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and directors, from and against claims, damages, losses, and expenses (including, but not limited to attorneys' fees and costs including fees of consultants) arising out of or resulting from: performance of the Work (including, but not limited to) the Contractor's or its Subcontractor's use of the Site; the Contractor's or its Subcontractor's construction of the Project, or failure to construct the Project, or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Contractor, its Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. The obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Contractor shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Contractor.

3.16.2 **Scope: Subcontractors**

3.16.2.1 **Indemnity.** The Subcontractors shall defend, indemnify, and hold harmless the Owner, the Architect, and the Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, and members of the Boards of Trustees and directors from and against claims, damages, losses, and expenses, including, but not limited to, attorneys' fees and costs, including consultants) arising out of or resulting from: performance of the Work (including, but not limited to) the Subcontractors' use of the Site; the Subcontractors' construction of the Project or failure to construct the Project or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. This obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Subcontractors shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance po

licies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Subcontractors.

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

3.16.3 **No Limitation**

The Contractor's and the Subcontractor's obligation to indemnify and defend the Indemnitees hereunder shall include, without limitation, any and all claims, damages, and costs: for injury to persons and property (including loss of use), and sickness, disease or death of any person; for breach of any warranty, express or implied; for failure of the Contractor or the Subcontractor to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work.

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 Definition

The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative and shall also refer to all consultants under the Architect's direction and control.

4.1.2 Modification

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

4.1.3 Termination

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

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 Status

The Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representative during construction, until final payment is due, and during the one (1) year period following the commencement of any warranties. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of The Owner/Architect Agreement.

The Architect will have all responsibilities and power established by law including California Code of Regulations, Title 24.

4.2.2 Site Visits

The Architect will visit the Site at intervals necessary in the judgment of the Architect or as otherwise agreed by the Owner and the Architect in writing to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. Architect's agreement shall not be unreasonably withheld. However, the Architect will not be required to make exhaustive or continuous on-Site inspections to check quality or quantity of the Work. On the basis of its on-Site observations, the Architect will keep the Owner informed of the progress of the Work.

4.2.3 Limitations of Construction Responsibility

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

4.2.4 Communications Facilitating Contract Administration

Except as otherwise provided in the Contract Documents or when direct communications are warranted by special circumstances, the Owner and the Contractor shall communicate through the Architect. Where direct communication is necessary between the Owner and the Contractor, the Architect shall be promptly informed, and shall receive copies of all written communications. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material or equipment suppliers shall be through the Contractor.

4.2.5 Payment Applications

Pursuant to Article 9, based on the Architect's observations, the Architect's evaluation of the Contractor's Applications for Payment, and the stage of the Inspector of Record's approval of the Work, the Architect will review and make recommendations to the Owner regarding the amounts due the Contractor on the Applications for Payment. Owner shall issue the Certificates of Payment.

4.2.6 Rejection of Work

In addition to the rights, duties, and obligations of the Inspector under this Article, the Architect may recommend to the Owner that the Owner reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable to achieve the intent of the Contract Documents, the Architect will recommend to the Owner that the Owner require additional inspection or testing of the Work in accordance with

paragraph 13.5.5, whether or not such Work is fabricated, installed, or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.2.7 **Change Orders**

The Architect will prepare change orders and construction change directives and may authorize minor changes in the Work as provided in paragraph 7.1.2.

4.2.8 **Warranties Upon Completion**

The Architect in conjunction with the Inspector will conduct field reviews of the Work to determine the date of completion, shall receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue, with Owner's concurrence, a final Certificate for Payment when the Architect believes the Work has been completed in compliance with the requirements of the Contract Documents. The handling by the Architect of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

The Architect will conduct a field review of the Contractor's comprehensive list of items to be completed or corrected (final punch list) and one (1) follow-up field review if required. The cost incurred by the Owner for further field reviews or the preparation of further punch lists by the Architect shall be invoiced to the Contractor and deducted from the final payment.

4.2.9 **Interpretation**

The Architect will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the Owner or the Contractor. The Architect's response to such requests will be made with reasonable promptness, while allowing sufficient time in the Architect's professional judgment, to permit adequate review and evaluation of request.

4.2.10 **Additional Instructions**

4.2.10.1 **Architect's Interpretations and Decisions.** Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations of and decisions regarding the Contract Documents, the Architect will endeavor to secure faithful performance under the Contract Documents by both the Owner and the Contractor and will not show partiality to either. The Work shall be executed in conformity with, and the Contractor shall do no work without, approved drawings, Architect's clarifying instructions, and/or submittals.

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

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

4.3 INSPECTOR OF RECORD

4.3.1 General

One or more project inspectors employed by the Owner and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. Inspection shall be performed in accordance with Section 4-333 (b), Part 1, Title 24. The duty of the inspector shall be in accordance with Section 4-342, Part 1, Title 24.

4.3.2 Inspector's Duties

All Work shall be under the observation of or with the knowledge of the Inspector. The Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector such information as may be necessary to keep the Inspector fully informed regarding progress and manner of work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector is not authorized to make changes in the drawings or specifications nor shall the Inspector's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

4.3.3 Inspector's Authority to Reject or Stop Work

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

4.3.4 Inspector's Facilities

Within seven (7) days after notice to proceed, the Contractor shall provide the Inspector with the temporary facilities as required under Division 1 of the Specifications.

4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE OWNER FOR PROFESSIONAL SERVICES

If at any time prior to the completion of the requirements under the Contract Documents, through no fault of its own, the Owner is required to provide or secure additional professional services for any reason by any act or omission of the Contractor, the Contractor shall be invoiced by the Owner for any actual costs incurred for any such additional services, which costs may, among other remedies, be deducted from the progress payments. Such invoicing shall be independent from any other Owner remedies, including but not limited to liquidated damages. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. Additional services shall include, but shall not be limited to, the following:

- A. Services made necessary by the default of the Contractor.
- B. Services made necessary due to the defects or deficiencies in the Work of the Contractor.
- C. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.

- D. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors proposed by the Contractor, and making subsequent revisions to drawings, specifications, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available).
- E. Services for evaluating and processing claims submitted by the Contractor in connection with the Work outside the established Change Order process.
- F. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.
- G. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.
- H. Services in conjunction with more than one (1) re-review of required submittals of shop drawings, product data, and samples.

4.5 **CLAIMS AND DISPUTES**

4.5.1 **Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and the Contractor arising out of or relating to the Contract Documents. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.5.2 **Decision of Architect**

Claims, including those alleging an error or omission by the Architect, shall be referred initially to the Architect for action as provided in paragraph 4.6. A decision by the Architect, as provided in paragraph 4.6.4, shall be required as a condition precedent to any mediation, arbitration, litigation or other action or proceeding on a Claim between the Contractor and the Owner as to all such matters arising prior to the date final payment is due, regardless of whether such matters relate to execution and progress of the Work, or the extent to which the Work has been completed. The decision by the Architect in response to a Claim shall not be a condition precedent to any mediation, arbitration, litigation or other action or proceeding in the event: the position of Architect is vacant; the Architect has not received evidence or has failed to render a decision within agreed time limits; the Architect has failed to take action required under paragraph 4.6.4 within thirty (30) days after the Claim is made; forty-five (45) days have passed after the Claim has been referred to the Architect; or the Claim relates to a Stop Notice Claim.

4.5.3 **Time Limit on Claims**

Claims by either party must be made within ten (10) days after occurrence of the event giving rise to such Claim or within ten (10) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered. The failure of the Contractor to provide the required Notice within the specified time shall constitute an express waiver of any right to assert such claim, whether affirmatively or defensively.

4.5.4 **Continuing Contract Performance**

Pending final resolution of a Claim including mediation, arbitration, or litigation, unless otherwise agreed to in writing, the Contractor shall proceed diligently with performance of the Contract, and the Owner shall continue to make any undisputed payments in accordance with the Contract.

4.5.5 **Claims for Concealed or Unknown Conditions**

4.5.5.1 ***Trenches or Excavations Less Than Four Feet Below the Surface.*** If conditions are encountered at the Site which are subsurface or otherwise concealed physical conditions, which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. The Architect will promptly investigate such conditions, and if they differ materially and cause an increase or decrease in the Contractor's cost of, time required for, or performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum, Contract Time, or both. If the Architect determines that the conditions at the Site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and the Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within ten (10) days after the Architect has given notice of the decision. If the Owner and the Contractor cannot agree on an adjustment in the Contract Sum or the Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to other proceedings pursuant to paragraph 4.6.

4.5.5.2 ***Trenches or Excavations Greater Than Four Feet Below the Surface.*** Pursuant to Public Contract Code section 7104, when any excavation or trenching extends greater than four feet below the surface:

4.5.5.2.1 The Contractor shall promptly, and before the following conditions are disturbed, notify the public entity, 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 the provisions of existing law.
- (2) Subsurface or latent physical conditions at the site differing from those indicated.
- (3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

4.5.5.2.2 The public entity 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 Contract.

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

4.5.6 **Claims for Additional Cost**

If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Each Claim for additional cost must include any claim for additional time and its associated costs, and all facts supporting the claim and a current schedule showing the impact on the critical path of any claimed delay and that the delay will extend the Work beyond the contractual completion date, including, but not limited to copies of written computations of delay damages and supporting documentation including but not limited to any relevant job cost, bidding and home office overhead information. Prior notice is not required for claims relating to an emergency endangering life or property arising under paragraph 10.4.1. If the Contractor believes additional cost is involved for reasons, including, but not limited to the following: a written interpretation from the Architect, an order by the Owner to stop the Work where the Contractor was not at fault, a written order for a minor change in the Work issued by the Architect, failure of payment by the Owner, termination of the Contract by the Owner, the Owner's suspension of the Work, or other reasonable grounds, a claim shall be filed in accordance with the procedure established herein.

4.5.7 **Claims for Additional Time**

4.5.7.1 **Notice and Extent of Claim.** If the Contractor wishes to make a claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's claim shall include the cost associated with the extension, if any, all facts supporting the claim and a current schedule showing the impact on the critical path of any claimed delay and that the delay will extend the Work beyond the contractual completion date. In the case of a continuing delay, only one (1) claim is necessary.

4.5.7.2 **Adverse Weather Claims.** If the request for extension of time is related to unusual weather circumstances, the Contractor shall submit substantiating data from the National Weather Service indicating that the weather pattern which gave rise to the delay was not foreseeable as "normal. Requests for weather related delays for normal or near-normal weather patterns will not be considered. If weather delays are approved, they shall extend the Contract Date, but no change to the Contract amount. Refer to the precipitation chart at the end of this section for normal weather conditions. A rain day is defined as one-tenth of one inch of rain in a 24 hour period.

4.5.7.3 **No Reservation Allowed.** In no event will the Contractor be allowed to reserve its rights to assert a claim for time extension or additional cost later than as required by paragraph 4.5.3 unless the Owner agrees in writing to allow such reservation.

4.5.8 **Injury or Damage to Person or Property**

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for

whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a claim for additional cost or time related to this claim is to be asserted, it shall be made as provided in paragraphs 4.5.6 or 4.5.7.

4.5.9 **Submission under Penalty of Perjury**

The Contractor shall certify, at the time of submission of a claim, as follows:

I, _____, being the _____ (Must be an officer) of _____ (Contractor), declare under penalty of perjury under the laws of the State of California, and do personally certify and attest that: I have thoroughly reviewed the attached claim for additional cost and/or extension of time, and know its contents, and said claim is made in good faith; the supporting data is truthful, accurate and complete; that the amount requested accurately reflects the adjustment for which the Contractor believes the Owner is liable; and further, that I am familiar with California Penal Code section 72 pertaining to false claims, and further know and understand that submission or certification of a false claim may lead to fines, imprisonment and/or other severe legal consequences.

By: _____

Contractor understands and agrees that any claim submitted without this certification does not meet the terms of the Contract Documents, that Owner, or Owner's representatives, may reject the claim on that basis and that unless Contractor properly and timely files the claim with the certification, Contractor cannot further pursue the claim in any forum. A condition precedent will not have been satisfied.

4.6 **RESOLUTION OF CLAIMS AND DISPUTES**

4.6.1 **Architect's Review**

The Architect will review claims and take one or more of the following preliminary actions within ten (10) days of receipt of a claim: request additional supporting data from the claimant; submit a schedule to the parties indicating when the Architect expects to take action; reject the claim in whole or in part, stating reasons for rejection; recommend approval of the claim by the other party; or suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the claim.

4.6.2 **Documentation if Resolved**

If a claim has been resolved, the Architect will prepare or obtain appropriate documentation.

4.6.3 **Actions if Not Resolved**

If a claim has not been resolved, the party making the claim shall, within ten (10) days after the Architect's preliminary response, take one or more of the following actions: submit additional supporting data requested by the Architect; modify the initial claim; or notify the Architect that the initial claim stands.

4.6.4 **Architect's Written Decision**

If a claim has not been resolved after consideration of the foregoing and of other evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven (7) days. Upon expiration of such time period, the Architect will render to the parties its written decision relative to the claim, including any change in the Contract Sum or Contract Time or both. The Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving

the controversy.

4.7 ALTERNATE DISPUTE RESOLUTION OF CLAIMS OF \$375,000 OR LESS

4.7.1 Claims Less Than \$375,000

Notwithstanding any other provision herein, claims of \$375,000 or less shall be resolved pursuant to the alternative dispute resolution procedures set forth in Public Contracts Code sections 20104, et seq. "Claim" for this purpose means a separate demand 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 Contract, for which payment is expressly provided, or the Contractor is otherwise entitled to, or an amount the payment of which is disputed by the Owner.

4.7.2 Submission of Claims Less than \$375,000

The Contractor shall submit its claim of \$375,000 or less to the Owner in writing, within the time frames established under paragraph 4.5.3, but no later than before the final payment is made. The Owner shall respond within the time provided by statute. If the Contractor disagrees with the response or the Owner fails to respond within the time permitted, the Contractor shall notify the Owner of the disagreement in writing within fifteen (15) days from the date of the response or expiration of the time permitted to respond and demand a meet-and-confer conference as detailed in paragraph 4.8.1. The Owner shall schedule a meet-and-confer conference within thirty (30) days of the demand. If not resolved at the meet-and-confer conference, then the claim shall be submitted to mediation pursuant to the procedures set forth in paragraph 4.9. If the dispute is not resolved at the mediation, the Contractor may initiate a civil action as set forth in Public Contract Code sections 20104, et seq.

4.7.3 Time Limits Not Extended

Nothing in Subdivision (a) of Public Contract Code section 20104.2 shall extend the time limit or supersede the notice requirements provided in the Contract Documents for filing claims by the Contractor.

4.8 DISPUTE RESOLUTION OF CLAIMS IN EXCESS OF \$375,000

As a condition precedent to the initiation of litigation and subsequent to the fulfillment of the claims procedures established in paragraph 4.5 of this Article, disputes in excess of a total value of \$375,000 shall first be submitted to mediation pursuant to the procedures set forth in paragraph 4.9.

4.8.1 Meet and Confer Conference

Following action by the Architect under paragraph 4.6, the parties will attempt in good faith to resolve any controversy or claim arising out of or relating to this Agreement promptly by negotiations between senior executives of the parties who have authority to settle the controversy. The party disputing the Architect's action shall give the other party written notice of the dispute. Within ten (10) days after delivery of said notice, executives of both parties shall meet at a mutually acceptable time and place, and thereafter as often as they reasonably deem necessary, to exchange relevant information and to attempt to resolve the dispute. If the matter has not been resolved within twenty (20) days of the disputing party's notice, or if the party receiving such notice will not meet within ten (10) days, either party may initiate mediation of the controversy or claim under paragraph 4.9.

4.9 MEDIATION PROCEDURES

4.9.1 Negotiations Before Mediation

Negotiations to resolve disputes before Mediation is initiated are for settlement purposes only and are not binding.

4.9.2 Mediation

4.9.2.1 **Authorization.** In the event of a dispute or issue that cannot be resolved by negotiation, the Owner and the Contractor agree to attempt to resolve the matter by Mediation. Said Mediation is voluntary, non-binding, and intended to provide an opportunity for the parties to evaluate each other's cases and arrive at a mutually agreeable solution. These provisions relating to voluntary Mediation shall not be construed or interpreted as mandatory arbitration.

4.9.2.2 **Initiation of Mediation.** Either party may initiate Mediation by notifying the other party or parties in writing.

4.9.2.3 **Request for Mediation.** A Request for Mediation shall contain a brief statement of the nature of the dispute or claim, and the names, addresses, and phone numbers of all parties to the dispute or claim, and those, if any, who will represent them in the Mediation.

4.9.2.4 **Selection of Mediator.** Within fourteen (14) days after execution of the Contract, the parties will meet-and-confer to select an appropriate Mediator agreeable to all parties and two (2) alternate mediators, who will serve for the entire project.

4.9.2.5 **Qualifications of a Mediator.** Any Mediator selected shall have expertise in the area of the dispute and be knowledgeable in the Mediation process. No person shall serve as a Mediator in any dispute in which that person has any financial or personal interest in the result of the Mediation. Before accepting an appointment, the prospective Mediator shall disclose any circumstances likely to create a presumption of bias or prevent a prompt meeting with the parties. Upon receipt of such information, the parties shall meet and confer and decide whether to select another Mediator.

4.9.2.6 **Vacancies.** If any Mediator shall become unable or unwilling to serve, the First Alternate Mediator shall be selected unless the parties agree otherwise.

4.9.2.7 **Representation.** Any party may be represented by persons of its choice, who shall have full authority to negotiate. The names and addresses of such persons shall be communicated in writing to all parties and to the Mediator.

4.9.2.8 **Time and Place of Mediation.** The Mediator shall set the time of each Mediation session. The Mediation shall be held at any convenient location agreeable to the Mediator and the parties, as the Mediator shall determine. All reasonable efforts will be made by the parties and the Mediator to schedule the first session within thirty (30) days after initiation of Mediation.

4.9.2.9 **Identification of Matters in Dispute.** At least ten (10) days before the first scheduled Mediation session, each party shall provide the Mediator a brief memorandum setting forth its position with regard to the issues that need to be resolved. If a party so chooses, it may send its memoranda to other parties.

At the first session, the parties will be expected to produce all information reasonably required for the Mediator to understand the issue presented. The Mediator may require each party to supplement such information.

4.9.2.10 **Authority of Mediator.** The Mediator does not have authority to impose a settlement on the parties but will attempt to assist the parties in reaching a satisfactory resolution of their dispute. The Mediator is authorized to conduct joint and separate meetings with the parties and to make oral and written recommendations for settlement. Whenever necessary, the Mediator may also obtain expert advice concerning technical aspects of the dispute, provided the parties agree and assume the expenses of obtaining such advice. Arrangements for obtaining such advice shall be made by the Mediator or the parties, as the Mediator shall determine.

The Mediator is authorized to end the Mediation whenever, in the Mediator's judgment, further efforts at Mediation would not contribute to a resolution of the dispute between the parties.

4.9.2.11 **Privacy.** Mediation sessions are private. The parties and their representatives may attend Mediation sessions. Other persons may attend only with the permission of the parties and with the consent of the Mediator.

4.9.2.12 **Confidentiality.** Confidential information disclosed to a Mediator by the parties or by witnesses in the course of the Mediation shall not be divulged by the Mediator. All records, reports, or other documents received by a Mediator while serving as Mediator shall be confidential. The Mediator shall not be compelled to divulge such records or to testify in regard to the Mediation in any adversary proceeding or judicial forum. The parties shall maintain the confidentiality of the Mediation and shall not rely on, or introduce as evidence in any arbitration, judicial, or other proceedings: views expressed or suggestions made by the other party with respect to the possible settlement of the dispute; statements made by the other party in the course of the Mediation proceedings; proposals made or views expressed by the Mediator; and whether the other party had or had not indicated willingness to accept a proposal for settlement made by the Mediator.

4.9.2.13 **No Stenographic Record.** There shall be no stenographic record of the Mediation.

4.9.2.14 **Termination of Mediation.** The Mediation shall be terminated: by the execution of a Settlement Agreement by the parties; by a written declaration of the Mediator to the effect that further efforts at Mediation are no longer worthwhile; or by a written declaration of a party or parties to the effect that the Mediation proceedings are terminated.

4.9.2.15 **Exclusion of Liability.** No Mediator shall be a necessary party in judicial proceedings related to the Mediation. No Mediator shall be liable to any party for any act or omission in connection with any Mediation conducted hereunder.

4.9.2.16 **Interpretation and Application of These Mediation Provisions.** The Mediator shall interpret and apply these Mediation provisions insofar as they relate to the Mediator's duties and responsibility.

4.9.2.17 **Expenses.** The expenses of witnesses for each party shall be paid by the party producing the witnesses. All other expenses of the Mediation, including, required travel and other expenses of the Mediator, the expenses of any witness called by the Mediator, and the cost of any proofs or expert advice produced at the direct request of the Mediator, shall be borne equally by all parties to the Mediation.

ARTICLE 5 - SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 Subcontractor

A Subcontractor is a person or entity, who has a contract with the Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. To the extent that the term Trade Contractor is utilized in the Contract Documents, it shall have the same meaning as the term "Subcontractor".

5.1.2 Sub-Subcontractor

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

5.1.3 Specialty Contractors

If a Subcontractor is designated as a "Specialty Contractor" as defined in section 7058 of the Business and Professions Code, all of the Work outside of that Subcontractor's specialty shall be performed in compliance with the Subletting and Subcontracting Fair Practices Act, Public Contract Code sections 4100, et seq.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Assignment or Substitution - Consent of Owner

In accordance with Public Contract Code sections 4107 and 4107.5, no Contractor whose bid is accepted shall, without the written consent of the Owner: substitute any person or entity as a Subcontractor in place of the Subcontractor designated in the original bid; permit any such Subcontract to be assigned or transferred, or allow it to be performed by any person or entity other than the original Subcontractor listed in the original bid; sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor's total bid as to which its original bid did not designate a Subcontractor. Any assignment or substitution made without the prior written consent of the awarding authority shall be void, and the assignees shall acquire no rights in the Contract. Any consent, if given, shall not relieve Contractor or its Subcontractors from their obligations under the terms of the Contract Documents.

5.2.2 Grounds for Substitution

Pursuant to Public Contract Code section 4107 and the procedure set forth therein, no Contractor whose bid is accepted may request to substitute any person or entity as a Subcontractor in place of a Subcontractor listed in the original bid except in the following instances:

- A. When the Subcontractor listed in the bid after having a reasonable opportunity to do so, fails or refuses to execute a written Contract when that written Contract, based upon the general terms, conditions, plans and specifications for the Project involved or the terms of that Subcontractor's written bid, is presented to the Subcontractor by the prime contractor;

- B. When the listed Subcontractor becomes bankrupt or insolvent;
- C. When the listed Subcontractor fails or refuses to perform his or her Subcontract;
- D. When the listed Subcontractor fails or refuses to meet the bond requirements of the prime contractor set forth in Public Contract Code section 4108.
- E. When the Contractor demonstrates to the awarding authority, or its duly authorized officer, subject to the further provisions of Public Contract Code section 4107.5, that the name of the Subcontractor was listed as the result of inadvertent clerical error;
- F. When the listed Subcontractor is not licensed pursuant to the Contractors License Law; or
- G. When the awarding authority, or its duly authorized officer, determines that the Work being performed by the listed Subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the Subcontractor is substantially delaying or disrupting the progress of the Work.

When the listed Subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

When the awarding authority determines that a listed Subcontractor is not a responsible contractor.

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

5.2.2.2 **Substitution Due to Clerical Error.** The Contractor, as a condition of asserting a claim of inadvertent clerical error in the listing of a Subcontractor, shall, pursuant to Public Contract Code section 4107.5, within two (2) working days after the time of the prime bid opening by the awarding authority, give written notice to the awarding authority and copies of such notice to both the Subcontractor it claims to have listed in error, and the intended Subcontractor who had bid to the Contractor prior to bid opening. Any listed Subcontractor who has been notified by the Contractor in accordance with the provisions of this section as to an inadvertent clerical error, shall be allowed six (6) working days from the time of the prime bid opening within which to submit to the awarding authority and to the Contractor written objection to the Contractor's claim of inadvertent clerical error.

In all other cases, the Contractor must make a request in writing to the awarding authority for the substitution of a subcontractor, giving reasons therefore. The awarding authority shall mail a written notice to the listed Subcontractor giving reasons for the proposed substitution. The listed Subcontractor shall have five (5) working days from the date of such notice within which to file with the awarding authority written objections to the substitution.

Failure to file written objections pursuant to the provisions of this section within the times specified herein shall constitute a waiver of objection to the substitution by the listed Subcontractor and, where the ground for substitution is an inadvertent clerical error, an agreement by the listed Subcontractor that an inadvertent clerical error was made.

If written objections are filed, the awarding authority shall give five (5) days notice to the Contractor and to the listed Subcontractor of a hearing by the awarding authority on the Contractor's request for substitution as provided in Public Contract Code section 4107. The determination by the awarding authority shall be final.

5.3 SUBCONTRACTUAL RELATIONS

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

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

- A. Assignment is effective only after termination of the Contract with the Contractor by the Owner for cause pursuant to Article 14 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and
- B. Assignment is subject to the prior rights of the surety, if any, obligated under any bond relating to the Contract.

5.5 SUBCONTRACTOR'S RESPONSIBILITIES

Every Subcontractor is bound to the following provisions, unless specifically noted to the contrary in the Subcontractor's contract subject to the limitations of paragraph 5.3 above.

5.5.1 Supervision by Subcontractors

Subcontractors shall efficiently supervise their Work, using their best skill and attention. Each of them shall carefully study and compare all Drawings, Specifications, and other instructions, shall at once report to Contractor any error or omission which any of them may discover, and shall subsequently proceed with the Work in accordance with instructions from the Contractor concerning such error or omission. Each Subcontractor shall be fully responsible for and shall bear the full risk of loss of all of its property.

5.5.2 Discipline and Order

Each Subcontractor shall at all times enforce strict discipline and good order among its

Subcontractors, material or equipment suppliers, or their agents, employees, and invitees, and shall establish and maintain surveillance over the activities of each of the foregoing to minimize any disturbance, damage, pollution, or unsightly conditions relative to property areas adjacent to or in the vicinity of the Site. The Contractor shall have the right to remove from the Work any employee of a Subcontractor for any reason including, without limitation, incompetence or carelessness.

5.5.3 Defects Discovered

Should the proper and accurate performance of the Work depend upon the proper and accurate performance of other work not included in its Contract, each Subcontractor shall use all necessary means to discover any defect in such other work and shall allow the Contractor, the Architect or other Subcontractors as Contractor elects a reasonable amount of time to remedy such defects. If the Subcontractor should proceed with its Work, it shall be considered to have accepted such other work, unless the Subcontractor shall have proceeded pursuant to instructions in writing by the Contractor over its written objection.

5.5.4 Subcontractor Information

Each Subcontractor shall submit to the Owner, the Contractor, or the Architect, as the case may be, promptly when requested by any of the foregoing, information with respect to the names, responsibilities, and titles of the principal members of its staff, the adequacy of the Subcontractor's equipment and the availability of necessary materials and supplies. Subcontractor shall fully cooperate with Contractor in its periodic review of the adequacy of Subcontractor's supervision, personnel, and equipment, and the availability of necessary materials and supplies and shall promptly comply with the requirements of the Contractor with respect thereto.

5.5.5 Temporary Structures

Each Subcontractor shall furnish at its expense its own temporary facilities and storage except those specifically agreed to be furnished to it by the Contractor in the Subcontract Agreement. Subcontractor's material storage rooms and field offices, etc., will be placed in locations designated by the Contractor. When it becomes necessary due to the progress of the Project for the Subcontractor to relocate its field operations, it will do so in an expeditious manner and at no additional cost to Contractor or Owner. The construction of material storage rooms and field offices, etc., will be of fire resistive material only, such as concrete or gypsum block, rated drywall, or sheet metal.

5.5.6 Charges to Subcontractor

Each Subcontractor may be subject to the Contractor's reasonable charges for hoisting, repair to other work caused by the fault or negligence of Subcontractor, removal of Subcontractor's rubbish, and clean-up occasioned by Subcontractor.

5.5.7 Fines Imposed

Subcontractor shall comply with and pay any fines or penalties imposed for violation of any applicable law, ordinance, rule, regulation, Environmental Impact Report mitigation requirement, and lawful order of any public authority, including, without limitation, all OSHA and California OSHA requirements and those of other authorities having jurisdiction of the safety of persons or property.

5.5.8 Project Signs

Each Subcontractor shall not display on or about the Project any sign, trademark, or other advertisement. The Owner will permit a single Project sign, which shall be subject to the Owner's prior and sole discretion and approval, as to all matters including, without limitation, size, location, material, colors, style and size of printing, logos and trademarks (if any), text,

and selection of names to be displayed.

5.5.9 Remedies for Failure to Perform

Without limitation of any other right or remedy available to Contractor under the Contract Documents or at law, should: the Subcontractor fail to perform its portion of the Work in a skilled and expeditious manner in accordance with the terms of the Contract Documents with sufficient labor, materials, equipment, and facilities; delays the progress of the job or otherwise fail in any of its obligations; or either a receiver is appointed for the Subcontractor or the Subcontractor is declared to be bankrupt or insolvent, and such appointment, bankruptcy, or insolvency proceedings or declaration is not set aside within thirty (30) days, then the Contractor, upon three (3) days notice to the Subcontractor (subject to the requirements of Pub. Contracts Code, § 4107), may provide such labor, materials, or perform such work and recover the cost plus profit and overhead from monies due or to become due thereafter to the Subcontractor. The Contractor may terminate the employment of the Subcontractor, taking possession of its tools, materials, and equipment related to the Work and cause the entire portion of the Subcontractor's Work to be finished either by another Subcontractor or through the Contractor's own forces.

5.5.10 Disputes Not to Affect Work

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

5.5.11 Application for Payment

Contractor agrees to advise the Subcontractor if any documentation in connection with the Subcontractor's application for payment has not been accepted or is in any way unsatisfactory.

5.5.12 Compliance with Procedures

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

5.5.13 On-Site Record Keeping

Subcontractor shall comply with all on-Site record keeping systems established by the Contractor and shall, upon the request of the Contractor, provide the Contractor with such information and reports as the Contractor may deem appropriate. Without limitation of the foregoing, the Subcontractor shall assemble all required permits and certificates so that they are readily accessible at the Site.

5.5.14 Non-Exclusive Obligations

The specific requirements of Article 5 are not intended to exclude the obligation of the Subcontractor to comply with any of the other provisions of the General Conditions and the

other Contract Documents which are relevant to the proper performance of its portion of the Work.

ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

6.1.1 Owner's Rights

The Owner reserves the right to perform Work related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the Site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance. Upon the election to perform Work with its own forces or by separate contracts, the Owner shall notify the Contractor. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.

6.1.2 Designation as Contractor

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

6.1.3 Contractor Duties

The Contractor shall have overall responsibility for coordination and scheduling of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors, and the Owner until subsequently revised.

6.1.4 Owner Obligations

Unless otherwise provided in the Contract Documents, when the Owner performs Work related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations, and to have the same rights, which apply to the Contractor under the General Conditions, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10 and 12.

6.2 MUTUAL RESPONSIBILITY

6.2.1 Delivery and Storage

The Contractor shall afford the Owner and separate contractors reasonable opportunity for delivery and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the separate contractors' construction and operations with theirs as required by the Contract Documents.

6.2.2 Notice by Contractor

If part of the Contractor's Work depends upon proper execution or results from work by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect patent discrepancies or defects in such other

construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs Incurred

Costs, expenses, and damages caused by delays, improperly timed activities, defective construction, or damages to another's Work shall be borne by the party responsible. Should any Contractor cause damage to the Work or property of any separate contractor on the Project, or cause any delay to any such contractor, the Contractor shall defend, indemnify and hold Owner harmless for such damage or delay. Owner reserves the right to backcharge Contractor for delay or damage to another contractor.

6.2.4 Correction of Damage

The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in paragraph 3.13, the Owner may clean up and allocate the cost among those responsible as the Architect determines to be just.

ARTICLE 7 - CHANGES IN THE WORK

7.1 CHANGES

7.1.1 No Changes Without Authorization

There shall be no change whatsoever in the drawings, specifications, or in the Work without an executed Construction Change Documents by the Architect for a minor change in the Work as herein provided. Owner shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the same shall have been authorized by and the cost thereof approved in writing. No extension of time for performance of the Work shall be allowed hereunder unless claim for such extension is made at the time changes in the Work are ordered, and such time duly adjusted in writing. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications. Notwithstanding anything to the contrary in this Article 7, and DSA IR A-6, all Construction Change Documents shall be prepared and issued by the Architect and shall become effective when approved by DSA.

7.1.2 Architect Authority

The Architect will have authority to order minor changes in the Work not involving any adjustment in the Contract Sum, an extension of the Contract Time, or a change which does not affect Structural Safety, Access Compliance or Fire & Life Safety of the Contract Documents. Such changes shall be affected by written Construction Change Document, Category B, and the Contractor shall carry out such written orders promptly.

7.2 CHANGE ORDERS ("CO")

Change Orders will be for pricing changes only; DSA does not review or approve any change

orders.

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

- A. a change in the Work, which the work must be already approved by DSA via the CCD process;
- B. the amount of the adjustment in the Contract Sum, if any; and
- C. the extent of the adjustment in the Contract Time, if any.
- D. all addenda and CCD's must comply with the procedures and obtain the approvals required by CBC and DSA.

7.3 CONSTRUCTION CHANGE DOCUMENTS ("CCD")

7.3.1 Definition

A CCD is a written order prepared and signed by the Architect and approved by DSA, directing a change in the Work, including the required backup documentation. There are two CCD Categories; 1) CCD Category A – which includes changes to or affecting the Structural, Access or Fire-Life Safety portions of the project, and 2) CCD Category B – which includes changes not affecting the Structural Safety, Access Compliance or Fire Life Safety portions of a project.

7.4 REQUEST FOR INFORMATION ("RFI")

7.4.1 Definition

An RFI is a written request prepared by the Contractor asking the Architect to provide additional information necessary to clarify an item which the Contractor feels is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions.

7.4.2 Scope

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

7.4.3 Response Time

The Owner and Contractor agree that an adequate time period for the Architect to respond to an RFI is generally fourteen (14) calendar days after the Architect's receipt of an RFI, unless the Owner and Contractor agree otherwise in writing. However, in all cases, the Architect shall take such time, whether more or less than 14 days, as is necessary in the Architect's professional judgment to permit adequate review and evaluation of the RFI. The total time required for the Architect to respond is subject to the complexity of the RFI, the number of RFI's submitted concurrently and the reprioritization of pending RFI's submitted by the Contractor, among other things. Contractor shall submit a revised and updated priority schedule with each RFI. The Architect shall endeavor to follow the Contractor's requested order of priorities. If the Architect's response results in a change in the Work, then such change shall be effected by a written CO or CCD. No presumption shall arise as to the timelines of the response if the response is more than fourteen (14) days after the Architect's receipt of the RFI. If the Architect cannot respond to the RFI within fourteen (14) calendar

days, the Architect shall notify the Contractor, with a copy to the Inspector and the Owner, of the amount of time that will be required to respond. Contractor shall review the Contract Documents before submitting an RFI to ensure that the information is not already in the Contract Documents. For each RFI where the information was already in the Contract Documents, Owner may deduct \$100 from the next progress payment.

7.4.4 Costs Incurred

The Contractor shall be invoiced by the Owner for any costs incurred for professional services, which shall be deducted from the next progress payment, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request.

7.5 REQUEST FOR PROPOSAL ("RFP") / PROPOSAL REQUEST ("PR")

7.5.1 Definition

An RFP / PR is a written request prepared by the Architect asking the Contractor to submit to the Owner and the Architect an estimate of the effect of a proposed change on the Contract Sum and the Contract Time.

7.5.2 Scope

An RFP / PR shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns required by paragraph 7.7. The Contractor shall not be entitled to any Additional Compensation for preparing a response to an RFP / PR, whether ultimately accepted or not.

7.6 CHANGE ORDER REQUEST ("COR")

7.6.1 Definition

A COR is a written request prepared by the Contractor asking the Owner and the Architect to incorporate a proposed change called for in an RFP or a claim per paragraph 7.7.6 into a CO.

7.6.2 Changes in Price

A COR shall include breakdowns per paragraph 7.7 to validate any change in Contract Sum due to proposed change or claim.

7.6.3 Changes in Time

A COR shall also include any additional time required to complete the Project. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Project Schedule as defined in paragraph 3.9 and Division 1 of the Specifications.

7.7 COST OF CHANGE ORDERS

7.7.1 Scope

Within ten (10) days or such lesser period of time as may be required by Owner after a request is made for a change that impacts the Contract Sum or the Contract Time, the Contractor shall provide to the Owner and the Architect in writing an estimate of the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, wage rates, required for the change, and the effect upon the

Contract Time of such CO. Changes may be made by Owner by an appropriate written CO, or, at the Owner's option, such changes shall be implemented immediately upon the Contractor's receipt of an appropriate written CCD.

7.7.2 Determination of Cost

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

- A. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- B. Unit prices stated in the Contractor's original bid, the Contract Documents, or subsequently agreed upon between the Owner and the Contractor;
- C. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- D. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

1. Daily Reports by Contractor.

a) General: At the close of each working day, the Contractor shall submit a daily report to the Inspector, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the Work, and for other services and expenditures when authorized concerning extra work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points 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.

b) Labor: Show names of workers, classifications, and hours worked.

c) Materials: Describe and list quantities of materials used.

d) Equipment: Show type of equipment, size, identification number, and hours of operation, including, if applicable, loading and transportation.

e) Other Services and Expenditures: Describe in such detail as the Owner may require.

2. Basis for Establishing Costs.

a) Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra work is done, plus employer payments of payroll taxes and 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 a labor classification, which would increase the extra work cost, will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment

operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

b) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery.

The Owner 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 Owner.

c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of \$100 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the work is performed. 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. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Owner 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 Owner.

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

d) Other Items. The Owner 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.

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

f) Overhead. Overhead, including direct and indirect costs, shall be submitted with the COR and include: home office overhead, off-Site supervision, CO preparation/negotiation/research for Owner initiated changes, time delays, project interference and disruption, additional guaranty and warranty durations, on-Site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, and additional safety equipment costs.

For work performed by Contractor's employees, Contractor's percentage markup shall not exceed fifteen percent (15%) of Contractor's actual cost for such work.

For work performed by a Subcontractor, Contractor's percentage markup shall not exceed five percent (5 %) of the Subcontractor's actual cost for such work, and the Subcontractor's percentage markup shall not exceed ten percent (10%) of the subcontractor's actual cost for such work.

The total percentage markup on any change order shall not exceed fifteen percent (15%) of the actual cost of such work. Not more than one subcontractor may charge Owner markup on any change order.

7.7.3 Format for Proposed Cost Change

The format provided in the contract documents shall be used as applicable by the Owner and the Contractor to communicate proposed additions and deductions to the Contract.

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

7.7.4 Discounts, Rebates, and Refunds

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

7.7.5 Accounting Records

With respect to portions of the Work performed by COs and CCDs on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records satisfactory to the Owner, which shall be available to the Owner on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

7.7.6 Notice Required

If the Contractor desires to make a claim for an increase in the Contract Sum, or any extension in the Contract Time for completion, it shall give the Owner and the Architect written notice thereof within ten (10) days after the occurrence of the event giving rise to the claim, together with detailed estimates of the impact on the Contract Sum and/or the Contract Time. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property, in which case the Contractor shall proceed in accordance with paragraph 10.4 hereof. No claim shall be considered unless made in accordance with this Subparagraph; however, the mere presentation of such claim shall not establish the validity of the cause giving rise to such claim, or of the extension of the Contract Time, and/or the increase in the Contract Sum. Contractor shall proceed to execute the Work even though the adjustment has not been agreed upon. Any change in the Contract Sum or extension of the Contract Time resulting from such claim shall be

authorized by a CO.

7.7.7 Applicability to Subcontractors

Any requirements under this Article 7 shall be equally applicable to COs or CCDs issued to Subcontractors by the Contractor to the same extent required of the Contractor.

ARTICLE 8 - TIME

8.1 DEFINITIONS

8.1.1 Contract Time

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

8.1.2 Notice to Proceed

The date of commencement of the Work is the date established in the Notice to Proceed. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 Days

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

8.2 HOURS OF WORK

8.2.1 Sufficient Forces

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

8.2.2 Performance During Working Hours

Work shall be performed during regular working hours as established by the Owner or the City or County jurisdiction, whichever is the most stringent, except that in the event of an emergency or when required to complete the Work in accordance with job progress, work may be performed outside of regular working hours with the advance written consent of the Owner.

8.2.3 Labor Code Application

As provided in Article 3 (commencing at § 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 Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractors in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work provided that compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

Contractor or subcontractor shall pay to the Owner a penalty of Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1)

calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

8.2.4 Costs for After Hours Inspections

If the work done after hours is required by the Contract Documents to be done outside the Contractor's or the Inspector's regular working hours, the costs of any inspections, if required to be done outside normal working hours, shall be borne by the Owner.

If the Owner allows the Contractor to do work outside regular working hours for the Contractor's own convenience, the costs of any inspections required outside regular working hours, among other remedies, shall be invoiced to the Contractor by the Owner and deducted from the next Progress Payment. Contractor shall give Owner at least 48 hours notice prior to working outside regular working hours.

If the Contractor elects to perform work outside the Inspector's regular working hours, costs of any inspections required outside regular working hours, among other remedies, may be invoiced to the Contractor by the Owner and deducted from the next Progress Payment.

8.2.5 Time for Commencement By Subcontractors

Unless otherwise provided in the Contract Documents, all Subcontractors shall commence their Work within two (2) consecutive business days after notice to them by the Contractor and shall prosecute their Work in accordance with the progress of the Work.

8.3 PROGRESS AND COMPLETION

8.3.1 Time of the Essence

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

8.3.2 No Commencement Without Insurance

The Contractor shall not knowingly, except by agreement or instruction of the Owner, in writing, commence operations on the Site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

8.3.3 Expedient Completion

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

8.4 EXTENSIONS OF TIME – LIQUIDATED DAMAGES

8.4.1 Excusable Delay

The Contractor shall not be charged for liquidated damages, as set forth in the Agreement, because of any delays in completion of the Work due to acts of God, acts of public enemy, acts of Government, acts of the Owner or anyone employed by it, acts of another contractor in performance of a contract (other than this Contract) with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, unusually severe weather, or delays of subcontractors due to such causes.

8.4.2 Notice by Contractor Required

The Contractor shall within ten (10) calendar days of beginning of any such delay (unless Owner grants in writing a further period of time to file such notice prior to the date of final payment under the Contract) notify the Owner in writing of causes of delay. Owner will then ascertain the facts and extent of the delay and grant an extension of time for completing the Work when, in its judgment, the findings of fact justify such an extension. The Owner's findings of fact thereon shall be final and conclusive on the parties. Extensions of time shall apply only to that portion of the Work affected by the delay and shall not apply to other portions of the Work not so affected. The sole remedy of Contractor for extensions of time under paragraph 8.4.1 shall be an extension of the Contract Time at no cost to the Owner.

8.4.3 Conditions for Extension of Time

If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner, the Architect, an employee of either, or of a separate contractor employed by the Owner, by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, or unavoidable casualties, by delay authorized by the Owner pending arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. Claims relating to time extensions shall be made in accordance with applicable provisions of Article 7.

8.4.4 Early Completion

Regardless of the cause therefore, the Contractor may not maintain any claim or cause of action against the District for damages incurred as a result of its failure or inability to complete its work on the Project in a shorter period than established in the Contract Documents, the parties stipulating that the period set forth in the Contract Documents is a reasonable time within which to perform the work on the Project.

8.4.5 Liquidated Damages

Failure to complete the Project within the time and in the manner provided for by the Contract Documents shall subject the Contractor to liquidated damages. The actual occurrence of damages and the actual amount of the damages which the District would suffer if the Project were not completed within the specified times set forth are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the District would suffer in the event of delay include, but are not limited to, loss of the use of the Project, disruption of school activities, costs of administration, inspection, supervision and the loss suffered by the design team and the public within the District.

Accordingly, the parties agree that the amount set forth in the Agreement shall be presumed to be the amount of damages which the District shall directly incur upon failure of the Contractor to complete the Project within the time specified plus the extra inspection costs incurred by the District, during or as a result of each calendar day by which completion of the Project is delayed beyond the completion date.

If the Contractor becomes liable for liquidated damages under this section, the District, in addition to all other remedies provided by law, shall have the right to withhold any and all retained percentages of payments, and to collect the interest thereon, which would otherwise be or become due the Contractor until the liability of the Contractor under this section has been finally determined. If the retained percentage is not sufficient to discharge all liabilities of the Contractor incurred under this Article, the Contractor and its sureties shall continue to remain liable to the District until all such liabilities are satisfied in full.

If the District accepts any work or makes any payment under this Agreement after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of completion and liquidated damages.

8.5 GOVERNMENT APPROVALS

District shall not be liable for any delays or damages related to the time required to obtain government approvals.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

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

9.2 COST BREAKDOWN

9.2.1 Required Information

On forms approved by the Owner, the Contractor shall furnish the following:

- A. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a detailed breakdown of the Contract Sum (Schedule of Values) for each Project or Site. Each item in the schedule of values shall include its proper share of the overhead and profit.
- B. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a schedule of estimated monthly payment requests (cash flow) due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the Owner may require;
- C. Five (5) days prior to the submission of a pay request, an itemized breakdown of work done for the purpose of requesting partial payments;
- D. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, the name, address, telephone number, fax number, license number, and classification of all of its Subcontractors and of all other parties furnishing labor, material, or equipment for its Contract, along with the amount of each such subcontract or the price of such labor, material, and equipment needed for its entire portion of the Work.

9.2.2 Owner Approval Required

The Owner shall review all submissions received pursuant to paragraph 9.2.1 in a timely manner. All submissions must be approved by the Owner, Architect, and IOR before becoming the basis of any payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Procedure

On or before the fifth (5th) day of each calendar month during the progress of the portion of the Work for which payment is being requested, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the Schedule of Values. Such application shall be notarized, if required, and supported by the following or such portion thereof as Architect requires:

- A. The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;
- B. The amount being requested with the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;
- C. The balance that will be due to each of such entities after said payment is made;
- D. A certification that the Record Drawings and Annotated Specifications are current;
- E. The Owner approved additions to and subtractions from the Contract Sum and Time;
- F. A summary of the retentions (each Application shall provide for retention, as set out in Article 9.6);
- G. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the Owner may require from time to time;
- H. The percentage of completion of the Contractor's Work by line item; and
- I. A statement showing all payments made by the Contractor for labor and materials on account of the Work covered in the preceding Application for Payment. Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to subcontractors or others because of a dispute or other reason.

9.3.2 Purchase of Materials and Equipment

As the Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from Owner, to assure that there will be no delays, payment by the Owner for stored material shall be made only in unusual circumstances where the Architect specifically recommends, and Owner specifically approves, the payment in writing. If payments are to be made on account of materials and equipment not incorporated in the Work, but delivered and suitably stored at the Site or at some other location agreed upon in writing by the Owner, the payments shall be conditioned upon submission by the Contractor, Subcontractor, or vendor of bills of sale and such other documents satisfactory to the Architect and the Owner to establish the Owner's title to such materials or equipment free of all liens and encumbrances, and otherwise protect the Owner's interest, including, without limitation, provision of applicable insurance and transportation to the Site. All stored items shall be inventoried, specified by identification numbers (if applicable), released to the Owner by sureties of the Contractor and the Subcontractor and, if stored off-Site, stored only in a bonded warehouse.

9.3.3 **Warranty of Title**

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

9.4 **REVIEW OF PROGRESS PAYMENT**

9.4.1 **Owner Approval**

The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment, either approve such payment or notify the Contractor in writing of the Architect's reasons for withholding approval in whole or in part as provided in paragraph 9.5.1.

9.4.2 **Architect's Review**

The review of the Contractor's Application for Payment by the Architect is based on the Architect's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has:

- A. Made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work;
- B. Reviewed construction means, methods, techniques, sequences, or procedures;
- C. Reviewed copies of requisitions received from Subcontractors, material and equipment suppliers, and other data requested by the Owner to substantiate the Contractor's right to payment; or
- D. Made an examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5 **DECISIONS TO WITHHOLD PAYMENT**

9.5.1 **Reasons to Withhold Payment**

The Owner may decide to withhold payment in whole, or in part, to the extent reasonably necessary to protect the Owner if, in the Owner's opinion, the representations to the Owner required by paragraph 9.4.2 cannot be made. The Owner may withhold payment, in whole, or in part, to such extent as may be necessary to protect the Owner from loss because of:

- A. Defective Work not remedied;
- B. Stop Notices filed, unless the Contractor at its sole expense provides a bond or other

security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claim. Any stop notice release bond shall be executed by an admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and performance bond sureties;

- C. Liquidated damages assessed against the Contractor;
- D. Reasonable doubt that the Work can be completed for the unpaid balance of any Contract Sum or by the completion date;
- E. Damage to the property or work of the Owner, another contractor, or subcontractor;
- F. Unsatisfactory prosecution of the Work by the Contractor;
- G. Failure to store and properly secure materials in a bonded warehouse approved by the Owner and Architect. All material must be inspected and approved by the IOR before it can be included in the payment application.
- H. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract 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;
- I. Failure of the Contractor to maintain record drawings;
- J. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment;
- K. Unauthorized deviations from the Contract Documents; or
- L. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion dates.
- M. Subsequently discovered evidence or observations nullifying the whole or part of a previously issued Certificate for Payment;
- N. Failure to pay subcontractors or materialmen;
- O. Breach of any provision of the Contract Documents.

9.5.2 **Written Reasons for Withholding Provided**

Upon request of the Contractor whose payment is deferred, the Contractor shall be given a written copy of Owner's reasons for withholding payment.

9.5.3 **Payment After Cure**

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

9.6 PROGRESS PAYMENTS

9.6.1 Payments to Contractor

Within thirty (30) days after approval of the Request for Payment, Contractor shall be paid a sum equal to ninety percent (90%) of the undisputed value of the Work performed up to the last day of the previous month, less the aggregate of previous payments. The value of the Work completed shall be an estimate only, no inaccuracy or error in said estimate shall operate to release the Contractor, or any bondsman, from damages arising from such Work or from enforcing each and every provision of this Contract, and the Owner shall have the right subsequently to correct any error made in any estimate for payment.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for work performed, so long as any lawful or proper direction given by the Owner concerning the Work, or any portion thereof, remains not complied with. Payment shall not be a waiver of any such direction.

9.6.2 Payments to Subcontractors

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

9.6.3 Percentage of Completion or Payment Information

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

9.6.4 No Obligation of Owner for Subcontractor Payment

The Owner shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to Suppliers

Payment to material or equipment suppliers shall be treated in a manner similar to that provided in paragraphs 9.6.2, 9.6.3 and 9.6.4.

9.6.6 Payment Not Constituting Approval or Acceptance

An approved Request for Payment, issuance of a Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of work not in accordance with the Contract Documents.

9.6.7 Joint Checks

Owner shall have the right, if necessary for the protection of the Owner, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. However, Owner has no duty to issue joint checks. In no event shall any joint check payment be construed to create any contract between the Owner and a Subcontractor of any tier, any obligation from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.

9.7 COMPLETION OF THE WORK

9.7.1 Close-Out Procedures

When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is complete, the Contractor shall prepare and submit to the Owner a comprehensive list of minor items to be completed or corrected (Punch List). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Upon receipt of the Contractor's list, the Owner will make an inspection to determine whether the Work, or designated portion thereof, is complete. If the Owner's inspection discloses any item, whether or not included on the Contractor's list, which is not completed in accordance with the requirements of the Contract Documents, the Contractor shall, before Owner's issuance of the Notice of Completion, complete or correct such item. The Contractor shall then submit a request for an additional inspection by the Owner to determine Completion. When the Work, or designated portion thereof, is complete, the Owner will prepare a Notice of Completion which shall establish the date of Completion, establish the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which the Contractor shall finish all items on the list accompanying the Notice of Completion. Warranties required by the Contract Documents shall commence on the date of Completion of the Work, or designated portion thereof, unless otherwise provided in the Notice of Completion. The Notice of Completion shall be submitted to the Owner and the Contractor for their written acceptance of responsibilities assigned to them in such Notice.

9.7.2 Payment Upon Completion

Upon Completion of the Work, or designated portion thereof, and upon application by the Contractor, the Owner shall make payment reflecting adjustment in retainage, if any, for such Work, or portion thereof, as provided in the Contract Documents in absence of any stop notices, liens or claims by Owner for liquidated damages or other damages.

9.7.3 Costs of Multiple Inspections

More than two (2) requests of the Owner to make inspections required under paragraph 9.7.1 shall be considered an additional service of Architect, and all subsequent costs will be invoiced to Contractor and withheld from remaining payments.

9.8 PARTIAL OCCUPANCY OR USE

9.8.1 Owner's Rights

The Owner may occupy or use any completed or partially completed portion of the Work at any stage. The Owner and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. When the Contractor considers a portion complete, the Contractor shall prepare and submit a Punch List to the Owner as provided under paragraph 9.7.1.

9.8.2 Inspection Prior to Occupancy or Use

Immediately prior to such partial occupancy or use, the Owner, the Contractor, and the Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.8.3 No Waiver

Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of the Work not complying with the requirements of the Contract Documents.

9.9 COMPLETION AND FINAL PAYMENT

9.9.1 Final Inspection

Contractor shall immediately upon receipt of the Punch List, initiate work on all items therein related to Contractor's Work and diligently complete the same. Upon receipt of Contractor's written notice that all of the Punch List items have been fully completed and the Work is ready for final inspection and acceptance, Architect shall inspect the Work and shall submit to Contractor and Owner a final inspection report noting the work, if any, required in order to complete the Work in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.

Upon completion of the Work contained in the final inspection report, the Contractor shall so notify the Owner, who shall again inspect such Work. If the Owner finds the Work contained in such final inspection report acceptable under the Contract Documents and, therefore, the Work fully completed, it shall so notify Contractor, who shall then submit to the Architect its final Application for Payment.

Upon receipt and approval of such final Application for Payment, the Architect shall issue a final Certificate of Payment stating that to the best of its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Architect in connection with the Work, such Work has been completed in accordance with the Contract Documents. The Owner may thereupon inspect such Work and shall either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon acceptance of the Work of the Contractor as fully complete (which, absent unusual circumstances, will occur when the Punch List items have been satisfactorily completed), the Owner may record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of payment from Owner, pay the amounts due Subcontractors.

9.9.2 Retainage

The retainage, less any amounts disputed by the Owner or which the Owner has the right to withhold, shall not be paid until after approval of the Owner of the Architect's Certificate of Payment referred to in paragraph 9.9.1 and, after satisfaction of the conditions set forth in paragraph 9.9. Owner may hold the retainage for at least sixty (60) days after recording of the Notice of Completion by Owner. No interest shall be paid on any retainage, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement and General Conditions between the Owner and the Contractor pursuant to Public Contract Code section 22300.

9.9.3 Procedures for Application for Final Payment

The Application for Final Payment shall be accompanied by the same details as set forth in paragraph 9.3, and in addition, the following conditions must be fulfilled:

- A. A full and final waiver or release of all Stop Notices in connection with the Work shall be submitted by Contractor, including a release of Stop Notice in recordable form,

together with (to the extent permitted by law) a copy of the full and final waiver of all Stop Notices or a Stop Notice Release Bond from a surety acceptable to the Owner as defined by the Contract Documents, including a release of Stop Notice in recordable form, in connection with the Work obtained by Contractor from each person to receive a payment thereunder, which waivers of Stop Notice shall be in a form as approved by Owner. Any stop notice release bond shall be executed by an admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and performance bond sureties;

- B. The Contractor shall have made, or caused to have been made, all corrections to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of Owner required under the Contract.
- C. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work.
- D. The Contractor shall deliver to the Owner reproducible final Record Drawings and Annotated Specifications showing the Contractor's Work "as built," with the Contractor's certification of the accuracy of the Record Drawings and Annotated Specifications, all guarantees, and operation and maintenance instructions for equipment and apparatus.
- E. Architect shall have issued a Final Certificate of Payment.
- F. The Contractor shall have delivered to the Owner all manuals and materials required by the Contract Documents.
- G. The Contractor shall have removed, or caused to be removed, all waste materials and rubbish from and about the Site, as well as all tools, construction equipment, machinery, surplus material, scaffolding equipment, and any other similar materials of the Contractor or any subcontractor, shall have cleaned, or caused to be cleaned, all glass surfaces, and shall have left the Work broom-clean, except as otherwise provided in the Contract Documents.
- H. Contractor shall provide extensive assistance in the utilization of any equipment or system such as initial start-up or testing, adjusting and balancing, preparation of operation and maintenance manuals and training personnel for operation and maintenance.

Acceptance of final payment shall constitute a waiver of claims by payees except for those previously identified in writing and identified by that payee as unsettled at the time of Final Application for Payment.

9.10 **SUBSTITUTION OF SECURITIES**

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

returned to the Contractor.

Securities eligible for investment under this section shall include those listed in Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner.

The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

The escrow agreement used for the purposes of this Section shall be substantially similar to the form set forth in Public Contract Code section 22300.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 Contractor Responsibility

The Contractor shall have responsibility for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. Each Contractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.2 Subcontractor Responsibility

Subcontractors have the responsibility for participating in, and enforcing, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

10.1.3 Cooperation

All Subcontractors and material or equipment suppliers, shall cooperate fully with Contractor, the Owner, and all insurance carriers and loss prevention engineers.

10.1.4 Accident Reports

Subcontractors shall promptly report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger. Contractor shall thereafter promptly report the facts in writing to the Owner and the Architect giving full details of the accident.

10.1.5 First-Aid Supplies at Site

The Contractor will provide and maintain at the Site first-aid supplies for minor injuries.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor

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

- A. Employees on the Work and other persons who may be affected thereby;
- B. The Work, material, and equipment to be incorporated therein, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- C. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

10.2.2 Contractor Notices

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

10.2.3 Safety Barriers and Safeguards

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent Sites and utilities.

10.2.4 Use or Storage of Hazardous Material

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the Owner any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the Owner and local fire authorities.

10.3 PROTECTION OF WORK AND PROPERTY

10.3.1 Protection of Work

The Contractor and Subcontractors shall continuously protect the Work, the Owner's property, and the property of others, from damage, injury, or loss arising in connection with operations under the Contract Documents. The Contractor and Subcontractors shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the Owner.

10.3.2 Protection for Elements

The Contractor will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work. The Contractor shall at all times provide heat, coverings, and enclosures necessary to maintain adequate protection against weather so as to preserve the Work, materials, equipment, apparatus, and fixtures free from injury or damage.

10.3.3 Shoring and Structural Loading

The Contractor shall not impose structural loading upon any part of the Work under

construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the appropriate Contractor. All such items shall conform with the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage or cause damage to the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the Owner.

10.3.4 Conformance Within Established Limits

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the Owner, and shall not unreasonably encumber the premises with construction equipment or materials.

10.3.5 Subcontractor Enforcement of Rules

Subcontractors shall enforce the Owner's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

10.3.6 Site Access

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the Owner, observe the boundaries of the Site designated by the Owner, park only in those areas designated by the Owner, which areas may be on or off the Site, and comply with any parking control program established by the Owner such as furnishing license plate information and placing identifying stickers on vehicles.

10.3.7 Protection of Materials

The Contractor and the Subcontractors shall receive, count, inspect for damage, record, store, and protect construction materials for the Work and Subcontractors shall promptly send to the Contractor evidence of receipt of such materials, indicating thereon any shortage, change, or damage (failure to so note shall constitute acceptance by the Subcontractor of financial responsibility for any shortage).

10.4 EMERGENCIES

10.4.1 Emergency Action

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 7.

10.4.2 Accident Reports

The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by

telephone or messenger to the Owner.

10.5 HAZARDOUS MATERIALS

10.5.1 Discovery of Hazardous Materials

In the event the Contractor encounters or suspects the presence on the Site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by section 25249.5 of the California Health and Safety Code, which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing, whether or not such material was generated by the Contractor or the Owner. The Work in the affected area shall not thereafter be resumed, except by written agreement of the Owner and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the Owner and the Contractor.

10.5.2 Hazardous Material Work Limitations

In the event that the presence of hazardous materials is suspected or discovered on the Site, the Owner shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by Owner, as certified by an independent testing laboratory and/or approved by the appropriate government agency.

10.5.3 Indemnification By Owner for Hazardous Material Not Caused by Contractor

In the event the presence of hazardous materials on the Project Site is not caused by the Contractor, Owner shall pay for all costs of testing and remediation, if any, and shall compensate Contractor for any additional costs incurred or Project delay in accordance with the applicable provisions of Article 7 herein. In addition, Owner shall defend, indemnify and hold harmless the Contractor and its agents, officers, directors and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with or arising out of, or relating to, the performance of the Work in the area affected by the hazardous material.

10.5.4 Indemnification by Contractor for Hazardous Material Caused by Contractor

In the event the hazardous materials on the Project Site is caused by the Contractor, Subcontractors, materialmen or suppliers, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the Owner for any additional costs incurred as a result of the generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless Owner and its agents, officers, and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Project Site.

10.5.5 Terms of Hazardous Material Provision

The terms of this Hazardous Material provision shall survive the completion of the Work and/or any termination of this Contract.

10.5.6 Archeological Materials

In the event the Contractor encounters or reasonably suspects the presence on the Site of archeological materials, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing. The Work in the affected area shall not thereafter be resumed, except after Contractor's receipt of written notice from the Owner.

ARTICLE 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 Liability Insurance Requirements

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

11.1.1.1 Claims for damages because of bodily injury (including emotional distress), sickness, disease, or death of any person other than the Contractor's employees. This coverage shall be provided in a form at least as broad as Insurance Services Office (ISO) Form CG 0001 11188;

11.1.1.2 Claims for damages arising from personal or advertising injury in a form at least as broad as ISO Form CG 0001 11188;

11.1.1.3 Claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents; and

11.1.1.4 Claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work; and

11.1.1.5 Claims involving blanket contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and

11.1.1.6 Claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

If commercial general liability insurance or another insurance form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project location (with the ISO CG 2501 or insurer's equivalent endorsement provided to the District) or the general aggregate limit shall be twice the required occurrence limit.

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

11.1.2 Subcontractor Insurance Requirements

The Contractor shall require its Subcontractors and any Sub-subcontractors to take out and maintain similar public liability insurance and property damage insurance in like amounts.

11.1.3 Owner's Insurance

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

11.1.4 Additional Insured Endorsement Requirements

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

11.1.5 Workers' Compensation Insurance

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

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

11.1.6 Builder's Risk/ "All Risk" Insurance

11.1.6.1 Course-of-Construction Insurance Requirements

The Contractor, during the progress of the Work and until final acceptance of the Work by Owner upon completion of the entire Contract, shall maintain Builder's Risk/"All Risk," course-of-construction insurance satisfactory to Owner issued on a completed value basis on all insurable Work included under the Contract Documents. Coverage is to provide extended coverage and insurance against vandalism, theft, 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 the Architect's services and expenses required as a result of such insured loss upon the entire Work which is the subject of the Contract Documents, including completed Work and Work in progress to the full insurable value thereof. For projects not funded through revenue bonds, this insurance coverage need not cover more than five (5)% of the Contract Sum for tidal waves or earthquakes in excess of 3.5 on the Richter Scale in magnitude. Such insurance shall include the Owner and the Architect as an additional named insured and any other person with an insurable interest designated by the Owner as an additional named insured.

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

11.1.7 Consent of Insurer for Partial Occupancy or Use

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

11.1.8 Fire Insurance

Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work subject to loss or damage by fire and the entire structure on which the work of this Contract is to be done to the insurable value thereof. The amount of fire insurance shall be subject to approval by the Owner and shall be sufficient to protect the Project against loss or damage in full until the Work is accepted by the Owner. Should the work being constructed be damaged by fire or other causes during construction, it shall be replaced in accordance with the requirements of the drawings and specifications without additional expense to the Owner.

11.1.9 Other Insurance

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

11.1.10 Proof of Carriage of Insurance

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

- (a) Certificates and insurance policies shall include the following clause:

This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the Owner. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.

- (b) Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.
- (c) Certificates of insurance shall clearly state that the Owner and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by Owner.
- (d) The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the Owner.

11.1.11 Compliance

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

11.2 PERFORMANCE AND PAYMENT BONDS

11.2.1 Bond Requirements

Unless otherwise specified in the Contract Documents, prior to commencing any portion of the Work, the Contractor shall apply for and furnish Owner separate payment and performance bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate surety authorized and admitted to transact business in California.

To the extent, if any, that the Contract Sum is increased in accordance with the Contract Documents, the Contractor shall, upon request of the Owner, cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Owner. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Sum, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the surety. If the Contractor fails to furnish the required bond, the Owner may terminate the Contract for cause.

11.2.2 Surety Qualification

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure section 995.120 shall be accepted. Surety must be a California-admitted surety whose assets exceed liabilities by at least the amount of the bond.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 Uncovering Work for Required Inspections

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

12.1.2 Costs for Inspections not Required

If a portion of the Work has been covered which the Inspector or the Architect has not specifically requested to observe prior to its being covered, the Inspector or the Architect may request to see such Work, and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor, in which event the Owner shall be responsible for payment of such costs to the Contractor.

12.2 CORRECTION OF WORK

12.2.1 Correction of Rejected Work

The Contractor shall promptly correct the Work rejected by the Inspector or the Owner upon recommendation of the Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Completion and whether or not fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby.

12.2.2 One-Year Warranty Corrections

If, within one (1) year after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established under paragraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one (1) year shall be extended with respect to portions of the Work first performed after Completion by the period of time between Completion and the actual performance of the Work. This obligation under this paragraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

12.2.3 Removal of Nonconforming Work

The Contractor shall remove from the Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are not corrected by the Contractor or accepted by the Owner.

12.2.4 Owner's Rights if Contractor Fails to Correct

If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with paragraph 2.4. In addition, if the Contractor does not proceed with correction of such nonconforming Work within the time fixed by written notice

from the Inspector or the Owner through the Architect, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, the Owner may upon ten (10) additional days written notice sell such material or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's and other professionals and representatives' services and expenses, made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contractor shall be invoiced for the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.5 Cost of Correcting the Work

The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or separate contractors, whether completed or partially completed, caused by the Contractor's correction or removal of the nonconforming Work.

12.2.6 No Time Limitation

Nothing contained in this paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one (1) year as described in paragraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work and has, for example, no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, or to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 ACCEPTANCE OF NONCONFORMING WORK

If it is found at any time before or after completion of the Work that the Contractor has varied from the Contract Documents in materials, quality, form, finish, or in the amount or value of the materials or labor used, the Architect shall make a recommendation: that all such improper work should be removed, remade, and replaced, that all work disturbed by these changes be made good at the Contractor's expense, and that the Owner deduct from any amount due Contractor that sum of money equivalent to the difference in value between the Work performed and that called for by the Drawings and Specifications. The Architect shall determine such difference in value. The Owner, at its option, may pursue either course unless correction is required by law. No structural related work shall be accepted that is not in conformance with the Contract Documents.

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

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

13.2 SUCCESSORS AND ASSIGNS

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

Contract.

13.3 WRITTEN NOTICE

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and Obligations Cumulative

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

13.4.2 No Waiver

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

13.5 TESTS AND INSPECTIONS

13.5.1 Compliance

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

13.5.2 Independent Testing Laboratory

The Owner will select and pay an independent testing laboratory to conduct all tests and inspections. Selection of the materials required to be tested shall be made by the laboratory or the Owner's representative and not by the Contractor. Any costs or expenses of inspection or testing incurred outside of a fifty (50) mile radius from the Project Site or not located in a contiguous county to the Site, whichever distance is greater, shall be paid for by the Owner, invoiced by the Owner to the Contractor, and deducted from the next Progress Payment.

13.5.3 Advance Notice to Inspector

The Contractor shall notify the Inspector a sufficient time in advance of its readiness for required observation or inspection so that the Inspector may arrange for same. The Contractor shall notify the Inspector a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector may arrange for the testing of the material at the source of supply.

13.5.4 Testing Off-Site

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector that such testing and inspection will not be required, shall not be incorporated in the Work.

13.5.5 Additional Testing or Inspection

If the Inspector, the Architect, the Owner, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under paragraph 13.5.1, the Inspector will, upon written authorization from the Owner, make arrangements for such additional testing, inspection, or approval. The Owner shall bear such costs except as provided in paragraph 13.5.6.

13.5.6 Costs for Retesting

If such procedures for testing, inspection, or approval under paragraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the Owner, invoiced to the Contractor, and, among other remedies, can be deducted from the next Progress Payment.

13.5.7 Costs for Premature Test

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the Owner for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Architect's fees and expenses, and the amount of the invoice can among other remedies, be deducted from the next Progress Payment.

13.5.8 Tests or Inspections Not to Delay Work

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

13.6 INTENTIONALLY LEFT BLANK

13.7 TRENCH EXCAVATION

13.7.1 Trenches Greater Than Five Feet

Pursuant to Labor Code section 6705, if the Contract Sum exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, submit to the Owner or a registered civil or structural engineer employed by the Owner a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

13.7.2 Excavation Safety

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the Owner or by the person to whom authority to accept has been delegated by the Owner.

13.7.3 No Tort Liability of Owner

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the Owner or any of its employees.

13.7.4 No Excavation Without Permits

The Contractor shall not commence any excavation work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be

prominently displayed on the Site prior to the commencement of any excavation.

13.8 WAGE RATES

13.8.1 Wage Rates

Pursuant to the provisions of Article 2 (commencing at § 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the governing board of the Owner has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed for this Project from the Director of Industrial Relations ("Director"). These rates are on file with the Clerk of the Owner's governing board, and copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at the Site.

13.8.2 Holiday and Overtime Pay

Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) 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.

13.8.3 Wage Rates Not Affected by Subcontracts

The 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.

13.8.4 Change in Prevailing Wage During Bid or Construction

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.

13.8.5 Forfeiture and Payments

Pursuant to Labor Code section 1775, the Contractor and any subcontractor under the Contractor shall as a penalty to the Owner, forfeit not more than Fifty Dollars (\$50.00) 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 such craft or classification in which such worker is employed for any public work done under the Agreement by the Contractor or by any Subcontractor under it. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on consideration of the Contractor's or subcontractor's mistake, inadvertence, or neglect in failing to pay the correct prevailing rate of per diem wage, the previous record of the Contractor in meeting his or her prevailing rate of per diem wage obligations, or the Contractor's or subcontractor'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 or subcontractor had knowledge of it or the 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 work by the Contractor or subcontractor.

13.8.6 Minimum Wage Rates

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 the 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.

13.8.7 Per Diem Wages

Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, and vacation pay.

13.8.8 Posting of Wage Rates

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

13.9 RECORD OF WAGES PAID: INSPECTION

13.9.1 Application of Labor Code

Pursuant to section 1776 of the Labor Code:

(a) Each Contractor and subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of sections 1771, 1811 and 1815 for any work performed by his or her employees on the public works project

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to such employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, 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 the preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.

(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

(d) Each Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within 10 days after receipt of a written request.

(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, 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 awarded the Contract or performing the Contract shall not be marked or obliterated.

(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(g) The contractor or subcontractor shall have 10 days in which to comply, subsequent to receipt of written notice specifying in what respects such Contractor must comply with this section. In the event that the Contractor or subcontractor fails to comply within the 10-day period, the Contractor shall, as a penalty to the Owner, forfeit twenty-five Dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the labor Standards Enforcement or Division of Apprenticeship Standards, such penalties shall be withheld from the progress payments then due. A contractor is not subject to a penalty assessment pursuant to these provisions due to the failure of the subcontractor to comply with these provisions.

13.10 APPRENTICES

13.10.1 Apprentice Wages and Definitions

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered. Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprenticeship agreements under Chapter 4 (commencing with § 3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training.

13.10.2 Apprentice Labor Pool

When the Contractor to whom the Contract is awarded by the Owner, or any Subcontractor under him or her, in performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the Site of the Project, for a certificate approving the Contractor or Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, approval as established by the joint apprenticeship committee or committees shall be subject to the approval of the Administrator of Apprenticeship. The joint apprenticeship committee or committees, subsequent to

approving the subject Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor in order to comply with this section. Every Contractor and Subcontractor shall submit the contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the joint apprenticeship committee or committees administering the apprenticeship standards of the crafts or trade in the area of the Site of the public work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local joint apprenticeship committees provided they are already covered by the local apprenticeship standards. The ratio of work performed by apprentices to journeymen, who shall be employed in the craft or trade on the Project, may be the ratio stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but, except as otherwise provided in this section, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman. However, the minimum ratio for the land surveyor classification shall not be less than one (1) apprentice for each five (5) journeymen.

13.10.3 Journeyman/Apprentice Ratio; Computation of Hours

Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the job Site and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract. However, the Contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the job Site. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one (1) apprentice for each five (5) journeymen in a craft or trade classification.

13.10.4 Journeyman/Apprentice Ratio

The Contractor or Subcontractor, if he or she is covered by this section upon the issuance of the approval certificate, or if he or she has been previously approved in the craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that he or she employs apprentices in the craft or trade in the state on all of his or her contracts on an annual average of not less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman, or in the land surveyor classification, one (1) apprentice for each five (5) journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 hourly ratio as set forth in this section. This section shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars (\$30,000) or twenty (20) working days. Any work performed by a journeyman in excess of eight (8) hours per day or forty (40) hours per week, shall not be used to calculate the hourly ratio required by this section.

13.10.4.1 *Apprenticeable Craft or Trade.* "Apprenticeable craft or trade" as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The joint apprenticeship committee shall have the discretion to grant a ce

rtificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting a Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions is met:

- A. Unemployment for the previous three-month period in the area exceeds an average of fifteen percent (15%).
- B. The number of apprentices in training in such area exceeds a ratio of 1-to-5.
- C. There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth (1/30) of its journeymen annually through the apprenticeship training, either on a statewide basis or on a local basis.
- D. Assignment of an apprentice to any work performed under this contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

13.10.5 Ratio Exemption

When exemptions are granted to an organization which represents Contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member Contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

13.10.6 Apprentice Fund

A Contractor to whom the Contract is awarded or any Subcontractor under him or her, who, in performing any of the work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the site of the Project, to which fund or funds other contractors in the area of the site of the Project are contributing, shall contribute to the fund or funds in each craft or trade in which he or she employs journeymen or apprentices on the Project in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept the funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Contractor or Subcontractor may add the amount of the contributions in computing his or her bid for the contract. The Division of Labor Standards Enforcement is authorized to enforce the payment of the contributions to the fund or funds as set forth in the Labor Code section 227.

13.10.7 Prime Contractor Compliance

The responsibility of compliance with paragraph 13.10 and section 1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor.

13.10.8 Decisions of Joint Apprenticeship Committee

All decisions of the joint apprenticeship committee under this paragraph 13.10 and Labor Code section 1777.5 are subject to Labor Code section 3081.

13.10.9 No Bias

It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in the Labor Code

section 3077.

13.10.10 **Violation of Labor Code**

Pursuant to Labor Code section 1777.7, in the event a Contractor or Subcontractor willfully fails to comply with the provisions of this paragraph 13.10 and Labor Code section 1777.5:

(a) . . . the Chief of the Division of Apprenticeship Standards may deny to the contractor or subcontractor, and to its responsible officers, the right to bid on, or be awarded or perform work as a subcontractor on, any public works contract for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violations. Each period of debarment shall run from the date the determination of noncompliance by the Chief becomes a final order of the Administrator of Apprenticeship.

(b) A contractor or subcontractor who violates section 1777.5 shall forfeit as a civil penalty an amount not exceeding the sum of one hundred dollars (\$100) for each full calendar day of noncompliance. Notwithstanding section 1727, upon receipt of a determination that a civil penalty has been imposed, the awarding body shall withhold the amount of the civil penalty from the contract progress payments then due or to become due.

(c) In lieu of the penalty provided for in this subdivision, the Chief may for a first time violation and with the concurrence of an apprenticeship program, order the contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.

(d) Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund if the awarding body is a state entity, or in the equivalent fund of an awarding body if the awarding body is an entity other than the state.

(e) The interpretation and enforcement of section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council.

Pursuant to Public Contract Code section 6109, no contractor may perform work on a public works project with a subcontractor who is ineligible to perform work on the project pursuant to sections 1777.1 or 1777.7 of the Labor Code.

13.11 **ASSIGNMENT OF ANTITRUST CLAIMS**

13.11.1 **Application**

Pursuant to Government Code section 4552, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Bus. & Prof. Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties. If the Owner receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor may, upon demand, recover from the Owner any portion of the recovery, including

treble damages, attributable to overcharges that were paid by the assignor but were not paid by the Owner as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

13.11.2 Assignment of Claim

Upon demand in writing by the assignor, the Owner shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the Owner has not been injured thereby or the Owner declines to file a court action for the cause of action.

13.12 STATE AUDIT

Pursuant to and in accordance with the provisions of Government Code section 8546.7, or any amendments thereto, all books, records, and files of the Owner, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars (\$10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of three (3) years after final payment is made under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period.

13.13 STORM WATER DISCHARGE PERMIT

If applicable, the Contractor shall file a Notice of Intent to comply with the terms of the general permit to discharge storm water associated with construction activity (WQ Order No. 920-08-DWQ). The Notice of Intent must be sent to the following address along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow warrant processing time.): California State Water Resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, CA 95812-1977. The Contractor may also call the State Water Board's Construction Activity Storm Water Hotline at (916) 657-1146. The Notice of Intent shall be filed prior to the start of any construction activity.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE

14.1.1 Grounds for Termination

The Contractor may terminate the Contract if the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, for only the following reasons:

- A. Issuance of an order of a court or other public authority having jurisdiction which requires all work to be stopped;
- B. An act of government, such as a declaration of national emergency, making material unavailable which requires all work to be stopped;
- C. If repeated suspensions, delays, or interruptions by the Owner as described in paragraph 14.3 constitute in the aggregate more than 100 percent (100%) of the total number of days scheduled for completion, or one hundred twenty (120) days in any three hundred sixty-five (365) day period, whichever is less.

14.1.2 Notice of Termination

If such grounds exist, the Contractor shall serve written notice of such grounds on Owner and demand a meet-and-confer conference to negotiate a resolution in good faith within twenty (20) days of Owner's receipt of such notice. If such conference does not lead to resolution and the grounds for termination still exist, Contractor may terminate the Contract and recover from the Owner payment for Work executed and for reasonable verified costs with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages for the Work executed, but excluding overhead (field and home office) and profit for (i) Work not performed and (ii) the period of time that the Work was stopped.

14.1.3 Notice of Termination - Owner Fault

If the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor, Subcontractor, Sub-Subcontractor, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters essential to the progress of the Work, the Contractor may, upon written notice of seven (7) additional days to the Owner, terminate the Contract and recover from the Owner as provided in paragraph 14.1.2.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 Grounds for Termination

The Owner may terminate the Contract if the Contractor:

- A. Refuses or fails to supply enough properly skilled workers or proper materials or refuses or fails to take steps to adequately prosecute the work toward completion within the Contract Time;
- B. Fails to make payment to Subcontractors for materials or labor in accordance with Business and Professions Code section 10262;
- C. Disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction; or
- D. Otherwise is in substantial breach of a provision of the Contract Documents.
- E. "Violates Labor Code section 1771.1(a), subject to the provisions of Labor Code section 1771.1(f);"

14.2.2 Notification of Termination

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, written notice of seven (7) days, terminate the Contract and may, subject to any prior rights of the surety:

- A. Take possession of the Site and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- B. Accept assignment of subcontracts pursuant to paragraph 5.4; and
- C. Complete the Work by whatever reasonable method the Owner may deem expedient.

14.2.3 Payments Withheld

If the Owner terminates the Contract for one of the reasons stated in paragraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is complete.

14.2.4 Payments Upon Completion

If the unpaid balance of the Contract Sum exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor, or Owner, as the case may be, shall be certified by the Architect upon application. This payment obligation shall survive completion of the Contract.

14.2.5 Inclusion of Termination for Convenience

Any purported termination by Owner for cause under this section 14.2, which is revoked or determined to not have been for cause, shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause

14.3 SUSPENSION OR TERMINATION BY THE OWNER FOR CONVENIENCE

14.3.1 Suspension by Owner

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

14.3.1.1 **Adjustments.** An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance caused by suspension, delay, or interruption. No adjustment shall be made to the extent:

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

14.3.1.2 **Adjustments for Fixed Cost.** Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

14.3.2 Termination by the Owner for Convenience

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

14.3.2.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

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

14.3.2.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

14.4 TERMINATION DUE TO DISCOVERY OF UNKNOWN OR CHANGED CONDITIONS

The Owner reserves the right to terminate this Contract should the Owner determine not to proceed because of the discovery of any condition described in Article 4.5.5 or Article 10.5. The Contractor shall receive payment for all Work performed to the date of termination in accordance with the provisions of Article 9.

14.5 MUTUAL TERMINATION FOR CONVENIENCE

The Contractor and the Owner may mutually agree in writing to terminate this Contract for convenience. The Contractor shall receive payment for all Work performed to the date of termination in accordance with the provisions of Article 9.

14.6 NOT A WAIVER

Any suspension or termination by Owner for convenience or cause under this Article 14 shall not act as a waiver of any claims by Owner against Contractor or others for damages based on breach of contract, negligence or other grounds.

END OF GENERAL CONDITIONS.

SECTION 00 73 19 – HEALTH AND SAFETY REQUIREMENTS

PART 1 – GENERAL

1.1 HEALTH AND SAFETY POLICY

- A. The policy of the District is to promote safety at a level to minimize personal injury and potential property damage.
- B. Employees of contractors working on this project are required to meet or exceed all established and recognized codes and standards for safety and protection of personnel and property.
- C. The safety guidelines included here are made available to you, the Contractor, as an extension of the safety clause in your Contract General Conditions (Article 10 Protection of Persons and Property).
- D. These guidelines are not intended to be complete in every detail, but are merely of a general nature. The separate contractors are in no way relieved of their responsibilities for the safety of persons and property, and compliance with all statutes, rules, regulations and orders applicable to the conduct of the work.
- E. The possession, use, or sale of any alcoholic beverage or illegal, controlled drug substance will not be permitted on or immediately adjacent to the jobsite by any contractor, contractor employee, subcontractor employer or associate.
- F. The abuse of prescribed medication will not be permitted on or immediately adjacent to the jobsite by any contractor, contractor employee, subcontractor employee or associate.
- G. This Contractor, and other contractors, share the responsibility of monitoring and enforcing, as necessary, E and F above. Any known, or with due cause (believed to be), violator of E or F shall be immediately reported to the District.
- H. The District reserves the right to take corrective action, as deemed in the best interest of the project and the District, for violation of any health or safety standard. This corrective action may include, but is not limited to; removal (from the jobsite) any unsafe tools/equipment, temporary work stoppage for any unhealthy or unsafe condition, immediate removal (from the jobsite) any person that is unwilling or incapable of conducting themselves in a manner that promotes a healthy and safe working atmosphere. Any person found to be repeatedly in violation of health and/or safety standards will be permanently removed from the site at the discretion of the District, the Architect, the Inspector or the District.
- I. The Contractor's employees dress code shall meet all safety regulations.

1.2 RESPONSIBILITIES

- A. The District demands that all project contractors perform in a reasonable and safe manner.
- B. The contractors working on this project have the ultimate total responsibility to conduct a sound accident control program as it pertains to their work and their employees, as well as to ensure safe working conditions for employees of other

contractors.

- C. The Contractor will insure his employees cooperate with and coordinate safety matters with other contractors to form a joint safety effort.
- D. Employees who have been, or will be exposed to excessive (measured against applicable standards) levels of toxic materials or harmful physical agents shall be notified by the Contractor. Notice of corrective action being taken shall be provided to the employees. Accurate records must be kept of all exposures which are required to be monitored under the State and Federal Codes.
- E. In the event of a defense by the Contractor against unsafe independent employee actions, the Appeals Board requires that you must show evidence of the following:
 - 1. That the employee was experienced in the job being performed;
 - 2. That you as the employer have a well-devised safety program which includes training employees in safety matters relating to their individual job assignments;
 - 3. That you effectively enforce your safety program;
 - 4. That you have and enforce a policy of sanctions against employees who violate your safety program, and
 - 5. That the employee caused a safety infraction which he or she knew was in violation of your safety requirement.

1.3 SAFETY ACTIVITIES

- A. Contractors will Conduct:
 - 1. Pre-job safety analysis and generate appropriate written rules and procedures and employee awareness programs and submit to the District;
 - 2. Weekly "Tool Box" safety meetings between Contractor, their supervisors, foremen and their employees working on the project;
 - 3. Weekly safety inspections of your work area and those areas of work under your responsibility; and
 - 4. Monthly supervisory safety meetings as well as taking any other necessary safety precautions.

1.4 REPORTS

- A. Submit all preliminary, periodic and special reports to the District. The Contractor is in no way relieved of the requirements for submission of reports to any agency or authority.
- B. All reports listing deficiencies, accidents, or injuries shall show corrective action taken.

- C. Prior to starting work, provide results of the pre-job safety analysis to the District.
- D. A comprehensive safety program to be used on the site will be submitted to the District.

1.5 WEEKLY REPORTS

- A. A weekly status and summary report of each "Tool Box" meeting held and items discussed.
- B. A weekly status report of inspection results.
- C. A continuing list of deficiencies found, date identified, responsible party, corrective action and date corrected.

1.6 ACCIDENT REPORTS AND INJURY FORMS

- A. Submit a copy of one of the following for each case:
 - 1. California Division of Labor Statistics and Research Form 5020 (latest rev.), or
 - 2. Federal OSHA Form 101, or
 - 3. Insurance Company form similar to 1 or 2 above.

1.7 MONTHLY REPORTS

- A. Minutes of the monthly supervisors Safety Meeting.
- B. A copy of CAL/OSHA Form 200 "Log and Summary of Occupational Injuries and Illness."

1.8 SPECIAL REPORTS

- A. Notification to District immediately of any accident involving injury to personnel or property and complete written reports within 24 hours of a death or injury of 5 or more employees as a result of one accident.
- B. Copies of all toxic or harmful agent reports, Item 1.2.C

1.9 GOVERNMENTAL REPORTS

- A. Notification of Governmental Authorities is the responsibility of each affected Contractor.

1.10 SAFETY DEFICIENCY CORRECTION

- A. All safety deficiencies will be corrected by contractors in accordance with the following priorities:
 - 1. Immediate correction of items with any probability of major or minor injury to people.

2. Correction immediately of any accident probability which could involve people and/or equipment.
3. Correction within one day of potential injury or damage to property.

1.11 OUTSIDE SAFETY INSPECTIONS

- A. Unannounced inspections by City, State or Federal Safety Agencies or insurance companies may occur.
- B. Contractors are to escort representatives of these agencies or companies directly to the District and assist him as required or directed.
- C. If the District is not available, the Contractor's foreman or representative shall accompany the inspector on the inspection.

1.12 INVESTIGATING

- A. All injuries are to be investigated by the contractors and reported as outlined in Item 1.4.
- B. The District shall be notified prior to proceeding with an investigation.

1.13 SAFETY STANDARDS AND CODES

- A. All contractors are to provide their job supervision with applicable safety code publications and ensure they are familiar with the contents.
- B. Volume 37, No. 234, Part II of the Department of Labor, Occupation Safety and Health Administration Standards (latest applicable edition) on the designated applicable safety standards.
- C. In states with OSHA approved plans, state codes will take precedence unless federal standards are more stringent, in which case federal standards shall apply.
- D. On General Services Administration (GSA) projects, GSA Manual Accident & Fire Prevention on Construction and Alteration Work, No. PBSP 5900.3 will apply in addition to all other codes and standards.
- E. All code and standard conflicts will be resolved by applying the most restrictive code and/or standard.
- F. Suggested references for contractors are:
 1. U.S. Department of Labor, OSSA, Volume 37, No. 243 - Safety & Health Regulation for Construction.
- G. State Standard – CAL/OSHA, State of California Construction Safety Orders, latest edition.
- H. 2022 CBC Chapter 33 – Safeguards During Construction

- I. GSA Manual - GSA - PBSP 5900.3.
- J. U.S. Army Engineering Manual - BM 385-1-1.
- K. Associated General Contractors - Accident Prevention.
- L. A Short Guide to the California Occupational Safety and Health Act. - National Federation of Independent Business, 150 West 20th Avenue, San Mateo, California, 94403.

1.14 REQUIRED NOTICES: TO BE VISIBLY DISPLAYED

- A. Workman's Compensation Insurance Notice
- B. OSHA poster: Safety and Health Protection on the Job.
- C. State of California Department of Human Resources: Notice to Employees - Unemployment Insurance - Disability Insurance.
- D. Hard Hat Area Signs.
- E. List of ambulances, doctors and hospitals with telephone numbers which can be called during an emergency.
- F. Site Safety Organization by name and title of the safety representative from each contractor's organization.
- G. Any other safety signs, slogans, etc. that will improve the general awareness of a joint safety program.

1.15 PERMITS

- A. Permits from the Division of Industrial Safety are required before contractors may undertake the following kinds of work:
 - 1. Construction of trenches or excavations which are 5 feet or more deep, into which a person is required to descend;
 - 2. Construction of any building, structure, falsework, or scaffolding more than three stories high.
 - 3. Demolition of any building, structure, falsework, or scaffolding more than three stories high.
- B. The Division of Industrial Safety may investigate or confer with the employer before the start of work. If a pre-job safety conference between the Division of Industrial Safety personnel and the employer is a requirement specified by the Division of Industrial Safety at the time the permit is issued, employees or their representatives are to be included at the conference.
- C. Permits must be posted at or near each place of employment requiring a permit. If posting at the actual job site is not possible, the permit must be available for inspection at all times at the site, or, in the case of a mobile unit, at the employer's

head office in the area.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 00 73 63 – FINGERPRINTING NOTICE AND ACKNOWLEDGMENT

(Education Code Section 45125.2)

Note: This document must be executed and submitted with the agreement between the Owner and Contractor.

Business entities entering into contracts with the District for the construction, reconstruction, rehabilitation or repair of a school facility must comply with Education Code sections 45125.1 and 45125.2. Such entities are responsible for ensuring full compliance with the law and should therefore review all applicable statutes and regulations. The following information is provided simply to assist such entities with compliance with the law.

1. If your employee(s) will have more than limited contact with students, then you must take one or more of the following steps:
 - a. Install a physical barrier at the worksite to limit contact with pupils.
 - b. Have an employee who has not been convicted of a violent or serious felony continually monitor and supervise employees. (See attached.)
 - c. Arrange for surveillance by school district personnel, with District approval.
2. If one or more of these steps is taken, you are not required to comply with Education Code section 45125.1.
3. If you are providing the services in an emergency or exceptional situation, you are not required to comply with Education Code section 45125.2. An “emergency or exceptional” situation is one in which pupil health or safety is endangered or when repairs are needed to make a school facility safe and habitable. District shall determine whether an emergency or exceptional situation exists.
4. I have read the foregoing and agree to comply with the requirements of Education Code §§ 45125.1 and 45125.2 as applicable.

Dated

Signature

Typed Name

Title

ATTACHMENT

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

1. Murder or voluntary manslaughter.
2. Mayhem.
3. Rape as defined in paragraph (2) or (6) of subdivision (a) of Section 261 of the Penal Code or paragraph (1) or (4) of subdivision (a) of Section 262 of the Penal Code.
4. Sodomy by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person.
5. Oral copulation by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person.
6. Lewd acts on a child under the age of 14 years as defined in Penal Code section 288.
7. Any felony punishable by death or imprisonment in the state prison for life.
8. Any felony in which the person inflicts great bodily injury on any person other than an accomplice which has been charged and proved as provided for in Penal Code section 12022.7 or 12022.9 on or after July 1, 1977, or as specified prior to July 1, 1977, in Penal Code sections 213, 264, and 461, or any felony in which the defendant uses a firearm which use has been charged and proved as provided in Penal Code section 12022.5, 12022.53, or 12022.55.
9. Any robbery perpetrated in an inhabited dwelling house, vessel, as defined in Section 21 of the Harbors and Navigation Code, which is inhabited and designed for habitation, an inhabited floating home as defined in subdivision (d) of Section 18075.55 of the Health and Safety Code, an inhabited trailer coach, as defined in the Vehicle Code, or in the inhabited portion of any other building, wherein it is charged and proved that the defendant personally used a deadly or dangerous weapon, as provided in subdivision (b) of Penal Code section 12022, in the commission of that robbery.
10. Arson, in violation of subdivision (a) of Penal Code section 451.
11. The offense defined in subdivision (a) of Penal Code section 289 where the act is accomplished against the victim's will by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person.
12. Attempted murder.
13. A violation of Penal Code section 12308.
14. Kidnapping, in violation of subdivision (b) of Penal Code section 207.
15. Kidnapping, as punished in subdivision (b) of Penal Code section 208.

16. Continuous sexual abuse of a child, in violation of Penal Code section 288.5.
17. Carjacking, as defined in subdivision (a) of Penal Code section 215, if it is charged and proved that the person personally used a dangerous or deadly weapon as provided in subdivision (b) of Penal Code section 12022 in the commission of the carjacking.
18. Any robbery of the first degree punishable pursuant to subparagraph (A) of paragraph (1) of subdivision (a) of Penal Code section 213.
19. A violation of Penal Code section 264.1.

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

(1) Murder or voluntary manslaughter; (2) Mayhem; (3) Rape; (4) Sodomy by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (5) Oral copulation by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (6) Lewd or lascivious act on a child under the age of 14 years; (7) Any felony punishable by death or imprisonment in the state prison for life; (8) Any felony in which the defendant personally inflicts great bodily injury on any person, other than an accomplice, or any felony in which the defendant personally uses a firearm; (9) Attempted murder; (10) Assault with intent to commit rape, mayhem, sodomy, oral copulation, or robbery; (11) Assault with a deadly weapon or instrument on a peace officer; (12) Assault by a life prisoner on a non-inmate; (13) Assault with a deadly weapon by an inmate; (14) Arson; (15) Exploding a destructive device or any explosive with intent to injure; (16) Exploding a destructive device or any explosive causing great bodily injury or mayhem; (17) Exploding a destructive device or any explosive with intent to murder; (18) Burglary of an inhabited dwelling house, vessel, as defined in the Harbors and Navigation Code, which is inhabited and designed for habitation, floating home, as defined in subdivision (d) of section 18075.55 of the Health and Safety Code, or trailer coach as defined by the Vehicle Code, or inhabited portion of any other building; (19) Robbery or bank robbery; (20) Kidnapping; (21) Holding of a hostage by a person confined in a state prison; (22) Attempt to commit a felony punishable by death or imprisonment in the state prison for life; (23) Any felony in which the defendant personally used a dangerous or deadly weapon; (24) Selling, furnishing, administering, giving, or offering to sell, furnish, administer, or give to a minor any heroin, cocaine, phencyclidine (PCP), or any methamphetamine-related drug, as described in paragraph (2) of subdivision (d) of Section 11055 of the Health and Safety Code, or any of the precursors of methamphetamines, as described in subparagraph (A) of paragraph (1) of subdivision (f) of Section 11055 or subdivision (a) of Section 11100 of the Health and Safety Code; (25) Any violation of subdivision (a) of section 289 where the act is accomplished against the victim's will by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person; (26) Grand theft involving a firearm; (27) Carjacking; (28) Any violation of section 288.5; (29) Any violation of section 244; (30) Assault with a deadly weapon or instrument on a firefighter; (31) Any violation of section 264.1; (32) Any violation of section 12022-53; (33) Any attempt to commit a crime listed in this subdivision other than an assault; (34) Any conspiracy to commit an offense described in paragraph (24) as it applies to Section 11370.4 of the Health and Safety Code where the defendant conspirator was substantially involved in the planning, direction, or financing of the underlying offense.

INDEPENDENT CONTRACTOR STUDENT CONTACT FORM

Contractor Name: _____

Supervisor/Foreman Name: _____

Start Date: _____

Completion Date: _____

Location of Work: _____

Hours of Work: _____

Length of Time on
School Grounds: _____

Number of Employees
on the Job: _____

Yes No
[] []

Employees will have more than limited contact with students. Explain:

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

- A physical barrier will be installed at the worksite to limit contact with pupils.
- Employees will be continually monitored and supervised by an employee who has not been convicted of a violent or serious felony.
- Employees will be surveilled by school district personnel.

Dated

Signature

Typed Name

Title

Note: This document must be executed and submitted with the executed Agreement between District and Contractor.

DIVISION 1 – GENERAL REQUIREMENTS

- 01 10 00 – Summary of Work
- 01 23 00 – Alternates
- 01 25 00 – Substitution Procedures
- 01 26 00 – Modification Procedures
- 01 29 00 – Payment Procedures
- 01 31 13 – Project Coordination
- 01 31 19 – Project Meetings
- 01 33 00 – Submittals
- 01 35 13 – Site Standards
- 01 42 00 – References and Definitions
- 01 45 23 – Testing and Inspections
- 01 50 00 – Temporary Facilities
- 01 50 13 – Construction Waste Management and Disposal
- 01 56 39 – Temporary Tree and Plant Protection
- 01 62 00 – Product Substitutions
- 01 66 00 – Product Storage and Handling
- 01 71 23 – Field Engineering
- 01 73 00 – Execution Requirements
- 01 73 29 – Cutting and Patching
- 01 77 00 – Project Closeout
- 01 78 36 – Warranties and Bonds
- 01 78 38 – Guarantee

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SECTION 01 10 00 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of each prime Contract, including General and Supplementary Conditions and other Division 01 Specifications sections, apply to work of this section.

1.2 PROJECT DESCRIPTION

- A. The Project consists of all work, including furnishing all labor, materials, tools, transportation service, equipment and appliances required to perform all work to complete the **El Capitan High School Stadium Upgrades** project, 100 Farmland Avenue, Merced, CA 95348, as shown in the Contract Documents prepared by California Design West Architects, Inc., 2100 19th Street, Sacramento, CA, 95818.
- B. Work Included: Performance of all work shown on the Drawings, specified and required for the completion of the Stadium Upgrades project. Project to include site demolition, grading, earthwork, landscape and irrigation, asphalt paving, concrete paving, architectural, structural, mechanical, plumbing, electrical, synthetic track, bleachers, fencing, field lighting, scoreboard, and other work as necessary or indicated to construct The Project.
 - 1. **OFCI** (Owner Furnished Contractor Installed) items for this project are as follows:
 - a. **Bleachers and Press Box – Material Only**: Bleachers and Press Box material are OFCI. The District will be under a separate contract for purchasing the materials for the bleacher assemblies. The GC will be responsible for all additional material and labor required to install the bleacher assemblies including; grubbing, grading, over-excavation, and recompaction as detailed in the soils report. GC will provide excavation of the footings. GC will provide and install all rebar and concrete for the footings. GC will coordinate locating and installation of all required cast-in-place embeds provided by southern bleachers. GC will backfill/recompact around footings, remove spoils, and perform final grading. GC will provide all final grading and installation of concrete SOG and fencing below bleachers assemblies. The GC will be in charge of the installation of the Bleacher assembly material purchased by the District. Refer to Section 13 34 16.
 - b. **Scoreboard**: Scoreboard (itself) is OFCI. The District will be under a separate contract for purchasing the scoreboard panel itself and associated control hardware and software. This purchase will include the controls, equipment, and software located in the press box to run the scoreboard. The GC will be in charge of all excavation, all rebar, steel columns, steel purlins, bolts and structural connections to the scoreboard. The GC will be in charge of prepping and painting the structure holding up the scoreboard assembly. OES will commission each facility at the control room. This will include an OES onsite

technician that will setup the control room equipment and software training. The GC is responsible for providing power at the control room as well as the fiber connection to the scoreboard and required Fiber terminations.

- c. Track Material:** Track Material itself is OFCI. The District will be under a separate contract to purchase the material components of the Beynon BSS 300 synthetic track surfacing system. The GC will be in charge of all required grubbing, grading, curbs, fencing, asphalt, drainage and all preparation for the installation of the track surfacing. Labor to install track material (as well as all labor and material for grading, drainage, concrete, curbs, fencing, and track substrate (asphalt, agg base, etc) within and around track surfacing shall be part of the General Contractor's site-work bid package. Refer to Sections 32 18 25 and 32 18 27.
- d. MUSCO Lighting:** MUSCO Lighting material is OFCI. The District will be under a separate contract for purchasing the MUSCO lighting materials. The GC will be responsible for providing the necessary equipment, excavation, rebar, concrete, and the installation and connection of all MUSCO equipment. The GC will include in their bid all gear / equipment necessary and noted in the plans except for the MUSCO light poles, MUSCO luminaires and MUSCO equipment shown on the MUSCO plans. GC shall be responsible for the receipt of the MUSCO-supplied materials. GC shall off load materials upon delivery to the site. Once received, contractor is responsible for the materials. GC shall provide safe storage of materials as necessary. GC is responsible for the offloading, assembly, and installation for the Musco supplied materials (see BOM). Any materials and labor not provided in the MUSCO BOM is the responsibility of the contractor to supply and install per the approved drawings. GC shall supply emergency inverter to power egress fixtures provided by MUSCO. On project completion, contractor is responsible for commissioning of the system. Coordinate with MUSCO for system test, startup, and training.
- C. Guarantee:** It is the declared and acknowledged intention and meaning, through coordination of Drawings and Specifications, that the Contractor commits to own all means, methods and requirements of the entire work force in order to deliver to the Owner, a system that will be free from defect for a minimum period of one (1) year. Any and all repairs or replacements of defective work shall be at the expense of the Contractor, with no additional cost to the Owner.
- D. Work Sequence:** Bids will be received from General Contractors, and a single contractor will be awarded the contract. This work will be completed in One Phase.
- E. Time of Work:** Subject to requirements of other sections of the specifications. The work of the project will commence upon the issuance of the Notice to Proceed and shall be completed as noted, start date of June 10, 2024, with a completion date of September 10, 2025.

1.3 CONTRACTORS' USE OF PREMISES

- A. General: During the entire construction period the Contractor shall have use of the premises for construction operations, including use of the site, limited only by the Owner's right to perform construction operations with its own forces, or to employ separate contractors on portions of the site.

- B. The Contractor will be required to meet with the school administration and formulate schedules acceptable to the administration for coordination of deliveries, staging of materials, interruption of utilities, unusually noisy, dusty, or disruptive construction activities, etc., so as to minimize disruption of neighborhood activities and hazards to residents.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

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SECTION 01 23 00 – ALTERNATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, each party involved shall be notified in writing of the status of each alternate, in particular whether alternates have been accepted, rejected, or deferred for later consideration. Notification shall include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Base Bid Includes All Work Shown on Drawings and Specifications.
- B. Alternate #1 – All Weather Track Color: The color used for bidding this track is Red. Please provide pricing to change the track to a BLUE all-weather track color, with gold exchange zones.

END OF SECTION.

SECTION 01 25 00 – SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section

1.2 SUMMARY

- A. General: Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.
 - 1. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.
 - a. Contract Amount: Base on materials and products included in Contract Documents.
 - b. Where materials and products are listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner's and Architect's approval of Contractor's written request for substitution.
 - 2. Purpose: After bidding, substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to no fault of Contractor.
 - 3. Purpose: Substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to conditions beyond Contractor control.
 - a. Owner benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.
 - b. List proposed cost or time reductions on request for substitution.
 - c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.

1.3 RELATED SECTIONS

- A. Section 01 26 00 – Modification Procedures.
- B. Section 01 33 00 – Submittals
- C. Section 01 62 00 – Product Substitutions

1.4 SUBSTITUTIONS

- A. Within a period of 35 days after award of Contract, Owner and Architect will consider formal requests for substitutions only from Contractor as specified in 1.1 Summary.
 - 1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.
 - 2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- B. Prior to submittal of second Request for Payment Owner and Architect will consider formal requests for substitutions from Contractor as specified in 1.1 Summary.
 - 1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.
 - 2. After payments begin, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- C. Submit each request with sequentially numbered “Substitution Request Transmittal” acceptable to Owner and Architect; submit separate request for each product and support each request with:
 - 1. Product identification with manufacturer's literature and samples where applicable.
 - 2. Name and address of similar projects on which product has been used, and date of installation.
- D. Submit itemized comparison of proposed substitution with product specified and list significant variations.
- E. Submit data relating to changes in construction schedule.
- F. Note effect of substitution on other work, products, or separate contracts.
 - 1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details or Specifications.
- G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.
 - 1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.
- H. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on submittals without a formal request from Contractor.
 2. They are requested directly by a subcontractor or supplier.
 3. Acceptance will require substantial revision of Contract Documents. Substitute products shall not be ordered without written acceptance of Owner and Architect.
- I. Owner and Architect will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

1.5 CONTRACTOR'S REPRESENTATION

- A. Requests constitute a representation that Contractor:
1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.
 2. Will provide same warranty or longer warranty for substitution as for specified product.
 3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
 4. Waives claims for additional costs that subsequently become apparent.
 5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.

1.6 ARCHITECT'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
1. Architect will recommend that Owner accept or reject substitution request.
 2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.
- B. Notify Contractor in writing of decision to accept or reject requested substitution.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

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SECTION 01 26 00 – MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications and clarifications.

1.3 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures
- B. Section 01 33 00 – Submittals
- C. Section 01 62 00 – Product Substitutions

1.4 MINOR CHANGES IN THE WORK

- A. Supplemental instructions authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, will be issued by the Architect on AIA form G710, Architect's Supplemental Instructions.
- B. All Substitutions (see Section 01 62 00) and Requests for Information (RFI's) that affect Structural Safety, Fire and Life Safety, Access Compliance or Energy (as applicable) shall be submitted to the Division of the State Architect (DSA) for review and approval.

1.5 ADDENDA

- A. The Contractor and the District agree that changes to the contract documents, in the Agreement or in the Project to be done under the Agreement, shall become effective only when written in the form of supplemental agreement or addenda and approved and signed by the District, the Architect and the Contractor and approved by the Division of State Architect (DSA). Division of the State Architect (DSA) approval must be evidenced by an official approved stamp and appropriate signatures.
- B. All Addenda must be completed must comply with the procedures and obtain the approvals required by Title 24 of the California Code of Regulations, Section 4-338, and must be signed and approved by all the following:
 - 1. A/E of record
 - 2. Delegated Professional Engineer (when applicable)
 - 3. Division of State Architect (DSA)

1.6 PROPOSAL REQUEST (PR)

- A. Proposal Request (PR): Proposed changes in the Work that will require adjustment

to the Contract Sum or Contract Time will be issued by the Architect (on behalf of the Owner), with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.

1. Proposal Requests (PR's) issued by the Architect (on behalf of Owner) are for information only. Do not consider them instruction either to stop work in progress, or to execute the proposed change.
2. Unless otherwise indicated in the proposal request, within fifteen (15) days of receipt of the proposal request, contractor to submit a Change Order Request (COR) / Proposed Change Order (PCO) to the Architect for the Owner's review an estimate of cost necessary to execute the proposed change.
3. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
5. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

1.7 CHANGE ORDER REQUEST (COR) / PROPOSED CHANGE ORDER (PCO)

A. Change Order Request (COR) / Proposed Change Order (PCO): When latent or other unforeseen conditions require modifications to the Contract, or in response to a PR issued by the Architect, the Contractor may propose changes by submitting a Change Order Request (COR) / Proposed Change Order (PCO) to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. All Change Order Request (COR) / Proposed Change Order (PCO)_Requests must contain a complete breakdown of costs, credits, deducts and extras; itemizing materials, labor, applicable taxes, delivery charges, equipment rentals, amounts of trade discounts, overhead and profit. All Subcontractor work shall be indicated. Where requested, furnish data to substantiate quantities.
 - a. If District accepts the Change Order Request (COR) / Proposed Change Order (PCO), the Architect and/or District will return an approved copy of the Change Order Request (COR) / Proposed Change Order (PCO).
 - b. If Change Order Request (COR) / Proposed Change Order (PCO)_is not acceptable to District because it does not agree with cost and/or time included in the Change Order Request (COR) / Proposed Change Order (PCO), District will submit in a response what it believes to be a reasonable cost and/or adjustment, if any. Except as

otherwise provided in this Section, Contractor shall have seven (7) days in which to respond to District with a revised Change Order Request (COR) / Proposed Change Order (PCO).

3. Comply with requirements in Section 01 62 00 – Product Substitutions, if the proposed change in the Work requires the substitution of one product or system for a product or system specified.
- B. The Contractor shall provide a current Change Order Request (COR) / Proposed Change Order (PCO) Log at each job site meeting. The log shall list the proposed COR's/PCO's in order of priority.
- C. Format: Industry standard Change Order Request (COR) / Proposed Change Order (PCO) forms to be used, or similar AIA Standard format.

1.8 CHANGE ORDERS

- A. All cost / time changes to a project that will be included in a Change Order must have PRIOR approval from the District and Architect, per Part 1.7 above.
- B. In addition to any statement governing change orders elsewhere in the Contract Documents, the Contractor and the District agree that changes in the Agreement or in the Project to be done under the Agreement shall become effective only when written in the form of supplemental agreement or accepted / approved Change Order Request (COR) / Proposed Change Order (PCO) and signed by the District, the Architect and the Contractor. If the Contractor receives oral direction for a change order, Contractor must submit a written COR / PCO within twenty-four (24) hours of receiving the change order, to District and Architect for verification prior to proceeding with the work.
- C. It is specifically agreed that the District shall have the right to request any alternations, deviation, reductions, or addition to the Contract Documents and the amount of the cost thereof shall be added or deduced from the amount of the contract sum by fair and reasonable valuations. However, in determining the cost of any additive cost change, Contractor agrees that the percentage markup for all overhead and profit shall be calculated as follows:
 1. General Conditions:
 - a. For work performed by Contractor's employees, Contractor's percentage markup shall not exceed fifteen percent (15%) of Contractor's actual cost for such work.
 - b. For work performed by a Subcontractor, Contractor's percentage markup shall not exceed five percent (5%) of the Subcontractor's actual cost for such work, and the Subcontractor's percentage markup shall not exceed ten percent (10%) of the Subcontractor's actual cost for such work.
 - c. The total percentage markup on any change order shall not exceed fifteen percent (15%) of the actual cost of such work. Not more than one Subcontractor may charge owner markup on any change order.

- d. The above percentage markups for overhead and profit (including that for work performed by subcontractors) are understood to include Contractor's and Subcontractor's site supervision costs, home office overhead, profit margin, insurance, general conditions and all other factors. The actual cost of additional bond capacity, not to exceed one percent (1%) of the increased value of the contract, shall be added to change orders.
- D. The Contractor shall submit with the proposed change order its request for time extension (if any) and include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the Project. The time extension, if any, shall be agreed to by the parties and memorialized by a written change order prior to initiation of the work contemplated by the change order. In the event of an agreed upon extension of time, the Contractor shall not be subject to any claim for liquidation damages for the period of time, but the Contractor shall have no claim for any compensation for any such delay other than that set forth in the change order itself.
- E. If the Contractor believes it is entitled to a change order for work it is being required to perform, or is entitled to an extension of time greater than that agreed to by the District, and the District refuses to issued a change order or include the requested extension of time in the change order, the Contractor must, at least three (3) days prior to commencing the disputed work, inform the Architect and the Owner of the reason for the dispute and the amount of the requested change order. No change order will later be approved, or compensation made, for work performed without such prior notice.
- F. All Change Orders must be completed must comply with the procedures and obtain the approvals required by Title 24 of the California Code of Regulations, Section 4-338, and must be signed and approved by the Architect of Record and Owner.

1.9 CONSTRUCTION CHANGE DOCUMENT

- A. Construction Change Document: When there is a change to the contract documents, the Architect will issue a CCD in one of two categories: 1) CCD Category A – which includes changes to or affecting the Structural, Access or Fire-Life Safety portions of the project, and 2) CCD Category B – which includes changes not affecting the Structural Safety, Access Compliance or Fire Life Safety portions of a project. Both CCD types (categories) shall be submitted to DSA on the DSA-140 form.
 1. CCD – Category A: The Contractor shall not proceed with a change in the work until DSA (SSS, FLS, and ACS as applicable) approves the CCD.
 2. CCD – Category B: Per approval from the Architect, the Contractor may proceed with a change in the work for a CCD – Category B.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Documents.
- C. After completion of the change, Contractor may submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract, as a Change Order Request (COR) / Proposed Change Order (PCO), as required.

1.10 REQUEST FOR INFORMATION

- A. The Contractor shall review any Requests for Information (RFI), or other Contractor initiated request for information, prior to submission to the Architect to ensure that the information requested in such RFI is not already provided in the Contract Documents.
- B. If, after reviewing the RFI as stated above, the Contractor requires information regarding the Project or Contract Documents or receives a Request for Information (RFI) from a Subcontractor, Contractor shall prepare and deliver the RFI to the Architect. RFI submittals shall come only directly from the contractor; RFI's sent by any subcontractor will not be reviewed.
- C. Contractor shall use RFI format, or similar AIA Standard RFI format, as provided in the Contract Documents.
- D. Contractor shall reference each RFI to an activity on the Progress Schedule and shall note time criticality of the RFI, indicating time within which a response is required. Contractor's failure to reference RFI to an activity on the Progress Schedule and note time criticality on the RFI shall constitute Contractor's waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI.
 - 1. The Architect shall endeavor to respect the Contractor's requested order of priorities. The total time required for the Architect to respond is subject to the complexity of the RFI's, the number of RFI's submitted concurrently and any re-prioritization of pending RFI's submitted by the Contractor.
 - 2. The Architect will endeavor to respond within Seven (7) Days from receipt of RFI with a written response to Contractor, provided that the RFI complies with all paragraphs above and is time critical. Additionally, the Architect may return RFI requesting additional information should original RFI be inadequate in describing condition. Contractor shall distribute response to all appropriate Subcontractors.
 - 3. If Contractor is satisfied with the response and does not request change in Contract Sum or Contract Time, then the response shall be executed without a change.
 - 4. If Contractor believes the response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter "R" indicating if it is a revised RFI) to Architect, clarifying original RFI.
 - 5. If Contractor believes that the response results in change in Contract Sum or Contract Time, Contractor shall notify District in writing within seven (7) Days after receiving the response. If District disagrees with Contractor, then Contractor may give notice of intent to submit a Claim as described in Section 00 72 00 (General Conditions), and submit its Claim within 30 days of District's response. If District agrees with Contractor, then Contractor must submit a Cost Proposal within 21 Days of District's response to the RFI. Contractor's failure to deliver either the foregoing notice of Claim or Cost Proposal by the respective deadlines stated in the foregoing sentences shall result in waiver of the right to file a Cost Proposal or Claim.

- E. Contractor shall provide a current RFI Priority Schedule listing the status of each RFI, or other Contractor initiated Request for Information. The RFI Priority Schedule shall be up to date, and the schedule shall rank the RFI's in order of Priority.
- F. Contractor shall be charged One Hundred Dollars (\$100.00) for each frivolous RFI submitted. Frivolous RFI's include Requests for Information readily available on drawings or specifications, requests to provide coordination of work of subcontractor's schedules, or other work which is the responsibility of the Contractor. Architect shall be solely responsible for determining whether an RFI is frivolous.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.3 RELATED SECTIONS

- A. Critical Path Method (CPM) – Contractor's Construction Schedule and Submittal Schedule information is included in Section 01 33 00 – Submittals.

1.4 SCHEDULE OF VALUES (SOV)

- A. Coordinate preparation of the Schedule of Values (SOV) with preparation of the Critical Path Method (CPM) – Contractor's Construction Schedule.
- B. Correlate line items in the Schedule of Values (SOV) with other required administrative schedules and forms, including:
 - 1. Critical Path Method (CPM) – Contractor's Construction Schedule.
 - 2. Application for Payment form.
 - 3. List of Subcontractors.
 - 4. List of Products.
 - 5. List of principal suppliers and fabricators.
 - 6. Schedule of Submittals.
- C. Submit the Schedule of Values (SOV) to the Architect at the earliest feasible date, but in no case later than seven (7) days before the date scheduled for submittal of the initial Application for Payment. Delay of the submittal of the Schedule of Values (SOV) may result in delay of approval of the Initial Application for Payment. Refer to Part 1.5.H in this Specification Section.
- D. Format and Content: Use industry standards as a guide to establish the format for the Schedule of Values (SOV).
- E. Identification: Include the following Project identification on the Schedule of Values (SOV):
 - 1. Project Name and Location.

2. Name of Owner.
 3. Name of Architectural Firm.
 4. DSA Application Number.
 5. Contractor's name and address.
 6. Date of submittal.
- F. Arrange the Schedule of Values (SOV) in a tabular form with separate columns to indicate the following for each item listed:
1. Generic name.
 2. Related Specification Section .
 3. Name of Subcontractor.
 4. Name of manufacturer or fabricator.
 5. Name of supplier.
 6. Change Orders (numbers) that have affected value.
 7. Dollar Value.
 8. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
 9. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 10. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 11. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values (SOV) for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- G. Unit Cost Allowances: Show line item value of unit cost allowances as a product of unit cost times measured quantity as estimated from the best indication in the Contract Documents, if applicable.
- H. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values (SOV) and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.

1. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values (SOV) or distributed as general overhead expense.
- I. Schedule Updating: Update and resubmit the Schedule of Values (SOV) when approved Change Order Request (COR) / Proposed Change Order (PCO), result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
- B. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- C. Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.
- D. Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment, or similar industry standard forms for each application.
- E. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.
 1. Entries shall match data on the Schedule of Values (SOV) and Critical Path Method (CPM) – Contractor's Construction Schedule. Use updated schedules if revisions have been made.
 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- F. Transmittal: Submit one (1) PDF or three (3) executed hard copies of each Application for Payment to the Architect by means ensuring receipt within 24 hours; and shall include waivers of lien and similar attachments, when required.
 1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
- G. Waivers:
 1. Mechanics Lien: With each Application for Payment submit waivers of mechanics liens from subcontractors or sub-subcontractors and suppliers for the construction period covered by the previous application.
 - a. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

- b. When an application shows completion of an item, submit final or full waivers.
 - c. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 2. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.
 - a. Submit final Application for Payment with, or preceded by, final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
 3. Waiver Forms: Submit waivers of lien on forms, (in sample forms), and executed in a manner, acceptable to Owner.
- H. Delay of Processing Applications for Payment: At the discretion of the District, processing of Applications for Payment may be delayed if any requirement in this section is not followed, AND if any of the following occur:
 1. Initial Applications for Payment may be held until the Critical Path Method (CPM) – Contractor's Construction Schedule is received and acceptable. Refer to Section 01 33 00 – Submittals for additional information.
 2. Initial Applications for Payment may be held until Schedule of Values (SOV) is received and acceptable to District. Refer to Part 1.4 in this Specification Section.
 3. Applications for Payment may be held until submittals are received. Refer to Section 01 33 00 – Submittals for deadlines and timelines for submittals.
 4. Final Application for Payment may be held until submitted as-built drawings are current and acceptable. Refer to Section 01 77 00 – Project Closeout, for requirements.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
 1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values (SOV).
 4. Critical Path Method (CPM) – Contractor's Construction Schedule (preliminary if not yet final)
 5. Schedule of principal products.
 6. Schedule of unit prices, if applicable.

7. Submittal Schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from governing authorities for performance of the Work.
 12. Initial progress report.
 13. Report of pre-construction meeting.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds (if required).
 16. Data needed to acquire Owner's insurance.
 17. Initial settlement survey and damage report, if required.
- J. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
1. Administrative actions and submittals that shall proceed or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Warranties, Guarantees, and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Meter readings.
 - f. Start-up performance reports.
 - g. Change-over information related to Owner's occupancy, use, operation and maintenance.
 - h. Final cleaning.
 - i. Application for reduction of retainage, and consent of surety.
 - j. Advice on shifting insurance coverage(s).

- k. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- K. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
- 1. Completion of Project closeout requirements.
 - 2. Completion of items specified for completion after Substantial Completion.
 - 3. Assurance that unsettled claims will be settled.
 - 4. Assurance that Work not complete and accepted will be completed without undue delay.
 - 5. Transmittal of required Project construction records to Owner.
 - 6. Certified property survey.
 - 7. Proof that taxes, fees and similar obligations have been paid.
 - 8. Removal of temporary facilities and services.
 - 9. Removal of surplus materials, rubbish and similar elements.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 01 31 13 – PROJECT COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Coordination
 - 2. Administrative and supervisory personnel
 - 3. General installation provisions
 - 4. Cleaning and protection

1.3 RELATED SECTIONS

- A. Section 01 31 19 – Project Meetings.
- B. Section 01 33 00 – Submittals.

1.4 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. Particular attention is called to the need for coordinating construction with school activities, to ensure that the least possible disruption occurs (see Section 01 31 19), and to the possibility that the owner will have other work occurring on site during the same time frame by separate contractors (see General Conditions Article 6).
 - 2. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 3. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
 - 4. Make adequate provisions to accommodate items scheduled for later installation.

- a. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
- B. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of schedules
 2. Installation and removal of temporary facilities
 3. Delivery and processing of submittal
 4. Progress meetings
 5. Project Close-out activities
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.
- E. Mutual Responsibility of Contractors: The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate work with theirs.
 1. If any contractor's work depends for proper execution or results upon the work of any other separate contractor, the contractor shall inspect and promptly report to the Architect any patent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report such shall constitute acceptance of the other contractor's work as fit and proper to receive work.
 2. Should the Contractor cause damage to the work or property of any separate contractor on the Project, or cause any delay to any such contractor, the Contractor shall defend, indemnify and hold the District harmless for such damage or delay.

1.5 SUBMITTALS

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates

maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on separate Shop Drawings
 2. Indicate required installation sequences
 3. Comply with requirements contained in Section 01 33 00 – Submittals.
- B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses, telephone numbers, cell phone numbers, and email addresses.
1. Post copies of the list in the Project meeting room and the temporary field office.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the

particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.2 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading
 - 2. Excessive internal or external pressures
 - 3. Excessively high or low temperatures
 - 4. Thermal shock
 - 5. Excessively high or low humidity
 - 6. Air contamination or pollution
 - 7. Water or ice
 - 8. Solvents
 - 9. Chemicals
 - 10. Light
 - 11. Radiation
 - 12. Puncture
 - 13. Abrasion
 - 14. Heavy traffic
 - 15. Soiling, staining and corrosion
 - 16. Bacteria
 - 17. Rodent and insect infestation
 - 18. Combustion
 - 19. Electrical current
 - 20. High speed operation
 - 21. Improper lubrication
 - 22. Unusual wear or other misuse
 - 23. Contact between incompatible materials
 - 24. Destructive testing
 - 25. Misalignment
 - 26. Excessive weathering
 - 27. Unprotected storage
 - 28. Improper shipping or handling
 - 29. Theft
 - 30. Vandalism

END OF SECTION.

SECTION 01 31 19 – PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conferences
 - 2. Progress Meetings
- B. Detailed information on Critical Path Method (CPM) – Contractor's Construction Schedule, is located in Section 01 33 00 – Submittals.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties (including representatives from the school's administrative staff) shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
 - 1. Tentative Construction Schedule
 - 2. Critical Path Method (CPM) – Contractor's Construction Schedule
 - 3. Designation of responsible personnel
 - 4. Procedures for processing field decisions and Change Orders
 - 5. Procedures for processing Applications for payment
 - 6. Distribution of Contract Documents
 - 7. Submittal of Shop Drawings, Product Data and Samples
 - 8. Preparation of record documents

9. Use of the premises
10. Office, Work and storage areas
11. Equipment deliveries and priorities
12. Safety procedures
13. First aid
14. Security
15. Housekeeping
16. Working hours

1.4 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site on a monthly basis. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
- D. The Contractor shall provide the following items for review by all parties at each progress meeting with priority items indicated for each log:
 1. RFI Log
 2. Proposed Change Order Log
 3. Two (2) Week Schedule
 4. Submittal Log
- E. Critical Path Method (CPM) – Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind 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.
- F. Review the present and future needs of each entity present, including such items as:
 1. Interface requirements

2. Time
 3. Sequences
 4. Deliveries
 5. Off-site fabrication problems
 6. Access
 7. Site utilization
 8. Temporary facilities and services
 9. Hours of Work
 10. Hazards and risks
 11. Housekeeping
 12. Quality and Work standards
 13. Change Orders
 14. Documentation of information for payment requests
- G. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- H. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

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SECTION 01 33 00 – SUBMITTALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:

1. Critical Path Method (CPM) – Contractor's Construction Schedule
2. Submittal Schedule
3. Daily Construction Reports
4. Shop Drawings
5. Product Data
6. Samples

- B. Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits
2. Applications for payment
3. Performance and payment bonds
4. Insurance certificates
5. List of Subcontractors

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

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 elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
3. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Deferred Approvals: The Contractor shall be responsible for the timely submittal, coordination, and processing of deferred approval items and for obtaining DSA approval so as to not delay the completion of the project. Delays associated with a failure to comply with this requirement shall not be considered a valid basis for delay claims.

- C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
1. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 2. If an intermediate submittal is necessary, process same as initial submittal.
 3. Allow two weeks for reprocessing each submittal.
 4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing, or for submittals requiring reprocessing.
- D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the 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. Number and title of appropriate Specification Section
 - i. Drawing number and detail references, as appropriate
- E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.
1. On the transmittal Record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
 2. The Contractor shall direct specific attention in writing on resubmitted Shop Drawings, Products Data, Samples or similar submittals to revisions other than those requested by the Architect on previous submittals.

1.4 CRITICAL PATH METHOD (CPM) – CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Within seven (7) calendar days after notice of award of Contract, the Contractor shall submit a Critical Path Method (CPM) Schedule or detailed bar chart conforming to the starting and completion time for the work under this Contract as shown on the overall project CPM schedule.
- B. Contractor's proposed progress schedule, and all updates or revisions thereto, shall:
1. Use a Critical Path Method (CPM), time-scaled network diagram showing continuous flow from left to right, computer generated with a software program equal to Primavera Project Planner.
 2. Demonstrate adequate planning for the work including a practical plan to complete the work within the Contract Time.
 3. Identify all work activities which constitute the critical path.
 4. Identify all other major work activities, including but not limited to, equipment, materials, building elements, items requiring owner or Architect's prior approval, submittals, and review of submittals, system test dates, scheduled over time, dated for owner furnished items, dated for access to specific sites, dates for owner furnished utilities, connection and relocation of existing utilities, and connection to and/or penetration of existing structures.
 5. Indicate planned mobilization of materials, equipment and work force.
 6. Indicated planned sequence of early operations or procurement, including submittals.
 7. A minimum of 14 days shall be allowed for owner/Architect's review of all submittals.
 8. Indicate all dependencies and logic between activities.
 9. Provide a brief description of each work activity, and duration in days, and identify the trades performing the work.
 10. Not provide for completion of the work required under these Contract Documents either sooner than, or later than, the contractual completion date set forth in these Contract Documents.
- C. Owner or owner's representative will review the proposed progress schedule for compliance with these Contract Documents. If Contractor's proposed progress schedule does not comply with the requirements of these Contract Documents, it may be returned to Contractor for revisions necessary to bring the proposed progress schedule into compliance with the Contract Documents. Should Contractor fail or refuse for any reason to properly and timely submit to owner, Architect, Contractor's proposed progress schedule, Contractor agrees it thereby waives any claim it may have then or that may arise in the future for delay, acceleration, impact, inefficiency, or the like, no matter how characterized.

- D. Following acceptance by owner or owner's representative of Contractor's proposed progress schedule, Contractor shall prepare and submit to Owner and Architect, periodic progress schedule updates at least three (3) workdays prior to each request for progress payment. Each periodic progress schedule shall accurately account for the work performed to date. Timely receipt by owner of each required periodic progress schedule to full compliance with all of these Contract Documents shall be a condition precedent to owner's obligation to pay or request payment for Contractor, sums due under this Contract.
- E. Critical work activities are those which if delayed or extended, will delay the scheduled completion of the total of the work required under these Contract Documents. All other work activities are not critical and have float. Float is the time that a work activity that is not critical can be delayed or extended without delaying the completion of the total of the work required under these Contract Documents.
- F. Float shall not belong exclusively to either the Contractor or the Owner. Use of float by either party will only be by mutual agreement. Delays of tasks that are not critical will not be the basis for an extension of the contract time unless and until said delays consume all associated float and cause the tasks to become critical.
- G. Following the Owner or the Owner's representative's acceptance of Contractor's proposed progress schedule, Contractor shall not change the critical path of the accepted progress schedule unless a Change Order agreeing to same has been signed by all of the appropriate parties.
- H. By submission of its proposed progress schedule to owner for review, Contractor represents that it have reviewed the proposed progress schedule with each of its subcontractors, and each subcontractor has agreed that as to that subcontractor's portion of the work, the proposed progress schedule is reasonable, and further that each subcontractor will devote the resources necessary to complete its portion of the work shown on the proposed progress schedule.

1.5 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.
- B. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
- C. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 - 1. Scheduled date for the first submittal
 - 2. Related Section number
 - 3. Submittal category
 - 4. Name of subcontractor
 - 5. Description of the part of the Work covered
 - 6. Scheduled date for resubmittal
 - 7. Scheduled date the Architect's final release or approval

- D. Distribution: Following response to initial submittal, print and distribute copies to the Architect, Owner, IOR, subcontractors, and other parties required to comply with submittal dates indicated. Maintain copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- E. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 SHOP DRAWINGS

- A. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.
- B. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules patterns, templates and similar drawings. Include the following information:
1. Dimensions
 2. Identification of products and materials included
 3. Compliance with specified standards
 4. Notation of coordination requirements
 5. Notation of dimensions established by field measurement
- D. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 30" x 42".
- E. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
- F. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
1. Any submitted Shop Drawing or Sample which does not bear the Contractor's review / approval stamp shall be returned without review.
 2. Submit one (1) PDF copy of all Shop Drawings unless otherwise required by the Contract Documents. If unable to submit PDF (digital) Shop Drawings, Contractor may submit four (4) hard copies of Shop Drawings; PDF (digital)

copies are preferred. Shop Drawings shall not be reproductions of Contract Documents.

3. Each of the Shop Drawings and Samples shall be properly identified bearing the name and quality of the material, the manufacturer's name, the Contractor's name, the name of the Project and the date of submission.
 4. Architect's approval of Shop Drawings or Samples which deviate from the Contract Documents does not authorize changes to the Contract Sum. Submit in writing at the time of submission of Shop drawings and Samples any changes to the Contract Sum affected by such Shop Drawings or Samples, otherwise claim for extras will not be granted.
 5. Submit schedule of Shop Drawing and Sample Submittals within seven (7) days after award of the Contract.
- G. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the District, Contractor, or separate Contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Contractor shall assume that the Architect may take as many as fourteen (14) days to review submittals and shall include such review period in its Project Schedule. Submittals requiring re-submittal and re-review due to incomplete submittal, non-complying specifications, or other reasons which in the opinion of the Architect make the submittal non-responsive, shall not constitute a cause of delay of the project. In this case, the Contractor shall revise the schedule to include an additional review period, without change to the completion date of the project. "Float" time in the schedule may be used for this change only upon approval of the District. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instruction for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents.

1.7 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
- B. Any submitted Product Data submittal which does not bear the Contractor's review / approval stamp shall be returned without review.
- C. **Mark each copy to show applicable choices and options. Please do not use red for any markups; Architect will use red for review.** Submittals where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. If no items are marked and multiple options are submitted, Architect will return Submittal with a "REVISE AND RESUBMIT" designation, asking Contractor to indicate products being submitted. Include the following information:

1. Manufacturer's printed recommendations
 2. Compliance with recognized trade association standards
 3. Compliance with recognized testing agency standards
 4. Application of testing agency labels and seals
 5. Notation of dimensions verified by field measurement
 6. Notation of coordination requirements
- D. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- E. Submittals: Submit one (1) PDF copy of each required submittal. If unable to submit PDF (digital) copies of Product Data submittals, Contractor to submit four (4) hard copies; digital submittals are preferred. Unless noncompliance with Contract document provisions is observed, the submittal may serve as the final submittal.
- F. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
1. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
 2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.8 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
- B. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's Sample. Include the following:
1. Generic description of the Sample
 2. Sample source
 3. Product name or name of manufacturer
 4. Compliance with recognized standards
 5. Availability and delivery time.
- C. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
- D. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
- E. Samples: Except for samples illustrating assembly details, workmanship, fabrication

techniques, connections, operation and similar characteristics, submit two (2) sets; one will be returned marked with the action taken.

1. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
 2. Unless noncompliance with Contract document provisions is observed, the submittal may serve as the final submittal.
 3. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- F. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
 2. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.9 ARCHITECT'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.
- B. Compliance with specified characteristics is the Contractor's responsibility.
- C. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 1. Final Unrestricted Release: Where submittals are marked "NO EXCEPTIONS TAKEN," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 2. Final-But-Restricted Release: When submittals are marked "MAKE CORRECTIONS NOTED," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 3. Returned for Resubmittal: When submittal is marked "REVISE AND RESUBMIT" and/or "REJECTED", Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

- a. Do not permit submittals marked "REVISE AND RESUBMIT" or "REJECTED" to be used at the Project site, or elsewhere where Work is in progress.
4. Informational Submittals: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "INFORMATION RECEIVED NO REVIEW REQUIRED."

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

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SECTION 01 35 13 – SITE STANDARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 REQUIREMENTS OF THE DISTRICT

A. Drug-Free Schools and Safety Requirements:

1. All school sites and other District Facilities have been declared “Drug-Free Zones.” No drugs, alcohol and/or smoking are allowed at any time in any buildings and/or grounds on District property. No students, staff, visitors, or contractors are to use drugs on these sites.
2. Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school owned vehicles and vehicles owned by others while on District property. Contractor shall post: "Non-Smoking Area" in a highly visible location on Site. Contractor may designate a smoking area outside of District property within the public right-of-way, provided that this area remains quiet and unobtrusive to adjacent neighbors. This smoking area is to be kept clean at all times.
3. Contractor shall ensure that no alcohol, firearms, weapons, or controlled substances enter or are used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee(s) found in violation of this provision.

- B. Language: Unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students or public will not be allowed.

C. Disturbing the Peace (Noise and Lighting):

1. Contractor shall observe the noise ordinance of the Site at all times including, without limitation, all applicable local, city, and/or state laws, ordinances, and/or regulations regarding noise and allowable noise levels.
2. The use of radios, etc., shall be controlled to keep all sound at a level that cannot be heard beyond the immediate area of use. District reserves the right to prohibit the use of radios at the Site, except for handheld communication radios. Any offensive or inappropriate music or talk radio is not allowed.
3. If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

D. Traffic:

1. Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school

hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require.

2. All paths of travel for deliveries, including without limitation, material, equipment, and supply deliveries, shall be reviewed and approved by District in advance. Any damage will be repaired to the pre-damaged condition by the Contractor.
 3. District shall designate a construction entry to the Site. If Contractor requests, District determines it is required, and to the extent possible, District shall designate a staging area so as not to interfere with the normal functioning of school facilities. Location of gates and fencing shall be approved in advance with District and at Contractor's expense.
 4. Parking areas shall be reviewed and approved by District in advance. No parking is to occur under the drip line of trees or in areas that could otherwise be damaged.
- E. All of the above shall be observed and complied with by the Contractor and all workers on the Site. Failure to follow these directives could result in individual(s) being suspended or removed from the work force at the discretion of the District. The same rules and regulations shall apply equally to delivery personnel, inspectors, consultants, and other visitors to the Site.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 01 42 00 – REFERENCES AND DEFINITIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes: Reference standards, abbreviations, symbols, and definitions used in Contract Documents.
- B. Full titles are given in this Section for standards cited in other Sections of Specifications.
- C. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard, shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.
- D. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor because manufacturers and trades involved are assumed to be familiar with their requirements.

1.3 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

- A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Proposals, except as may be otherwise specifically stated in the Contract Documents.
- B. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, Contractor shall report it in writing at once to Inspector, with copies to District's Representative and Architect/Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by District.
- C. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, CCD, or Supplemental Instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 2. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).
- D. No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of District, District's Representative or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to District, or any of their consultants, agents, representatives or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.
- E. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- F. Comply with the applicable portions of standards and specifications published by the technical societies, institutions, associations, and governmental agencies referred to in Specifications.
1. Comply with referenced standards and specifications; latest revision in effect at the time of opening of Proposals, unless otherwise identified by date.
 - a. Exception: Comply with issues in effect as listed in governing legal requirements.
- G. Referenced Grades, Classes, and Types: Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Drawings or in Specifications, provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.
- H. Jobsite Copies:
1. Obtain and maintain at the Site copies of reference standards identified on Drawings and in Specifications in order to properly execute the Work.
 2. At a minimum, the following shall be readily available at the Site:
 - a. Safety Codes: State of California, Division of Industrial Safety regulations.

I. Edition Date of References:

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Proposals.
2. All amendments, changes, errata and supplements as of the effective date shall be included. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.4 ABBREVIATIONS

A. Listed hereinafter are the various organizations or references which may appear in the Contract Documents, along with their respective acronyms and/or abbreviations:

- | | | |
|-----|----------|--|
| 1. | AA | Aluminum Association |
| 2. | AABC | Associated Air Balance Council |
| 3. | AAMA | Architectural Aluminum Manufacturers Association |
| 4. | ACI | American Concrete Institute |
| 5. | AED | Association of Equipment Distributors |
| 6. | AGA | American Gas Association |
| 7. | AISC | American Institute of Steel Construction |
| 8. | AISI | American Iron and Steel Institute |
| 9. | AITC | American Institute of Timber Construction |
| 10. | AMCA | Air Moving and Conditioning Association, Inc. |
| 11. | ANSI | American National Standards Institute |
| 12. | APA | American Plywood Association |
| 13. | ARI | Air-Conditioning and Refrigeration Institute |
| 14. | ASHRAE | American Society of Heating, Refrigeration, and Air-Conditioning Engineers |
| 15. | ASME | American Society of Mechanical Engineers |
| 16. | ASTM | American Society for Testing and Materials |
| 17. | AWCI | Association of the Wall and Ceiling Industries |
| 18. | AWPA | American Wood Preservers Association |
| 19. | AWS | American Welding Society |
| 20. | AWWA | American Water Works Association |
| 21. | BAAQMD | Bay Area Air Quality Management District |
| 22. | BIL | Basic Insulation Level |
| 23. | Cal/OSHA | California Occupational Safety and Health Administration |
| 24. | Caltrans | State of California, Department of Transportation |
| 25. | CBC | California Building Code |
| 26. | CCD | Construction Change Directive |
| 27. | CCR | California Code of Regulations |
| 28. | CEC | California Electric Code |
| 29. | CFR | Code of Federal Regulations |
| 30. | CISPI | Cast Iron Soil Pipe Institute |
| 31. | CLMFI | Chain Link Fence Manufacturers Institute |
| 32. | CMC | California Mechanical Code |

33.	CO	Change Order
34.	CPC	California Plumbing Code
35.	CPM	Critical Path Method
36.	CPUC	California Public Utilities Commission
37.	CRA	California Redwood Association
38.	CRSI	Concrete Reinforcing Steel Institute
39.	CS	Commercial Standards, U.S. Department of Commerce
40.	CTI	Ceramic Tile Institute
41.	DBE	Design-Build Entity
42.	DHI	Door and Hardware Institute
43.	DSA	Division of the State Architect
44.	EPA	Environmental Protection Agency
45.	FGMA	Flat Glass Marketing Association
46.	FM	Factory Mutual
47.	FS	Federal Specifications
48.	GA	Gypsum Association
49.	HPMA	Hardwood Plywood Manufacturers Association
50.	HVAC	Heating, Ventilating and Air Conditioning
51.	I.D.	Identification
52.	IACS	International Annealed Copper Standards
53.	IAPMO	International Association of Plumbing and Mechanical Officials
54.	IBC	International Building Code
55.	ICC	International Code Council
56.	ICEA	Insulated Cable Engineers Association
57.	IEEE	Institute of Electrical and Electronic Engineers, Inc.
58.	IES	Illuminating Engineering Society
59.	IOR	Inspector of Record
60.	ISA	Instrumentation Society of America
61.	JATC	Joint Apprenticeship Training Committee
62.	JV	Joint Venture
63.	LBE	Local Business Enterprise
64.	M/WBE	Minority and/or Woman-Owned Business Enterprise
65.	MBE	Minority Business Enterprise
66.	MIA	Masonry Institute of America
67.	MLSFA	Metal Lath/Steel Framing Association
68.	MPI	Master Painters Institute
69.	MS	Military Specifications
70.	MSDS	Material Safety Data Sheet
71.	MSS	Manufacturers Standardization Society of the Valve & Fitting Industry
72.	NAAMM	National Association of Architectural Metal Manufacturers
73.	NACE	National Association of Corrosion Engineers
74.	NBS	National Bureau of Standards
75.	NEC	National Electric Code
76.	NEMA	National Electric Manufacturers Association
77.	NESC	National Electrical Safety Code
78.	NFPA	National Fire Protection Association
79.	NIOSH	National Institute for Occupational Safety and Health
80.	NIST	National Institute of Science and Technology
81.	NSF	National Sanitation Foundation
82.	NTMA	National Terrazzo & Mosaic Association
83.	NWWDA	National Wood Windows and Doors Association

84.	OSHA	Occupational Safety and Health Administration
85.	OSHPD	Office of Statewide Health Planning and Department
86.	PCA	Portland Cement Association
87.	PCI	Prestressed Concrete Institute
88.	PDI	Plumbing and Drainage Institute
89.	PG&E	Pacific Gas and Electric Company
90.	PI	Project Inspector
91.	PM	Preventive Maintenance
92.	PR	Proposal Request
93.	PS	Product Standard, U. S. Department of Commerce
94.	RFI	Request for Information
95.	RFP	Request for Proposals
96.	RFS	Request for Substitution
97.	RIS	Redwood Inspection Service
98.	SDI	Steel Deck Institute
99.	SFM	State of California, Office of State Fire Marshal
100.	SIGMA	Sealed Insulating Glass Manufacturers Association
101.	SJI	Steel Joint Institute
102.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
103.	SPIB	Southern Pine Inspection Bureau
104.	SSPC	Steel Structures Painting Council
105.	SWI	Steel Window Institute
106.	SWPPP	Storm Water Pollution Prevention Plan
107.	TCA	Tile Council of America
108.	UL	Underwriters' Laboratories, Inc.
109.	UMC	Uniform Mechanical Code
110.	UPC	Uniform Plumbing Code
111.	USA	Underground Service Alert
112.	USC	United States Code
113.	WCLIB	West Coast Lumber Inspection Bureau
114.	WHI	Warnock Hersey International
115.	WI	Woodwork Institute
116.	WWPA	Western Wood Products Association

B. Abbreviations in Specifications:

1.	Co.	Company
2.	Corp.	Corporation
3.	cm.	centimeter(s)
4.	cu.	Cubic
5.	Div.	Division
6.	dia.	Diameter
7.	ft.	foot (feet)
8.	g./gr.	gram (grams)
9.	ga.	gauge (gage)
10.	gal.	gallon (gallons)
11.	gpd	gallons per day
12.	gpm	gallons per minute
13.	hr.	hour
14.	kg.	kilogram (kilograms)
15.	in.	inch (inches)
16.	Inc.	Incorporated

17.	km.	kilometer (kilometers)
18.	Kw.	Kilowatt
19.	l.	liter (liters)
20.	lbs.	pounds
21.	m	meter (meters)
22.	Mfg.	manufacturing
23.	Mg.	milligram (milligrams)
24.	ml./mls.	milliliter (milliliters)
25.	mm.	millimeter (millimeters)
26.	No.	number
27.	O.C.	on center
28.	O.D.	outside diameter
29.	psi	pounds per square inch
30.	psf	pounds per square foot
31.	sq.	square
32.	T&G	tongue and groove
33.	yd.	yard (yards)

- C. Abbreviations on Drawings: Additional abbreviations, used only on drawings, are indicated thereon.

1.5 SYMBOLS

- A. Symbols in Specifications:

1.	:	“shall be” or “shall” - where used within sentences or paragraphs
2.	1	Number
3.	#	Pound
4.	&	And
5.	%	Percent
6.	C	Centigrade
7.	F	Fahrenheit
8.	°	Degree
9.	/	per, except where used to combine words; example: power/fuel, and in that case it means and
10.	"	inch (inches)
11.	'	foot (feet)
12.	@	At

- B. Symbols on Drawings: Symbols, used only on Drawings, are indicated thereon.

1.6 DEFINITIONS

- A. Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. In the Contract Documents, the neuter gender includes the feminine and masculine, and the singular number includes the plural. While District has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:

1. Addenda: Written or graphic instruments issued prior to the opening of Proposals, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall be approved by DSA.

2. Agreement (Section 00 52 00): Agreement is the basic contract document that binds the parties to design & construction Work. Agreement defines relationships and obligations between District and Contractor and by reference incorporates Conditions of Contract and contains Addenda and all Modifications subsequent to execution of Contract Documents.
3. Alternate: Work added to or deducted from the Base Proposal, if accepted by District.
4. Application for Payment: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.
5. Approve: Where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
6. Approved Equal: Approved in writing by District as being of equivalent quality, utility and appearance.
7. Architect/Engineer: Unless otherwise obviously intended, "Architect/Engineer" shall mean a person holding a valid California State Architect's or Engineer's license representing District in the preparation of the Construction Documents. A Consultant Architect/Engineer may also be connection with the Project. The Consulting Architect/Engineer (if used) may be an employee of or an independent consultant to District. When a Consultant Architect/Engineer is referred to within the Contract Documents and no Consultant Architect/Engineer has in fact been designated, then the matter shall be referred to District. The term Architect/Engineer shall be construed to include employees of Architect/Engineer and/or employees that Architect/Engineer supervises. When the designated Consultant Architect/Engineer is an employee of District, his or her authorized representatives on the Project will be included under the term Consultant Architect/Engineer.
8. Asbestos: Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by OSHA or Cal/OSHA.
9. Bid: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed. Also referred to in the Contract Documents as the Proposal. The terms Bid and Proposal in the Contract Documents both refer to the Proposal.
10. Bidder: One who submits a Bid. Also referred to in the Contract Documents as a Proposer. The terms Bidder and Proposer in the Contract Documents both refer to the Proposer.
11. Bidding Documents: All documents comprising the Project Manual (including all documents and specification sections listed on Section 00 01 10 – Table

of Contents), including documents supplied for bidding purposes only and Contract Documents.

12. Board: The District's Board of Trustees.
13. Business Day: Any Day other than Saturday, Sunday, and the following days that have been designated as holidays by District. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday. Refer to the District's web site for a list of District observed holidays.
14. By District: Work that will be performed by District or its agents at the District's expense.
15. By Others: Work that is outside scope of Work to be performed under this Contract, which will be performed by District, other contractors, or other means.
16. Change Order: A written instrument prepared by District and signed by District and Contractor, stating their agreement upon all of the following:
 - a. a change in the Work;
 - b. the amount of the adjustment in the Contract Sum, if any; and
 - c. the amount of the adjustment in the Contract Time, if any.
17. Concealed: Work not exposed to view in the finished Work, including within or behind various construction elements.
18. Construction Change Directive: A written order prepared and signed by District, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. All CCD's must be approved by DSA.
19. Construction Documents: Is defined in Section 01 10 00 – Summary of Work.
20. Construction Manager: See Section 00 52 00 – Agreement.
21. Contract Conditions: Consists of two parts: General Conditions and Supplemental Conditions.
 - a. General Conditions are general clauses that are common to the District Contracts, including Section 00 71 00.
 - b. Supplemental conditions modify or supplement General Conditions to meet specific requirements for this Contract.
22. Contract Documents and Contract: Contract Documents and Contract shall consist of the documents identified as the Contract Documents in Section 00 52 00 – Agreement, plus all changes, addenda, and modifications thereto.
23. Contract Modification: Either:
 - a. a written amendment to Contract signed by Contractor and District; or

- b. a Change Order; or
 - c. a Construction Change Directive; or
 - d. a written directive for a minor change in the Work issued by District.
24. Contract Sum: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by District to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.
25. Contract Time: The number or numbers of Days or the dates stated in the Agreement:
- a. to achieve Substantial Completion of the Work or designated Milestones; and/or
 - b. to complete the Work so that it is ready for final payment and is accepted.
26. Day: One calendar day of 24 hours measured from midnight to the next midnight, unless the word “day” is specifically modified to the contrary.
27. Defective: An adjective which, when modifying the word “Work,” refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of samples and “or equal” items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by District). District is the judge of whether Work is defective.
28. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.
29. District-Furnished, Contractor-Installed: Items furnished by District at its cost for installation by Contractor at its cost under Contract Documents.
30. District’s Representative(s): See Section 00 52 00 – Agreement.
31. Drawings: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.
32. Equal: Equal in opinion of District. Burden of proof of equality is responsibility of Contractor.
33. Exposed: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

34. Field Engineer: A DSA representative responsible for the enforcement of applicable codes and regulations, who makes site visit.
35. Final Acceptance or Final Completion: District's acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Acceptance/Final Completion include, but are not limited to:
- a. All systems having been tested and accepted as having met requirements of Contract Documents.
 - b. All required instructions and training sessions having been given by Contractor.
 - c. All Project Record Documents having been submitted by Contractor, reviewed by District and accepted by District.
 - d. All punch list work, as directed by District, having been completed by Contractor.
 - e. Generally all Work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of District.
36. Force Account: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.
37. Furnish: Supply and deliver to the Site, ready for unloading, unpacking, assembly, installation, and similar operations.
38. Holiday: District's recognized holidays are New Year's Day, Martin Luther King's Birthday, Lincoln's Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and the day following Thanksgiving, Last workday before Christmas, Christmas Day, and All workdays between Christmas Day and New Year's Day.
39. Indicated: Refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown", "noted", "scheduled" and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
40. Inspector: The person engaged by District to inspect the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes. The Inspector is subject to approval by the District and, as appropriate, Division of the State Architect, and he will report to District. Refer to section 4-333 and section 4-342, Part 1, Title 24, California Code of Regulations.
41. Install: Used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying,

working to dimension, finishing, curing, protecting, cleaning, and similar operations."

42. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier 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.
 - a. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
43. Latent: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.
44. Law: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions
45. Material: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.
46. Milestone: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.
47. Modification: Same as Contract Modification.
48. Not in Contract (NIC): Work that is outside the scope of Work to be performed by Contractor under Contract Documents.
49. Notice of Completion: Shall have the meaning provided in California Civil Code Section 3093, and any successor statute.
50. Off Site: Outside geographical location of the Project.
51. Partial Utilization: Use by District of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all of the Work.
52. PCBs: Polychlorinated byphenyls.
53. Phase: A specified portion of the Work (if any) specifically identified as a Phase in Section 00 52 00 – Agreement or Section 01 10 00 – Summary of Work.

54. Product Data: That information (including brochures, catalogue cuts, MSDS, etc.) supplied by the vendor describing the technical and commercial characteristics of the supplier equipment or materials, and accompanying commercial terms such as warranties, instructions and manuals.
55. Progress Report: A periodic report submitted by Contractor to District with progress payment invoices accompanying actual work accomplished to the Progress Schedule. See Division 1 sections.
56. Project: Refers to totality of Work, including design and construction, performed under Contract Documents.
57. Project Float: As defined in Section 01 32 16.
58. Project Manual: Project Manual consists of Proposal Requirements, Agreement, Bonds, Certificates, and Contract Conditions.
59. Project Record Documents: All Project deliverables required under Sections 01 78 39, including without limitation, as-built drawings, operations and maintenance manuals Installation, Operation, and Maintenance Manuals, and Machine Inventory Sheets.
60. Provide: Furnish and install, complete and ready for intended use.
61. Regulation: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
62. Request for Information (RFI): A document prepared by Contractor requesting information regarding the Project or Contract Documents as provided in Section 01 26 00 – Modification Procedures. The RFI system is also a means for District to submit Contract Document clarifications or supplements to Contractor.
63. Request for Proposals (RFP): A document issued by District to Contractor whereby District may initiate changes in the Work or Contract Time as provided in Contract Documents. See Document 01 26 00 – Modification Procedures.
64. RFI-Reply: A document consisting of supplementary details, instructions, or information issued by District that clarifies or supplements Contract Documents, and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by District. RFI-Replies will be issued through the RFI administrative system.
65. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
66. Services. As defined in Section 01 10 00 – Summary of Work.

67. Shop Drawings: All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
68. Shown: As indicated on Drawings.
69. Site: The particular geographical location of Work performed pursuant to Contract Documents.
70. Specifications: The written portion of the Contract (Project Manual) consisting of requirements for materials, equipment, construction systems, standards, and workmanship for the Work; performance of related services; and are contained in Divisions 1 through 33.
71. Specified: As written in Specifications.
72. Subcontractor: A person or entity that has a direct contract with Contractor either to perform a portion of the Work at the Site, or to perform some or all of the Services. The term “Subcontractor” is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term “Subcontractor” does not include a separate contractor or subcontractors of a separate contractor.
73. Substantial Completion: The Work, or a specified part thereof, has progressed to the point where, in the opinion of District as evidenced by a Certificate of Substantial Completion, the Work is sufficiently complete, in accordance with Contract Documents, so that the Work, or specified part, can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work, or specified part, is complete and ready for final payment as evidenced by written recommendation of District for final payment. The terms “Substantially Complete” and “Substantially Completed” as applied to all or part of the Work refer to Substantial Completion thereof.
74. Substitution Request: A document prepared by Contractor requesting substitution of materials as permitted and to the extent permitted in Contract Documents. See Section 01 60 00 – Product Requirements.
75. Supplemental Instruction: A written directive from District to Contractor ordering alterations or modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications. See Section 01 26 00 – Modification Procedures.
76. Technical Specifications: Specification Divisions 2 through 33 of the Contract Documents.
77. Title 24: Title 24, California Code of Regulations.
78. Testing and Special Inspection Laboratories: An independent entity engaged by District to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.

79. Trades: 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.
80. Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials:
- a. Electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.
81. Unit Price Work: Shall be the portions of the Work for which a unit price is provided in Section 00 52 00 – Agreement, or Section 01 10 00 – Summary of Work.
82. Verified Report or Final Verified Report: A periodic report submitted to DSA, District, Inspector and Architect. Refer to Sections 4-336, 4-337 and 4-343, Part 1, Title 24, California Code of Regulations.
83. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents. Work may also include the design requirements set forth in the Contract Documents. Wherever the word "work" is used, rather than the word "Work," it shall be understood to have its ordinary and customary meaning.
- B. Wherever words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood that direction, requirements, or permission of District is intended. Words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in judgment of District.
- C. Words "approved," "acceptable," "satisfactory," "favorably reviewed," or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by District.
- D. Wherever the word "may" or "ought" is used, the action to which it refers is discretionary. Wherever the word "shall" or "will" is used, the action to which it refers is mandatory.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 01 45 23 – TESTING AND INSPECTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and General Requirements sections, apply to work of this section.

1.2 SUMMARY

- A. This section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.

1.3 INSPECTIONS, TESTS AND REPORTS

- A. General: Required inspection and testing services are intended to assist in determination of probable compliance of the work with requirements but do not relieve Contractor of responsibility for those compliance, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspection.
- B. Residual District Responsibility: In specification sections of Division 2 through 33, whatever required inspection, testing and similar quality control provisions to be performed by independent agencies (not directly by the Contractor) and not indicated to be Contractor's responsibility shall be the District's responsibility.
- C. The Contractor shall give the District, Inspector, and the Architect timely notice of the work's readiness for all required tests and inspections. Testing and inspection shall be performed as required by the DSA-103 form entitled "Structural Tests and Special Inspections," a copy of which is bound herein at the end of this Section. Required testing is also stipulated in various specification sections.

1.4 INDEPENDENT TESTING LABORATORY

- A. DSA to approve testing lab.
- B. The District will provide, bear all costs and select independent testing laboratory services with advice and acceptance of the Architect and his consultants. Except in the case of failure, in meeting test requirements, the Contractor will bear all costs of the service selected by the District for retesting of noncomplying work or materials.
- C. Samples for tests shall be taken by the Inspector or a representative of the approved testing laboratory and not by the Contractor.

1.5 DSA TEST REPORTING

- A. One copy of all test reports shall be forwarded to the Inspector, Architect, and the Division of the State Architect (DSA) 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 as required shall also be reported. The reports shall show the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with the requirements.

1.6 VERIFICATION OF TEST REPORTS TO DSA

- A. Each testing agency shall submit to the Inspector, Architect, and the Division of the State Architect (DSA) a verified report in duplicate covering all of the tests which were required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.

1.7 DISTRIBUTION OF REPORTS

- A. Test and Inspection Reports: After each inspection and test, one copy of report shall be promptly submitted to Division of State Architect, District, Architect, Structural Engineer, Contractor, Project Inspector and/or any other consultant District designates and any agency having jurisdiction (if required by Code).
 - 1. Testing Lab is responsible for uploading required test reports, and final verified reports to the proper folder on the DSA Box.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 REQUIRED SCHEDULE AND NOTICES

- A. Schedule: Contractor shall establish as part of construction schedule a schedule for testing required. Coordinate testing requirements with all entities involved, including Testing Laboratory, the Architect, the Structural Engineer, the Contractor, and the Project Inspector. Update the testing schedule as needed if the construction schedule is changed.
- B. Advance Notice: Notify the inspecting party, Project Inspector (Testing Laboratory, and District), 48 hours in advance of any inspection called for in these specifications.
- C. Untimely Testing: Additional testing expenses caused by failure of Contractor to adhere to construction schedule or caused by failure of the Contractor to give proper advanced notice or caused by the Contractor requesting testing to be performed outside normal working hours shall be borne by the Contractor.

3.2 INSPECTION SERVICES – BY THE OWNER

- A. The District and its representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in

preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.

- B. The District and its representatives shall have the right to reject materials and workmanship which are defective, or to require their correction. Rejected workmanship shall be removed from the premises without charge to the District.
- C. Should it be considered necessary or advisable by the District at any time before final acceptance of the entire work to make an examination of work already completed by removing or tearing out the same, the Contractor shall, on request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstructing. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor by change order.

3.3 INSPECTION SERVICES – BY THE DIVISION OF THE STATE ARCHITECT INSPECTOR OF RECORD

- A. In accordance with the requirements of the State of California Code of Regulations Part 1, Title 24, the Owner shall select and pay for a Division of the State Architect (DSA) certified Inspector(s) of Record.
- B. Inspection shall be performed in accordance with Section 4-333 (b), Part 1, Title 24. The duty of the Inspector shall be in accordance with Section 4-342, Part 1, Title 24. The inspector shall perform his/her duties under the direction of and report to the District and the Architect. The primary duty of the Inspector is to check the Contractor's work for compliance with the Contract Documents. The Contractor will provide the Inspector access and facilities for access to all the work at all times.
- C. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of this work and the character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill the contract. The presence of an Inspector shall in no way change, mitigate or alleviate the responsibility of the Contractor.
 - 1. Inspections and Tests by Governing Authorities: Contractor shall cause all tests and inspections required by governing authorities having jurisdiction to be made for Work under this Contract.
 - 2. Such authorities may include, but are not limited to, the Division of State Architect, Fire Department, and similar agencies.
 - 3. Except as specifically noted, scheduling, conducting and paying for such inspections shall be solely the Contractor's responsibility.
- D. The Inspector shall have authority to stop the work whenever the provisions of the Contract Documents are not being complied with and the Contractor shall instruct his employees accordingly.

- E. In case any dispute arises between the Contractor and the Inspector, as to materials furnished or the manner of performing the work, the Inspector shall have the authority to reject materials or suspend the work until dispute at issue can be referred or settled. The Inspector is not authorized to change, revoke, alter, enlarge or decrease in any way any requirements of the Contract Documents, drawings, project manual, specifications or change orders.

3.4 INSPECTIONS SERVICES – BY INDEPENDENT TESTING AND INSPECTION AGENCY

- A. District will select an independent testing and inspection agency or agencies approved by the Division of State Architect to conduct tests and inspections in accordance with Part 1, Title 24, Section 4-335, California Code of Regulations and as indicated on Drawings, in Specifications and as required by governing authorities having jurisdiction.
- B. Notify District and Inspector in writing (and, if provided, on inspection request form provided by District) and, if directed by District, testing and inspection agency, when Work is ready for specified tests and inspections. Deliver this written notification at least 48 hours before the requested inspection date.
- C. Tests and special inspections to be paid by District may, where required, include the following; see attached DSA-103 Form.
- D. Test and Inspection Reports: After each inspection and test, one copy of report shall be promptly submitted to Division of State Architect, District, Architect, and/or any other consultant District designates and any agency having jurisdiction (if required by Code).
 - 1. Reports shall clearly identify the following:
 - a. Date issued.
 - b. Project name and number.
 - c. Identification of product and Specification Section in which Work is specified.
 - d. Name of inspector.
 - e. Date and time of sampling or inspection.
 - f. Location in Project where sampling or inspection was conducted.
 - g. Type of inspection or test.
 - h. Date of test.
 - i. Results of tests.
 - j. Comments concerning conformance with Contract Documents and other requirements.
 - 2. Test reports shall indicate specified or required values and shall include statement whether test results indicate satisfactory performance of products.
 - 3. Samples taken but not tested shall be reported.
 - 4. Test reports shall confirm that methods used for sampling and testing conform to specified test procedures.
 - 5. When requested, testing and inspection agency shall provide interpretations of test results.

E. Contractor's Responsibilities in Inspections and Tests:

1. Unless specified otherwise, notify Inspector, District's Representative, or any other consultant District designates and independent testing and inspection agencies 48 hours in advance of expected time of each test and inspection, and for all other operations requiring inspection and testing services, by submitting Contractor's inspection request in writing (or, if District provides a specific form, on that form).
 - a. When tests or inspections cannot be performed after such notice, reimburse District for testing and inspection agency personnel and travel expenses incurred due to Contractor's negligence.
2. Deliver to laboratory or designated location, adequate samples of materials proposed to be used that require advance testing, together with proposed mix designs.
3. Cooperate with Inspector, District's Representative, or any other consultant District designates, and District's consultants. Provide access to Work areas and off-Site fabrication and assembly locations, including during weekends and after normal Work hours.
4. Provide incidental labor and facilities to provide safe access to Work to be tested and inspected, to obtain and handle samples at the Site or at source of products to be tested, and to store and cure test samples.
5. Provide, at least 15 Days in advance of first test or inspection of each type, a schedule of tests or inspections indicating types of tests or inspections and their projected scheduled dates.

3.5 REPORTS TO THE DIVISION OF THE STATE ARCHITECT (DSA)

- A. Contractors shall comply with the report requirements of the Division of the State Architect as described in Section 4-333, 4-336 4-337, and 4-343(c) of Group I, Chapter 4, Part 1, Title 24, C.C.R. These reports, in general, require each contractor having a contract with the District to file verification reports regardless of the type of work involved.
- B. Verified Reports: From time to time as the work progresses, the Contractor shall make a duly verified report to the office upon a prescribed form or forms, showing that of his own personal knowledge the work during the period covered by the report has been performed and materials have been used and installed in every material respect in compliance with the duly approved plans and specifications, and setting forth such detailed statements of fact as shall be required. (For a definition of personal knowledge see Section 17309 and 81141 of the Education Code or the DSA forms listed below that are to be filed.)
- C. Final Verified Reports – Required Filing: Final Verified Reports shall be made as follows and in accordance with Section 4-336 and 4-343, Part 1, Title 24:
 1. DSA 6-PI Project Inspector Verified Report: An original copy by the Project Inspector must be submitted to DSA at the completion of the contract.
 2. DSA-152 Inspection Card: The Project Inspector shall keep current the

project inspection card, which shall track all testing and inspections.

3. DSA-291 Laboratory of Record Verified Report: The Testing Lab of Record must file this report with DSA, if applicable.
4. DSA-292 Special Inspection Verified Report: The Special Inspectors and/or Testing Lab of Record must file this report with DSA, if applicable.
5. DSA-293 Geotechnical Verified Report: The Geotechnical Engineer and/or Testing Lab of Record must file this report with DSA, if applicable.

3.6 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for Cutting and Patching.
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.7 TITLE 24, Part 2, 2022 EDITION, CALIFORNIA BUILDING CODE

- A. Tests and Inspections for the following will be required as per the approved DSA-103 form.

END OF SECTION.

SECTION 01 50 00 – TEMPORARY FACILITIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities required include, but are not limited to:
1. Water service and distribution
 2. Temporary electric power and light
 3. Telephone service
 4. Internet service
 5. Storm and sanitary sewer
- C. Temporary construction and support facilities required include, but are not limited to:
1. Temporary heat
 2. Field offices and storage sheds, including offices for DSA inspector, Construction Manager, and Architect
 3. Temporary roads and paving
 4. Sanitary facilities, including drinking water
 5. Dewatering facilities and drains
 6. Temporary enclosures
 7. Hoists and temporary elevator use
 8. Temporary Project identification signs and bulletin boards
 9. Waste disposal services
 10. Construction aids and miscellaneous services and facilities
 11. Record Drawings and Shop Drawings
- D. Security and protection facilities required include, but are not limited to:
1. Temporary fire protection
 2. Barricades, warning signs, lights
 3. Sidewalk bridge or enclosure fence for the site
 4. Environmental protection
 5. Security provisions, including watchmen if necessary
 6. Safety Fences & Barricades

1.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the date

established for commencement of the Work.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
1. Building Code requirements
 2. Health and safety regulations
 3. Utility company regulations
 4. Police, Fire Department and Rescue Squad rules
 5. Environmental protection regulations
- B. Standards: Comply with NFPA Code 241 – Building Construction and Demolition Operations, ANSI-A10 Series standards for Safety Requirements for Construction and Demolition, and NECA Electrical Design Library Temporary Electrical Facilities.
1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services," prepared jointly by AGC and ABC, for industry recommendations.
- C. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with California Electric Code.
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. 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.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood:
1. For job-built shops and sheds within the construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
 2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness

indicated.

- C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- D. Water: Provide potable water approved by local health authorities.
- E. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 6-feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

2.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- D. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- E. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.
- F. Temporary Offices: Provide mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- G. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
- H. First Aid Supplies: Comply with governing regulations.
- I. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
- B. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
- C. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
- D. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect, and will not be accepted as a basis of claims for a Change Order.
- E. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
- F. Sterilization: Sterilize temporary water piping prior to use.
- G. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
 - 1. Except where overhead service must be used, install electric power service underground.
- H. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage.
- I. Temporary Lighting: Provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.
- J. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of

occupants.

1. At each telephone, post a list of important telephone numbers.
 2. Provide a separate line for DSA Inspector's use.
- K. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.
1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- L. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access.
- B. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion.
- C. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.
- D. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
- E. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.
 1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.
- F. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and

orderly for use for small progress meetings. Furnish and equip offices as follows:

1. Furnish with a desk and chairs, a 4-drawer file cabinet, plan table and plan rack and a 6-shelf bookcase.
 2. Provide minimum 10' x 12' office space, equipped as above, for DSA Inspector's use.
 3. Provide conference space equipped with table and chairs.
- G. Record Drawings: Provide and maintain a complete set of drawings, specifications, and addenda at the job site. See General Conditions and Section 01 77 00 for requirements.
- H. Shop Drawings: Provide and maintain a complete set of Approved Shop Drawings at the job site. See General Conditions and Section 01 33 00 for requirements.
- I. Schedule: Provide and maintain a current Project Schedule, and an original project schedule at the job site. See General Conditions and Section 01 33 00 for requirements.
- J. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site.
- K. Temporary Paving: Construct and maintain temporary roads and paving to adequately support the indicated loading and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.
1. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
 2. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas that are without damage or deterioration when occupied by the Owner.
 3. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 4. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration and supervision.
- L. Sanitary facilities include temporary toilets, and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

- M. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
- N. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Section, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.
- O. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
1. Where heat is needed, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
 3. Close openings through flood or roof decks and horizontal surfaces with load-bearing wood-framed construction.
 4. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
- P. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- Q. Project Identification and Temporary Signs: Prepare project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.
1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- R. Temporary Exterior Lighting: Install exterior yard and sign lights to that signs are visible when Work is being performed.
- S. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner. See Section 01 50 13 for details.

- T. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Architect.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 – Standard for Portable Fire Extinguishers, NFPA 241 – Standard for Safeguarding Construction, Alterations and Demolition Operations, and Chapter 33 of 2022 CBC.
1. Locate fire extinguishers where convenient and effective for their intended purpose.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- E. Enclosure Fence: When excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except by the entrance gates.
1. Provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.
- F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with

the installation and release of material to minimize the opportunity for theft and vandalism.

- G. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.
1. Specific attention is called to the Contractor's responsibility to prepare a Stormwater Run-off Protection Plan, obtain the necessary permits, and implement the provisions of the plan.

3.5 OPERATION TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when 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 the 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 the Contractor. The Owner reserves the right to take possession of Project identification signs.
 2. Remove temporary paving that is not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances which might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.
- D. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
1. Replace air filters and clean inside of ductwork and housings.

2. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
3. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION.

SECTION 01 50 13 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for the following:
 - 1. Salvaging non-hazardous construction waste.
 - 2. Recycling non-hazardous construction waste.
 - 3. Disposing of non-hazardous construction waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- G. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- H. Sanitary Wastes:
 - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.
 - 2. Sewage: Domestic sanitary sewage.

1.4 INFORMATIONAL SUBMITTALS

- A. Waste Management Plan: Submit waste management plan within 5 days of date established for commencement of the Work.

- B. If applicable, submit permit or license and location of recycling or waste disposal sites.

1.5 RECORD KEEPING

- A. Contractor is to keep records as listed below, and is to produce these for the Owner if requested:
 - 1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
 - 2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
 - 3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
 - 4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
 - 5. Statement of Refrigerant Recovery (If Applicable): 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.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 6. Handling and Transportation Procedures: Include 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.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Equipment Salvage: Any existing equipment that can be salvage for resale, reuse, or salvaged for parts shall be removed in a manner preserving the equipment integrity. Removed equipment shall be palletized, all the operational parts included, wrap in plastic shrink-wrap, and return as directed by the District. The District may also

require any equipment be sent to a designated reseller. The following equipment maybe salvaged including but not limited to the following:

1. Light fixtures (without fluorescent Light bulbs)
 2. Electrical equipment (deemed PCB free)
 3. Electronic Equipment / IDF cabinets or racks
 4. Ventilation hoods
 5. Refrigerators or Freezers (including Walk-ins)
 6. Mechanical Units
 7. Mechanical Compressors
 8. Plumbing fixtures
 9. Toilet room accessories
 10. Windows, Doors and Frames
 11. Casework
 12. White Boards and framed Pin Boards
 13. Pencil sharpeners / Projections Screens
 14. Masonry or bricks
 15. Others as appropriate.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas of Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Section 01 50 00 – Temporary Facilities, for controlling dust and dirt, environmental protection, and noise control.

3.2 RECYCLING CONSTRUCTION WASTE

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to the Contractor.

- C. Procedures: 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.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.
 5. Remove recyclable waste off District property and transport to recycling receiver or processor.
- D. Packaging:
1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag material.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project Site. For pallets that remain on Site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- E. Site-Clearing Wastes: Chip brush, branches, and trees on site.
- F. Wood Materials:
1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off District property and legally dispose of them.

END OF SECTION.

SECTION 01 56 39 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

- A. Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.4 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.
- B. Organic Mulch: Wood and bark chips, free from deleterious materials.

- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.
 - 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart. High-visibility orange color, nonfading.
 - 2. Height of Fencing: 4 feet.

PART 3 – EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.2 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area except by entrance gates.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by The District.
- C. Maintain protection-zone fencing and signage in good condition as acceptable to The District and remove when construction operations are complete, and equipment has been removed from the site.

3.3 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 31 20 00 – Earthwork.
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

- C. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Temporarily support and protect roots from damage until they are permanently covered with soil.
 - 3. Cover exposed roots with burlap and water regularly.
 - 4. Backfill as soon as possible according to requirements in Section 31 20 00 – Earthwork.
- B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
 - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
 - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
 - a. Cut branches with sharp pruning instruments; do not break or chop.
 - b. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

3.6 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.7 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.8 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by The District.
 1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 3. Perform repairs within 24 hours.
 4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by The District.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION.

SECTION 01 62 00 – PRODUCT SUBSTITUTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 01 42 00 – References and Definitions.

1.4 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions." The following are not considered substitutions:
 - 1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.5 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.
 - 1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and in accordance with procedures required for Change Order proposals.

2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Product Data, including Drawings and descriptions, of products, fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
 - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
- B. Architect's Action: Within one week of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, whichever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

- A. All Substitutions affecting DSA regulated items shall be considered as a CCD or Addenda and shall be approved by DSA prior to installation and/or fabrication, per CCR 4-338(c) and IR 4-6. Any cost changes associated with this work during construction shall be at the contractor's expense.

- B. If a proposed substitution requires investigation, testing, or agency approval (including DSA) to determine its suitability for incorporation into the work, the testing of the proposed substitution shall be as determined by the Architect. The Contractor shall bear all cost of such investigations, testing, or approval by appropriate agencies.
- C. Conditions: The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect; otherwise, requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
- D. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

- E. By making requests for substitutions based on the sub-paragraph above, the Contractor:
1. Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.
 2. Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.
 3. Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs and waives all claims for additional costs related to the substitution which subsequently becomes apparent.
 4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects.

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

SECTION 01 66 00 – PRODUCT STORAGE AND HANDLING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 01 42 00 – References and Definitions.

1.4 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.
- B. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturers published product literature that is current as of the date of the Contract Documents.
- C. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- D. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
 - 1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect for a determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources that

produce products that possess these qualities, to the fullest extent possible.

- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
- D. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- E. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - 1. Name of product and manufacturer
 - 2. Model and serial number
 - 3. Capacity
 - 4. Speed
 - 5. Ratings

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
- B. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- C. 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.
- D. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
- E. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.
- F. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
- G. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- H. Store products subject to damage by the elements above ground, under cover in a

weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 – PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
 - 1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- B. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- C. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
- D. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
- E. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
- F. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
- G. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- H. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
 - 1. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
- I. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.

- J. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
1. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
- K. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.

PART 3 – EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
- B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

3.2 ATTIC STOCK

- A. As required by certain specification sections, contractor to provide various amounts of attic stock / extra materials, for specific finishes. Contractor to coordinate delivery and storage locations of these products with the District.

END OF SECTION.

SECTION 01 71 23 – FIELD ENGINEERING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Bid Packages and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:
 - 1. Layout of the Project
 - 2. Land Survey Work
 - 3. Shoring and Bracing Engineering
 - 4. Construction Equipment
 - 5. Support from Structure
 - 6. Stormwater Runoff Protection Plan
 - 7. Other Field Engineering
- B. Except for engineering work to be provided by the owner relative to existing conditions, all grade lines, levels and bench marks shall be established and maintained by the Contractor.

1.3 SUBMITTALS

- A. Certificates: Submit a certificate signed by the Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract Documents.
- B. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout."

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 EXAMINATION

- A. The Owner will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during

construction.

- C. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
- D. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- E. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
- F. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- G. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction. Contact utility companies, including USA, for on-site location services.
- H. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water service piping and gas. Verify locations of underground electrical line. It is the responsibility of the Contractor to use all means possible to locate underground utilities.

3.2 PERFORMANCE

- A. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
- B. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
- C. As construction proceeds, check every major element for line, level and plumb.
- D. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.
 - 1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 - 2. On completion of major site improvements, and other Work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles and elevations of construction and sitework.
- E. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by

instrumentation and similar appropriate means.

- F. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.
- G. Shoring and Bracing: Design of Shoring and Bracing for support of formwork, scaffolding, or other temporary construction supports, shall be the responsibility of the Contractor. If requested, supply engineering calculations and data regarding proposed shoring and bracing.
- H. Construction Equipment: Engineering for cranes, temporary hoists, or other hoisting equipment requiring structural loading during construction shall be the responsibility of the Contractor. If requested, supply engineering calculations and data regarding proposed construction equipment. The structural system of the building is not intended to support hoisting systems unless specifically noted, and all such equipment shall be designed to be structurally independent of the building.
- I. Storm Water Pollution Protection Plan (SWPPP):
 - 1. It shall be the responsibility of the Contractor to obtain all permits required by the EPA or their designated authority regarding control of Storm Water at construction sites. It shall also be the responsibility of the Contractor to bring the construction activities for this project into compliance with the requirements of the State Water Resources Control Board Construction Activity Storm Water General Permit, to discharge storm water associated with construction activities, to be in full compliance with City Standards, and the National Pollutant Discharge Elimination (NPDES) Permit.
 - 2. The Contractor shall engage a California Registered Professional Civil Engineer as necessary to prepare an Erosion Control and SWPPP, and shall fully implement the recommendations of the Plan on the Project Site, including a Post-Construction Storm Water Management Plan.
 - 3. The Contractor shall file a Notice of Intent to comply with the terms of the General Permit to discharge storm water associated with construction activity (Order No. 2009-0009-DWQ). Application of a Permit and the Notice of Intent must be obtained and processed, along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow normal warrant processing time) to the California State Water Resources Control Board. Visit www.waterboards.ca.gov for detailed information. The Notice of Intent shall be filed prior to the start of any construction activity.
- J. Other Field Engineering: Other field engineering affecting means and methods of construction, or engineering of specific building components as required by Specification, or demolition shall be the responsibility of the Contractor.

END OF SECTION.

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SECTION 01 73 00 – EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. General requirements for installing, applying and placing products.
- B. General requirements for protection of existing buildings, products, appurtenances indicated to remain, and requirements on how Contractor shall restore any and all damaged substrates and finishes to match original and/or adjacent or surrounding new construction.
- C. General requirements for correction of defective work.

1.3 RELATED SECTIONS

- A. Section 01 31 19 – Project Meetings: Pre-installation and coordination conferences where procedures for installing, applying and placing products are reviewed prior to performance of the Work.
- B. Individual Division Product Specification Sections: Specific requirements for installing, applying and placing products.

1.4 EXECUTION

- A. Manufacturer's Requirements: Contractor shall determine product manufacturer's requirements and recommendations prior to commencing Work.
- B. Execution: Contractor shall perform installation, application and placement actions according to manufacturer's instructions and recommendations and according to specified procedures.
 - 1. Contractor shall perform surface preparation as necessary to create suitable substrates for application, installation and placement of products.
 - 2. Contractor shall notify Owner, Owner's Representative, and Architect in writing of unsuitable conditions preventing proper performance of the Work.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 INSTALLATION, APPLICATION AND PLACEMENT OF PRODUCTS

- A. Manufacturer's Instructions: Contractor shall comply with manufacturer's written instructions and recommendations for installing, applying, placing and finishing products.

- B. Installation, Application and Placement, General: Contractor shall locate the Work and components of the Work accurately, in correct alignment, orientation and elevation, as indicated.
1. Contractor shall make vertical work plumb and make horizontal work level.
 2. Where space is limited, Contractor shall install components to maximize space available for maintenance and ease of removal for replacement.
 3. Contractor shall conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Contractor shall install products at the time and under conditions that will ensure the best possible results. Contractor shall maintain conditions required for product performance until acceptance of the Work.
 5. Contractor shall 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.
 6. Anchors and Fasteners: Contractor shall provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 7. Mounting Heights: Where mounting heights are not indicated, Contractor shall mount components at heights directed by Architect.
 8. Contractor shall allow for building movement, including thermal expansion and contraction.
- C. Joints: Contractor shall make joints of uniform width. Where joint locations in exposed work are not indicated, Contractor shall arrange joints for the best visual effect. Contractor shall fit exposed connections together to form hairline joints.
- D. Hazardous Materials: Contractor shall use products, cleaners, and installation materials that are not considered hazardous.
- E. Cleaning: Contractor shall comply with requirements specified in Section 01 77 00 – Project Closeout. See individual product Specifications Sections for specific cleaning procedures to be performed.
- F. Protection: Contractor shall provide barriers, covers and other protective devices as recommended by manufacturer and complying with general requirements specified in Section 01 50 00 – Temporary Facilities.
1. Contractor shall comply with manufacturer's written instructions for temperature and relative humidity.
 2. See individual product specifications sections for specific protective measures to be provided.
- G. Limiting Exposures: Contractor shall supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful,

dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.2 OWNER-INSTALLED PRODUCTS

- A. Site Access: Contractor shall provide access to project site for all construction and all subcontractors.
- B. Coordination: Contractor shall coordinate construction and operations of the work with work performed by Owner by separate contract, if applicable.
 - 1. Construction Schedule: Refer to Section 01 33 00 – Submittals. Critical Path Method (CPM) information is included in this section.
 - 2. Pre-installation and Coordination Conferences: Refer to Sections 01 31 13 – Project Coordination, and Section 01 31 19 – Project Meetings.

3.3 CORRECTION OF THE WORK

- A. General: Contractor shall repair or remove and replace defective construction. Contractor shall restore damaged substrates and finishes to match original and new surrounding construction.
 - 1. Contractor shall comply with requirements in Section 01 73 29 – Cutting and Patching Procedures.
 - 2. Repairing shall include replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 - 3. Contractor shall remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
 - 4. Contractor shall repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
 - 5. Contractor shall remove and replace chipped, scratched, and broken glass.
- B. Restoration of Existing Conditions: Contractor shall restore permanent facilities used during construction to their original condition or to match new construction.

END OF SECTION.

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SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract including but not limited to these major items:
 - 1. Cutting, fitting and patching of work under this Contract as required to make components fit together.
 - 2. Uncover portions of the work to provide for installation of ill-timed work
 - 3. Remove and replace non-conforming work to the requirements of the Contract Documents.
 - 4. Remove and replace defective work.
 - 5. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduits and raceways.
 - 6. Requirements of this Section apply to, but are not limited to mechanical and electrical installations. Refer to plans for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.
 - 7. Obtain and pay for all permits required for all portions of demolition and repair work, including hauling, routing and dumping of waste materials.

1.3 RELATED WORK IN OTHER SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 02 41 19 – Selective Demolition.

1.4 QUALITY ASSURANCE

- A. Perform all cutting and patching in strict accordance with pertinent requirements of these specifications and, in the event no such requirements are determined, in conformance with the District's or Architect's written direction.
- B. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load carrying or load deflection ratio. Consult with the Architect to obtain approval prior to cutting/patching structural items, including beams, posts and footings.
- C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related component in a manner that would result in reducing their capacity to

perform as intended or result in increased maintenance or decreased optional life or safety.

- D. Visual Requirements: Do not cut and patch construction exposed in a manner that would, in the District's opinion, reduce aesthetic qualities or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.

1.5 SUBMITTALS

- A. Provisions: Comply with Section 01 33 00 Submittals.
- B. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
1. Describe the extent of cutting and patching required and how it is to be performed.
 2. Describe anticipated result in terms of changes to existing construction; include changes to structural elements and operating components as well as change in the building's appearance and other significant visual elements.
 3. List products to be used and firms of entities that will perform work.
 4. Indicate dates when cutting and patching is to be performed.
 5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 6. Where cutting and patching involves addition of reinforcement to structural elements, submit details to show how reinforcement is integrated with the original structure.
 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.
 8. Effects on District and School's operation and on concurrent construction operations by other contractors.
- C. Obtain approval, from the Architect, of the cutting and patching proposal before cutting and patching structural elements or which affect the structural integrity of any element of new or existing construction, including:
- a. Bearing walls
 - b. Retaining walls
 - c. Structural concrete
 - d. Structural steel and miscellaneous structural metals
 - e. Equipment supports
 - f. Piping, ductwork, vessels and equipment

- D. Obtain approval, from the Architect, of the cutting and patching proposal before cutting and patching any of the following operational or safety related systems:
1. Primary operational systems and equipment
 2. Air or smoke barriers
 3. Primary water, moisture or vapor barriers
 4. Membranes and flashings
 5. Fire protection systems
 6. Noise and vibration control elements and systems
 7. Control systems
 8. Electrical systems including wiring
 9. Efficiency, maintenance, or safety of operational elements
- E. Visual Requirements: Do not cut and patch construction exposed on the exterior or occupied interior spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manor.
- F. Obtain approval, from the Architect, of the cutting and patching proposal before cutting and patching that could affect work by the District or separate Contractors.
- G. Items to be included in the approval request:
1. Identification of Project.
 2. Location and description of affected work.
 3. Explanation of necessity for cutting and patching required.
 4. Description of proposed work and products to be used.
 5. Alternatives to cutting and patching.
 6. Effect on existing construction.
 7. Date and time, work will be executed.
 8. List utilities that will be disturbed or affected including those that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
- H. Should conditions of the work or schedule indicate a required change of materials or method for cutting and patching, so notify the Architect, and secure his written permission before proceeding.
- I. Submit written notification to the District designating time the work will be uncovered/exposed to provide for testing lab observation and inspection.

1.6 PAYMENT FOR COSTS

- A. Perform all cutting and patching needed to comply with the Contract Documents at no additional cost to the District.
- B. The District will reimburse the Contractor for cutting and patching performed pursuant to the Architect's written request and only after:
1. A Change Order Request is submitted by the Contractor.
 2. The District determined the cutting and patching was a necessary part of the project.

3. The cutting and patching was not for the convenience of the contractor or any subcontractors, material suppliers, etc.
4. The Architect requested the cutting and patching.
5. No reasonable alternative to cutting and patching was available.

1.7 WARRANTY

- A. Replace, patch and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Primary Products: For replacement of work removed to match original installation, use materials that comply with the quality of materials originally installed, to match existing conditions and to complete the scope of work of the Contract.
- B. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual defect only after consulting with the Architect. Use materials whose installed performance will equal or surpass that of the existing materials.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Before proceeding, meet at the site with parties involved in cutting and patching, including asbestos abatement, mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts.
- B. Inspect existing conditions including elements subject to movement or damage during cutting, excavating, backfill, or patching and repair.
- C. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- D. After uncovering the work, inspect conditions affecting installation of new work.
- E. If uncovered conditions are not as anticipated, immediately notify the Architect and District to secure directions and approval.
- F. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found by the contract to be acceptable.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut where required.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
 - 1. Provide all required protection including, but not necessarily limited to shoring, sheeting, under pinning and bracing to ensure structural integrity of the Work.
 - 2. Provide protection from elements for areas that may be exposed by uncovered work.
 - 3. Protection shall include but is not limited to barricades, dust partitions, safety equipment, warning signs, guard rails or other installations required to protect the public, the workers and existing construction to remain.
 - 4. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. Employ skilled workers to perform cutting and patching. If possible, retain original installer or fabricator throughout construction phases. If it is not possible to engage original installer or fabricator, engage another recognized experienced or specialized firm.
- B. Perform all required work as shown or as directed, in conformance with industry and trade standards, requirements and current procedures. Perform cutting and demolition by methods that will prevent damages to other portions of the work and will provide proper surfaces and conditions to receive installation of repair and new work. Perform installation, fitting and adjustment of new products or materials to provide finished installation complying with specified tolerances and finishes, as specified or as required to be in line with existing surfaces.
- C. Cutting:
 - 1. Execute cutting and patching of weather exposed, moisture resistant elements and sight exposed surfaces by methods to preserve weather and moisture proofing and visual integrity.
 - 2. Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed

procedures with the original installer, comply with original installer's recommendations.

3. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut rigid materials using diamond grit abrasive/carborundum saws/drills for smooth edges. Core drill holes through concrete and masonry. Pneumatic tools will not be allowed without prior approval, Cut holes neatly to size required with minimum disturbance to adjacent surfaces.
4. To avoid marring existing finished surfaces cut or drill from the exposed or finished side into concealed surfaces. Protect adjacent surfaces using plywood, visqueen, drop cloths, etc.
5. Fit work neat and tight allowing for expansion and contraction.
6. Bypass utility services such as pipe or conduit, before cutting where services are shown or required to be removed, relocated or abandoned. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.

D. Patching:

1. Restore/refinish surfaces to match adjacent finishes and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing. For continuous surfaces, refinish to the nearest intersection or material break. For an assembly, refinish entire unit.
2. Where plaster patch is required, comply with manufacturer's instructions and install thickness and coats as indicated.
3. Where patching occurs on a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.
4. Replace concrete walkways to nearest construction joint.
5. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
6. All work to be performed is subject to Architect and District approval

3.4 CLEANING AND PREPARATION FOR FINISHES

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access in accordance with the requirements of the Contract, General Conditions, and Division 1.
- B. Remove completed paint, mortar, oils and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION.

SECTION 01 77 00 – PROJECT CLOSEOUT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Record documents.
 - 3. Record drawings (as-builts)
 - 4. Operating and maintenance manual submittal.
 - 5. Maintenance trainings for District (must be video recorded).
 - 6. Submittal of warranties.
 - 7. Uploading of required reports to DSA Box.
 - 8. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 33.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - 2. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 3. Advise Owner of pending insurance change-over requirements.
 - 4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 5. Obtain and submit releases enabling the Owner unrestricted use of the Work

and access to services and utilities; include occupancy permits, operating certificates and similar releases.

6. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.
 7. Deliver tools, spare parts, extra stock, and similar items.
 8. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
 9. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
 10. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and the list has been endorsed and dated by the Architect.
 4. Submit final meter readings for utilities, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.
- B. Record Drawings: Maintain a clean, and undamaged set of black line white-prints of Contract Drawings and Shop Drawings (hard copy or PDF). Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil (for hard copy) and red markups (for PDF copy); use other colors to distinguish between variations in separate categories of the Work.
 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
 3. Note related Addenda Item numbers, Change Order Item numbers, CCD numbers, PR numbers, and ASI numbers where applicable.
 4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
 5. Upon completion of the work, submit one hard copy of record drawings (as-built drawings) **as well as a color scan set of the record drawings** (as-built drawings) to the Architect for review at the completion of the project. The Architect shall check over the record set of drawings, but responsibility for accuracy of the record set of drawings rests with the Contractor.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders

and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the work, submit one hard copy of record specifications **as well as a color scan set of the specifications** to the Architect for review at the completion of the project. The Architect shall check over the record set of specifications, but responsibility for accuracy of the record set of specifications rests with the Contractor.
- D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.
1. Upon completion of the work, submit one hard copy of record product data **as well as a color scan set of the record product data** to the Architect for review at the completion of the project. The Architect shall check over the record set of product data, but responsibility for accuracy of the record set of product data rests with the Contractor.
- E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.
- F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.
- G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Provide a bound, properly indexed manual in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information, AND provide a color scanned version of this binder, in PDF format. Mark appropriate identification on front and spine of each binder. Include the following types of information:
1. Emergency instructions
 2. Spare parts list
 3. Copies of warranties
 4. Wiring diagrams
 5. Recommended "turn around" cycles
 6. Inspection procedures

7. Shop Drawings and Product Data
8. Fixture lamping schedule

1.6 MAINTENANCE TRAINING

- A. **Contractor is responsible for video recording all maintenance trainings and shall provide a copy to the District.** Refer to Item 3.1 below for additional information.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. As noted in Item 1.6 above, **Contractor is responsible for video recording all maintenance trainings, and shall provide a copy to the District.** If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals
2. Record documents
3. Spare parts and materials
4. Tools
5. Lubricants
6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning
11. Warranties and bonds
12. Maintenance agreements and similar continuing commitments

- B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up
2. Shutdown
3. Emergency operations
4. Noise and vibration adjustments
5. Safety procedures
6. Economy and efficiency adjustments
7. Effective energy utilization
8. Submit 4 bound Copies of information

3.2 DSA BOX

- A. Box.com is a secure cloud based, collaborative, online file sharing website. DSA initiated using its services to allow greater transparency and communication between DSA field engineers and designated stakeholders.
- B. DSAbbox allows the DSA to create folder structure for every project, set different folder permissions for project participants, manage versioning control, sort data for internal

enterprise reporting for all documents submitted and much more.

- C. DSAbox allows design professionals, contractors, owners of projects, laboratories and project inspectors, all covered by the Field Act to have 24/7 mobile and desktop access to their submitted project files so they can fulfill their obligation of reporting to DSA.
- D. At the beginning of each project, the contractor is required to provide contact names and email addresses for whoever in their office will be responsible for, and allowed to, upload and view project files. This information is included in the DSA-102 IC form. Once processed, DSA will email an 'invitation' to the DSAbox.com. The responsible persons must 'accept' the invitation, and set up a free box.com account.
- E. When the project is complete, and notified by the Architect and/or Project Inspector, the Contractor(s) shall comply with the report requirements of the Division of the State Architect as described in Section 4-336 4-337, and 4-343(c) of Group I, Chapter 4, Part 1, Title 24, C.C.R., which require each contractor having a contract with the District to file a Final Verified Report regardless of the type of work involved, as listed below:
 - 1. DSA 6-C Contractor Final Verified Report: An electronic copy by each contractor must be uploaded to the "Contractor / 006-C Verified Reports" folder on DSA Box at the completion of the contract. The name of the electronic copy of the DSA-6C form must comply with DSA's file naming requirements, specifically as follows:

DSA App #_006C_Date(yy-mm-dd)_Contractor's License #.

A sample of this is: 02-100000_006C_16-10-10_111111

3.3 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities."
- B. District's Right to Clean Up: If a dispute arises between the separate contractors as to their responsibility for cleaning up as required herein, the District may clean up and charge the cost thereof to the several contractors as the Architect shall determine to be just.
- C. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean exposed hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean.
 - c. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary

condition. Clean light fixtures and lamps.

- d. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
- F. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.
- G. The Contractor shall clean all glass and all other finish surfaces, replace all broken and scratched glass; remove stains, spots, marks and dirt from decorated work; clean all hardware; remove paint spots and smears from all surfaces, clean all fixtures and wash all floors; leaving work in a clean and spotless condition.
- H. Comply with cleaning instructions contained in the specifications. In the absence of specific cleaning instruction, follow accepted cleaning practices or the recommendation of the manufacturer of the material to be cleaned.

END OF SECTION.

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SECTION 01 78 36 – WARRANTIES AND BONDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties and products and special warranties.

1.3 RELATED SECTIONS

- A. Section 00 72 00 – General Conditions, for terms of the Contractor's special warranty of workmanship and materials.
- B. Section 01 77 00 – Project Closeout, for general closeout requirements.
- C. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual sections of this Project Manual.
- D. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

1.4 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- B. Related Damages and Losses: 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.
- C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

- E. Owner's Recourse: 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 other duties, obligations, rights, or remedies.
- F. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
 - 1. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, 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.

1.5 SUBMITTALS

- A. Submit written warranties to the Architect prior to the date certified for Completion. If the Architect's Certificate of Completion designates a commencement date for warranties other than the date of Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
- B. 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 Architect within fifteen (15) days of completion of that designated portion of the Work.
- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
- D. Forms for special warranties are included in appropriate Sections. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or the Contractor and subcontractor, supplier or manufacturer. Submit a draft to the Owner through the Architect for approval prior to final execution.
- E. Refer to individual Sections of Divisions 2 through 33 for specific content requirements, and particular requirements for submittal of special warranties.
- F. Form of Submittal: At Final Completion compile two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Provide both a hard copy and a digital (PDF) copy.
 - 2. Hard Copy:
 - a. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" x 11" paper.

- b. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the installer.
 - c. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the Project title or name, and the name of the Contractor.
3. Digital (PDF) Copy:
 - a. Use same orderly sequence as used for hard copy.
 - b. Instead of physical tabs as specified above, bookmark PDF at same sections for consistency and ease of locating.
4. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION – NOT APPLICABLE

END OF SECTION.

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SECTION 01 78 38 – GUARANTEE

We hereby guarantee that the workmanship and materials that we installed in the **EL CAPITAN HIGH SCHOOL – STADIUM UPGRADES** project, have been in accordance with the plans and/or contract documents and that the work as installed will fulfill the requirements of the guarantee included in the Project Manual. We agree to repair or replace any or all work, together with any other adjacent work that we may displace in so doing, that may prove to be defective in its workmanship or material within a period of not less than **One (1) year** from date of acceptance of the above-named structure(s) by the Board of Trustees of the Merced Union High School District without any expense whatsoever to said Board of Trustees, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within ten (10) days after being notified in writing by the District we collectively or separately do hereby authorize the District to proceed to have said defects repaired and made good at our expense and we will honor and pay the cost and charges there for upon demand.

WORK COMPLETED

List work and associated specifications, as applicable

Authorized Signature

Title

Contractor

License Number

Address

City, State and Zip Code

Telephone Number

Date

END OF SECTION.

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DIVISION 2 – EXISTING CONDITIONS

02 41 19 – Selective Demolition

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SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary conditions and other Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Definition: "Demolition" includes cutting into or removing existing construction and conditions to provide for the installation of other work.
- B. Section includes Selective Demolition as follows:
 - 1. Removal of above-grade improvements
 - 2. Removal of below-grade improvements
 - 3. Removal of existing building components, including architectural, structural, plumbing, fire protection, mechanical and electrical materials and equipment, as indicated on drawings and as required to accommodate new construction.
 - 4. Sawcut and remove concrete where necessary to prepare for subsequent work as indicated on the Drawings.
 - 5. Disconnect, remove, cap and identify utilities for later reconnection.
 - 6. Removal of materials from site, and dispose of legally.
 - 7. Temporary partitions to allow adjacent building occupancy.
 - 8. Salvage of designated elements for repair/reinstallation as indicated on Drawings.
 - 9. Protection of existing trees and adjacent buildings / improvements indicated to remain.
 - 10. Recycling of building components.

1.3 RELATED SECTIONS

- A. Section 01 50 00 – Temporary Facilities and Controls (such as fencing, barricades, warning lights, and other temporary safety measures).
- B. Coordinate with Sections of Division 26 for electrical items to be demolished.

1.4 EXISTING CONDITIONS

- A. Bidders are required to examine the site and examining existing building drawings before providing a Bid (see Instructions to Bidders). Owner makes no representations of conditions other than can be reasonably inferred from examination

of the above, and assumes no responsibility for actual conditions of items or structures to be demolished.

- B. If unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit a report to the Owner's representative. Pending receipt of directive from Owner's representative, rearrange demolition schedule as necessary to continue overall job progress without undue delay.
- C. Protect trees indicated to remain, and provide maintenance (including watering) to ensure their survival. Cut roots only as necessary, and as acceptable to Arborist employed by the Contractor.
- D. Protect adjacent buildings and improvements from damage. If contractor damages adjacent work, it shall be his responsibility to completely restore that work to its previous condition, as acceptable to the Architect, at no additional cost to the Owner.
- E. Pre-Demolition Meetings: Schedule a conference to be held on-site not less than 14 days before demolition work begins to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Provide not less than one-week advance notification to attendees, Owner, and Architect.
 - 1. Topics to be discussed at meeting shall include:
 - a. Review and finalize of schedule, methods, and procedures related to selective demolition
 - b. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations
 - c. Inspect and discuss condition of construction to be demolished. Discuss items to be salvaged, and location for storage of salvaged items.
 - d. Review structural load limitations of existing structure.
 - e. Verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - f. Review areas where existing construction is to remain and needs to be protected
 - g. Review and finalize protection requirements.

1.5 REFERENCES

- A. American National Standards Institute (ANSI): ANSI A10.6 Safety Requirements for Demolition.
- B. California Occupational Safety & Health Administration (Cal/OSHA): OSHA Technical Manual (OTM), Section V: Chapter 1.

C. 2022 California Building Code (CBC) with Amendments.

1.6 SUBMITTALS

A. General: Refer to Section 01 33 00 – Submittals.

D. Methodology:

1. Submit overall demolition and removal procedures and schedule, including but limited to:
 - a. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - b. Indication of how long utility services will be interrupted.
 - c. Coordination for shutoff, capping, and continuation of utility services, and accurately record locations of capped utilities.
 - d. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
2. Submit a detailed written program for each aspect of selective removal process, including a description of methods and materials used for protection of adjacent areas scheduled to remain.
3. Submit procedures and/or drawing that indicate measures proposed for environmental protection, dust control, and noise control measures, proposed locations, and proposed time frame for measures.

E. Shoring and Bracing Submittals: Prepare and submit shoring and bracing drawings with calculations showing analysis of work to be performed. Drawings and calculations shall be prepared by and bear seal of a registered professional engineer, licensed to practice in California, if required.

F. Pre-demolition Photographs: Before commencing demolition, file with Architect photographs documenting existing conditions that later could be mistaken for damage caused by demolition operations.

G. Shop Drawings: Indicate areas for demolition, removal procedures and removal sequence, and location of salvageable items; location and construction of temporary Work.

H. Project Record Documents: Accurately record locations of capped utilities, subsurface obstructions, and any other requirements provided by Project Manager.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Perform selective demolition in compliance with applicable rules, regulations, codes, and ordinances of authorities having jurisdiction, including Environmental Protection Agency (EPA).

2. Comply with requirements of public utility corporations having jurisdiction over this Project. Obtain and pay for permits, licenses, and certificates needed during performance of selective demolition.
 3. Comply with Cal/OSHA demolition requirements.
 4. Comply with ANSI A10.6 except as otherwise modified herein.
 5. Do not close or obstruct roadways or sidewalks without permits.
 6. Minimize interference with corridors, exits, sidewalks, roadways and public thoroughfares.
 7. Comply with hauling and disposal regulations of authorities having jurisdiction.
 8. Comply with applicable procedures if hazardous or contaminated materials are discovered or suspected.
- B. Requirements for Structural Work: Do not cut or remove structural work of building components to remain in a manner that would result in a reduction of load-carrying capacity.
- C. Environmental Protection: Provide dust and noise control measures, including but not necessarily limited to dust barriers, sound barriers, ventilation, and watering, to prevent dust and debris from demolition activities from doing damage to existing building conditions.
- D. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition work similar to that indicated for this Project.

1.8 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, materials and debris resulting from cutting, moving, or removal becomes property of Contractor.
1. On-site storage or sale of Contractor's materials and debris shall not be allowed.

1.9 PROJECT CONDITIONS

- A. Protect adjacent work to remain, and items to be salvaged, from damage.
- B. Existing Conditions:
1. Do not interfere with use of adjacent buildings. Maintain free and safe passage to and from.
 2. Do not close or obstruct walkways or driveways except as otherwise indicated without authorization of authority having jurisdiction. Do not store or place materials in walkways, driveways, or other means of egress.

3. Conduct selective demolition operations with not less than interference to adjacent building areas, public or private roadways, and walkways.
 4. Maintain a protected egress and access at all times.
 5. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 6. Do not store debris or other materials in building to remain that would overload floor structure.
- C. Unforeseen Conditions:
1. It is not expected that hazardous materials will be encountered in Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Do not recommence work in the area until advised by the Architect or Owner that the area has been cleared for work.
 3. Should unforeseen conditions be encountered that affect design or function of Project, investigate fully and submit an accurate, detailed, written report to Owner and Architect for consideration.
 4. While awaiting Architect and/or Owner's response, reschedule operations if needed to avoid delay of overall Project.
- D. Work under this Section shall not affect the operation of adjacent areas.

1.10 SEQUENCING

- A. Submit schedule indicating proposed sequence of operations for selective demolition work to Architect, DSA Inspector, Owner, and Project Manager for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services, and details for dust and noise control.
 1. Specific attention is called to the requirements to coordinate demolition work with ongoing activities in the building so as to minimize impacts on those activities.
- B. Prior to beginning of any work, obtain approval from the Owner and Architect.
- C. Coordinate the scheduling of work of Section with the work of other sections.

PART 2 – PRODUCTS

2.1 MATERIALS, EQUIPMENT AND FACILITIES

- A. The Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities and services as required for performing the selective demolition and removal work.
- B. Use repair materials identical to existing materials. Determine type and quality by

inspection and testing of existing products where necessary, referring to existing work as a standard.

1. Where 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 performance equals or surpasses that of existing materials.
- C. Materials forming portions of the structure indicated to be removed shall become the Contractor's property and the Contractor shall be responsible for their removal from the site.

2.2 PROTECTION MATERIALS

A. Cushioning Materials:

1. Description: Non-staining, flexible, resilient boards, blocks or sheets of expanded polystyrene closed cell foam.
2. Thickness: As needed to provide adequate protection for on-site conditions.

B. Board (Panel) Materials:

1. Description: Rigid panel products, including but not limited to, tempered hardboard, or plywood.
2. Thickness: Not less than 3/8".

C. Sheet Materials:

1. Description: Non-staining polyethylene sheet and/or nylon reinforced sheets as needed to resist rips and tears due to work being performed and weather or wind.
2. Thickness: Not less than 15 mils.

- D. Accessories: Provide tape suitable for joining cushioning, board, gasket, padding materials, and sheet materials together at seams.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Inspect and verify the existing conditions and become familiar with the extent of the Work. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

1. Insofar as practicable, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition. Perform engineering surveys as needed to determine both condition of framing, floors, and walls, and possibility of unplanned collapse of any portion of structure and adjacent structures where appropriate.
- B. Examine the site to determine proper access within the limitations of the Contract.
1. Verify actual conditions to determine in advance whether removal or demolition of elements will result in structural deficiency, overloading, failure, or unplanned collapse.
 2. Perform continuing surveys as work progresses to detect hazards from demolition or construction activities.
- C. Conduct operations so as not to interfere with adjacent roads, driveways, walks, buildings, corridors, means of access and egress, work areas, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, 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.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.
- E. Verify that utilities have been disconnected and capped.

3.2 PREPARATION

- A. Interfaces with Other Work: Coordinate extent of selective demolition work with limits of new work and existing work to remain, and with demolition and modification requirements shown on the Drawings.
- B. Protection: Protect existing materials, appurtenances and equipment which are not to be demolished. Existing materials, appurtenances and equipment, building exterior and interior, and landscaping altered or damaged during demolition work shall be repaired or replaced to match existing undisturbed conditions at no additional cost.
- C. Prevent movement of structure to remain; provide bracing and shoring as required.
- D. Provide proper and permanent support to adjacent structure for all piping, conduits and cables to remain.
- E. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

- F. Provide and maintain temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage, or wind damage occurs to structure or interior areas of existing building.
- G. Provide and maintain temporary barriers and security devices at locations indicated. Barriers shall be one-hour fire-rated at exit corridors.
- H. Temporary Fire Protection: Provide protection as needed by and in compliance with, local requirements. Consult local fire authority regarding on-site fire protection during selective demolition.
- I. Place roof-walk boards over roof areas to protect roofing membrane. Fasten or attach roof protection boards to keep them from being blown off roof; do not harm integrity of roof. Protection shall be provided in such a manner as to completely protect areas subject to damage.
- J. Use periodic light water mist, temporary enclosures, and other suitable methods to limit dust and dirt. Comply with applicable environmental protection regulations. Use water only if approved by Architect or Owner.
- K. Provide and maintain temporary partitions to prevent spread of dust, odors and noise to permit continued building occupancy.
- L. Maintain path of travel for debris removal dust free and clean at all times.
- M. Maintain ventilation system dust free at all times.
- N. Cover and protect windows and walls that are adjacent to areas to be demolished.
- O. Protect smoke alarms and fire sprinklers from dust intrusion.
- P. Use covered debris bins and/or debris chute to remove and materials indicated. Location of debris chute and bins shall be approved by Project Manager.
- Q. Noise Abatement: Comply with noise abatement ordinances.
- R. Maintain parking areas, driveways, exterior walkways, exit paths, and landscaping in a clean, undisturbed condition. Any debris caused by selective demolition work shall be removed each day.

3.3 UTILITY SERVICES

- A. Utility Requirements: Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.
- B. Field verify the exact location of existing concealed utilities. Use caution if working in or about concealed or exposed utilities.
- C. Disconnect, remove, and cap designated utility lines within demolition areas. Accurately mark locations of disconnected utilities. Identify utilities and indicate capping locations on Project Record Documents.

- F. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- G. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
 - 1. **Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.**
- H. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
 - 1. Prior to interruption of utility services, notify affected public utility companies and obtain instruction for carrying out disconnection. Take precautionary measures deemed necessary by public utility companies.
- I. Where utility services are required to be removed, relocated or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
- J. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
- K. Utility Requirements: Refer to Mechanical, Plumbing, Fire Protection, and Electrical Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.4 EXECUTION

- A. General:
 - 1. Minimize interference with adjacent and occupied building areas, materials and equipment, and as required to allow the school's continued use of the facilities.
 - 2. Investigate and measure the nature and extent of unanticipated items that conflict with intended function or design. Submit written report with accurate detailed information to Project Manager. While awaiting instructions from Project Manager, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
 - 3. Remove items in an orderly and careful manner.
 - 4. Remove only as much material as is required for new construction work to be conveniently performed. Protect supporting structural members and foundation.
 - 5. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on next lower level.

6. Cut surfaces so as to minimize the amount of new surfaces required to match existing, by using hand or small power tools designed for sawing or grinding, not hammering or chopping. Make cuts plumb, true, level and straight, or as otherwise required to provide proper surfaces to receive new work and repairs. Perform cutting and removal operations so as not to cut or remove more than is necessary and not to damage adjacent work.
7. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
8. 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.
9. Remove miscellaneous abandoned appurtenances that will be exposed to view, unless indicated otherwise.
10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
11. Remove and promptly dispose of vermin infested materials.
12. Stop work and notify Project Manager immediately if structure or other items to remain appear to be endangered. Do not resume work until directed by Project Manager.

B. Concrete / Masonry Cutting and Removal:

1. Demolish freestanding columns and free standing walls to level of slab or foundation on which they rest. Carefully examine freestanding columns and walls and do not demolish if their demolition will result in an unstable or unsafe condition.
2. Cut asphalt, concrete, and masonry in small sections by power saw in neat, sharp straight lines; do not use power-driven impact tools. Repair broken edges as directed by Project Manager.
3. Provide saw cut perimeters to horizontal and vertical openings.
4. Apply one coat of epoxy paint to exposed ends of concrete reinforcement at openings made in concrete floors and walls.
5. Contractor to recycle concrete debris to the extent possible.

C. Steel Cutting and Removal:

1. Remove steel framing members individually. Do not heat, cut, or otherwise disturb remaining structural members, including purlins, tie rods, rivets, and bolts.

2. Do not cut structural columns, beams, girders, or trusses to remain.
3. Contractor to clean, sort, and recycle metal components (within reasonable effort).

D. Salvage:

1. Salvage items indicated for reuse, and/or items identified for retention by Owner.
2. Remove materials to be reinstalled or retained and store in a manner to prevent damage. Where items are indicated to be removed and reinstalled, install materials and equipment in locations indicate. Comply with requirements for new materials and equipment.
3. Materials and equipment for reinstallation and/or retention by Owner shall be as indicated on Drawings.

E. Dust Control: Eliminate dust, allowing none into the existing facilities and adjacent facilities. Install dust barriers at doors of spaces where demolition work is being done and as required to keep dust out of corridors and adjacent areas. Use walkoff mats designed to remove dust at the corridor side of doors to rooms where demolition work is being done.

1. Activities which generate silica dust, such as concrete saw cutting, jackhammering, chipping, or abrasive blasting, shall incorporate engineering controls to eliminate visible emissions.
2. Do not use silica sand or other substances containing more than 1 per cent crystalline silica as abrasive blasting material
3. Use concrete and masonry saws that provide water to the blade.
4. Prevent human exposure to dust using methods such as removing dust with water, high efficiency particulate air (HEPA) filters, and wet sweeping. Do not use compressed air or dry sweeping.

F. Do not disrupt service to existing fire sprinkler lines. If disruption becomes necessary, coordinate with Project Manager.

3.5 PATCHING AND REPAIRS

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
- B. Patching is specified in Section 01 73 29 – Cutting and Patching.
- C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- D. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminated evidence of patching and refinishing.

3.6 DISPOSAL

- A. Material removed under this Subcontract which is not to be salvaged or reused in the Project shall become the property of the Contractor and shall be promptly removed from the site. Do not store or permit debris to accumulate at the site.
- B. Unless indicated otherwise, immediately remove demolished material from site. Dispose of materials legally off site. Do not burn or bury materials on site.
- C. Items listed below have unique or regulated disposal requirements and are to be removed and disposed of in manner dictated by law or in most environmentally responsible manner. Typical concerns are listed in parentheses:
 - 1. Fluorescent light ballast manufactured prior to 1978 (PCB)
 - 2. Fluorescent lamps (Mercury)
 - 3. Refrigeration, air-conditioning, and other equipment containing refrigerants (CFC recovery)
 - 4. Batteries (Lead, acid, mercury)
 - 5. Paints, solvents, and other hazardous fluids
 - 6. Asbestos based materials
 - 7. Materials with lead based finishes

3.7 CLEANING

- A. Upon completion of selective demolition, tools, materials, apparatus, and rubbish shall be removed. Site shall be left clean. Remove temporary work.

END OF SECTION.

DIVISION 3 – CONCRETE

- 03 11 00 – Concrete Formwork
- 03 20 00 – Concrete Reinforcing
- 03 30 00 – Cast-in-Place Concrete

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SECTION 03 11 00 – CONCRETE FORMWORK

PART 1 – GENERAL

1.1 PRINCIPLE WORK IN THIS SECTION

- A. The requirements of the District's General Conditions, Supplementary Conditions, and Division 1 – General requirements apply to the work of this Section.
- B. Coordinate the work of this Section with related trades.
- C. Verify applicable extents of work and dimensions at the jobsite
- D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
 - 1. Forms for concrete, including but not limited to:
 - a. Flatwork
 - b. Curbs
 - c. Ramps
 - d. Vehicular paving
 - e. Site drainage components
 - f. Mechanical and electrical items, such as clean-outs, valve access boxes, and pads.
 - 2. Installation of bolts, anchors, sleeves, slots and inserts furnished under other Sections, except that embedded items for mechanical or electrical work are to be installed by trade involved.
 - 3. Construct smooth face forms for Seat Walls.

1.2 RELATED WORK / SECTIONS

- A. Related work includes, but is not limited to the following:
 - 1. Rough Grading
 - 2. Pad construction
 - 3. Finish Paving
 - 4. Soil Treatment
 - 5. Reinforcing
- B. Related Sections include, but are not limited to the following:
 - 1. Section 03 20 00 – Concrete Reinforcement

2. Section 03 30 00 – Cast in Place Concrete

1.3 REFERENCE STANDARDS

- A. 2022 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
- B. (CCR) Title 24, (CBSC) Part 11 – California Green Building Standards Code
 - 1. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines, current version.
- C. Refer to specifications, including, but not limited to Division 1 – References and Definitions.
- D. American Concrete Institute (ACI):
 - 1. ACI 303R – Guide to Cast-In-Place Architectural Concrete Practice.
 - 2. ACI 318 – Building Code Requirements For Structural Concrete and Commentary
 - 3. ACI 347 – Guide to Formwork for Concrete
- E. Standard Grading and Dressing Rules #17, West Coast Lumber Inspection Bureau (For Douglas Fir Form Lumber).
- F. U.S. Product Standard PS 1-19 (For Plywood Form Lumber).
- G. West Coast Lumber Inspection Bureau (WCLIB)

1.4 PERFORMANCE, TESTING AND INSPECTION

A. General:

- 1. Comply with manufacturer’s standards.
- 2. Comply with Building Code.
- 3. Job site inspections shall be done as herein specified and as listed in drawings.
- 4. Testing shall be done as herein specified and as listed in drawings.

B. Standards:

Item	Name of Test	Performance	Testing Std.
Material	Exposed concrete application	Smooth face / masonite material	N/A
Refer to drawings and as herein specified			

C. Construction Testing:

Item	Name of Test	Performance Results	Testing Std.
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Formwork Tolerances	As herein specified	Comply	Refer to as herein specified "WORKMANSHIP and TOLERANCES heading
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D. Construction Testing / Inspection by others:

Item	Name of Test	Performance Results	By Whom
Formwork	Design Compliance	Accommodate slopes, heights, slopes and extents	Special Inspector General Contractor

1.5 SUBMITTALS

- A. Refer to Division 1 – Submittals.
- B. Submit shop drawings showing the locations of all proposed construction joints, control joints and sequence of all concrete pours (for concrete walls, columns, elevated slabs, and slab on grade, etc.)

1.6 QUALITY ASSURANCE

- A. Refer to Division 1 Sections.
- B. Contractor /Installer shall have been in business for Five (5) years providing/installing similar size projects and complexity.
- C. Design, erect, support, brace and maintain formwork and shoring to safely support all vertical and lateral loads that might be applied until such loads can be carried by concrete.
- D. General Contractor is responsible for adequacy of all work. Specifications are only minimum standards. Adequate and safe support bracing, shoring, and stabilizing of all concrete forms is sole responsibility of General Contractor, who shall adhere to all requirements of Division of Industrial Safety, State of California.
- E. Concrete formwork shall be designed and constructed to safely support fluid concrete and superimposed construction loads without excessive deflection or concrete leakage.
 - 1. Provide bracing to maintain accurate alignment and to resist all anticipated lateral loads. Forms shall conform with drawings and to shape, line, and dimension.
 - 2. Design, engineering and construction of forms shall be General Contractor's responsibility.
 - 3. Formwork for exposed concrete shall be constructed to tolerances indicated in ACI guidelines.
- F. Cooperate and coordinate with other trades who furnish and/or install piping, conduit, reglets, anchors, inserts, sleeves, hangers, etc., as their work requires; including provisions for recesses and chases.

- G. Conform to Standard Grading and Dressing Rules #17, West Coast Lumber Inspection Bureau (WCLIB) for Douglas Fir Form Lumber.
- H. Conform to U.S. Product Standard PS 1-19 (For Plywood Form Lumber).
- I. Forms shall be set and field reviewed with General Contractor prior to concrete pours to verify compliance with building code and ADA accessibility requirements.
- J. Forms shall not be removed until concrete has reached a minimum of 80% design strength, unless approved otherwise by structural engineer.

1.7 PRODUCT STORAGE AND HANDLING

- A. Comply with Division 1 specifications – Product Storage and Handling.

1.8 JOB CONDITIONS

- A. Field-verify that all components, backing, subgrade, etc. by others are installed correctly to proceed with installation of products as herein specified, and indicated in drawings.

1.9 PROTECTION

- A. Protect finish surfaces, piping, conduit, etc, at all times from work specified herein and in drawings.
- B. Finish work defaced with other materials on surface shall be replaced.
- C. Protect work under this section from damage by other trades.

1.10 GUARANTEE / WARRANTY

- A. Refer to Section 01 78 36 – Warranties and Bonds and Section 01 78 38 – Guarantee.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single source responsibility, specified items shall be from one manufacturer for each product type.
 - 1. Acceptable manufacturers/installer/fabricator shall be one of the following and as herein listed and in Drawings:
 - a. Refer to documents and as herein specified
 - b. Reviewed Equivalent by Architect.
 - i. Substitutions and deviations shall require Architect's approval and shall be given in letterform.
 - ii. Refer to Division 1– Submittal Procedures.

- iii. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
2. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
3. Refer to drawings, details, and other related specification section whether listed or not.
4. Details shall set basic requirements for size and configuration of systems.

2.2 MATERIALS

A. Form material

1. Concrete exposed to view options:
 - a. Acceptable form material:
 - i. 5/8" minimum APA Plyform
 - ii. Steel
 - iii. MDO (medium density overplay plywood)
 - iv. Plywood
 - b. Seat Walls: Line 5/8" plywood with smooth masonite board veneer with seams aligning with reveals at seat walls.
2. Concrete concealed from view materials:
 - a. 5/8" minimum APA Plywood
 - b. MDO (medium density overplay plywood)
 - c. Steel
 - d. Clean and sound 1 x 8 Standard Grade Douglas Fir

B. Fiber Forms: Tubular column forms spirally constructed of laminated plies of fiber. Plies shall be laminated using a non-water sensitive adhesive and surface wax impregnated for moisture protection. Forms shall give a smooth and seamless appearance to the cast concrete. Provide reveals, as shown on the drawings, as supplied by the form manufacturer.

1. Manufactured by;
 - a. Sonoco Products (www.sonoco.com), plastic lined
 - b. Burke Smoothtube by Burke Co.
 - c. Approved equal

- C. Form Clamps: Assembly to have cone washers, (1 inch break back) 3/8" center rod.
- D. Form Ties:
 - 1. Concrete exposed to view: Snap ties allowing full 1 inch break back.
 - a. Seat walls
 - b. Concrete retaining walls
 - 2. Concrete concealed from view: Snap ties or wire.
 - 3. Verify special spacing requirements with architectural drawings at exposed concrete.
- E. Spreaders: Metal (no wood permitted).
- F. Form Coating: Non-grain and non-staining types of form coating that will not leave a residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.
 - 1. Form coating containing mineral oils or other non-drying materials will not be permitted for any concrete work.
 - 2. Refer to section 03 30 00 – Cast In Place Concrete.
- G. Joint Tape: No. 471 plastic film tape 3 inches wide, as manufactured by the Industrial Tape Division of 3M Company.
- H. Expansion Joint Filler (Preformed):
 - 1. ½ inch thick; Flexcell by Celotex Corporation.
 - 2. Elastic Fiber Expansion Joint by Phillip Carey Mfg. Co.
 - 3. Sealtight Fiber Expansion Joint by W.R. Meadows, Inc. (www.wrmeadows.com)
- I. Extruded Polystyrene Foam: ASTM C578 type IV.
 - 1. Dow Chemical Corp. (www.dow.com) "Styrofoam".
 - 2. US Industries "Foamular", or approved equal.
- J. Form support bars:
 - 1. Condition where bars penetrate thru vapor barrier and cannot be patched when removed; install rigid plastic bars which are sealed with vapor barrier manufacturer's mastic when installed.
 - a. Cutoff bar close to vapor barrier prior to or during concrete placement and maintain minimum 2.5" of concrete cover.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the General Contractor subject to the approval of the Architect.

PART 3 – EXECUTION

3.1 INSPECTION / EXAMINATION

- A. Verification of Conditions:
 - 1. Examine areas and conditions under which work is to be performed.
 - 2. Identify conditions detrimental to proper or timely completion of work and coordinate with General Contractor to rectify.

3.2 COORDINATION

- A. Refer to Division 1 – Project Coordination.
- B. General Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.3 PREPARATION

- A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.4 INSTALLATION

- A. Perform work in accordance with drawings, and as herein specified.

3.5 FIELD QUALITY CONTROL

- A. Monitor work to insure installation and assembly are in accordance with applicable standards, drawings and specifications.

3.6 WORKMANSHIP and TOLERANCES

- A. Form to produce concrete straight, plumb and true to plan.
 - 1. Concrete out of line, level or plumb will be rejected.
- B. Coordinate with all trades to insure proper placement of all items in forms and to provide proper blockouts wherever required.
- C. Earth Forms: Side forms for footings may be of earth provided soil will stand without caving, sides of bank are made with neat cut, and footing width is increased 2 inches, and protected from sluffing-off.
 - 1. Comply with OSHA Standards.
 - 2. Comply with agencies having jurisdiction.
- D. Tolerance per ACI 347 (variance shall not be collective).

1. Variation from plumb
 - a. In the lines and surfaces of columns, piers, walls, and in risers; 1/4 per 10 ft., but not more than 1/2".
 - b. Exposed corner columns, control joint grooves, and other conspicuous lines.
 - i. In any bay or 20' max. ----- 1/4"
 - ii. In 40' or more max. ----- 1/2"
 2. Variation of linear building lines from established position in plan and related position of columns, walls, and partitions.
 - a. In any bay or 20' max. ----- 1/4"
 - b. In 40' or more ----- 1/2"
 3. Variation of sizes and locations of sleeves, floor openings, and wall openings----- 1/4"
 4. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls.
 - a. Minus ----- 1/4"
 - b. Plus ----- 1/2"
 5. Footings
 - a. Variation in dimensions in plan
 - i. Minus ----- 1/2"
 - ii. Plus ----- 1/2"
 - b. Misplacement or eccentricity
 - i. 2% of the footing width in the direction of misplacement but not more than ----- 2"*
 - ii. *(Applies to concrete only; not to reinforcing bars or dowels.)
 - c. Reduction in thickness
 - i. Minus ----- 5%
- E. Tolerances indicated shall not be exceeded and shall not cause work to exceed accessibility requirements or limits.

3.7 CONSTRUCTION

- A. Form material: Straight, true, sound and able to withstand deformation due to loading and effects of moist curing. Do not reuse material which is warped or delaminated, and/or requires more than minor patching of contact surfaces.

- B. Build substantial forms and shores to shapes, lines, grades, elevations and dimensions indicated. Forms and shores shall be substantial, tight to prevent leakage of mortar, concrete and properly braced and tied together to maintain position and shape. Butt joints tightly and locate on solid backing. Chamfer corners where indicated. Form bevels, grooves, offsets, and recesses too neat, straight lines. Construct forms and shores for easy removal without hammering, wedging or prying against concrete. Tape plywood form joints for exposed concrete surfaces.
1. No forms, shores, wooden stakes or braces shall be left in any concrete pour for either foundations or slabs beyond the point where the concrete has taken its initial set.
 - a. Steel stakes shall not be left in floor slab concrete and holes through vapor barrier shall be repaired prior to concrete placement over vapor barrier.
 - b. Steel stakes which do not puncture vapor barrier may be left in foundation pours beyond the initial set if they are placed in a pvc or similar sheath so that later removal of the stake will not cause damage to the green concrete. Sheathed stakes shall be placed no closer than 2" from any required reinforcing. Sheath shall be abandoned in place and remaining hole shall be filled with flowable grout.
 2. All interpretations and decisions shall be made by the District's Inspector of Record and shall be in accordance with design unless approved otherwise by Structural Engineer.
 3. All forms shall extend 10" minimum below finish floor slab elevation and 10" minimum below foundation wall at exterior building sides typical.
 4. All foundation trenching sides and edges shall be formed as indicated in Structural Drawings.
 5. Apply form coating to forms before reinforcing steel is in place.
- C. Sleeves, anchors and bolts, including those for angle frames, supports, ties and other materials in connection with concrete construction, shall be secured in position before the concrete is placed.
- D. Proper provisions shall be made for openings, blockouts, sleeves, offsets, sinkages, recesses and depressions required by other trades and suppliers prior to placing concrete.
1. The General Contractor shall also see that sleeves have been installed and other provisions have been made for the installation of mechanical, electrical and other equipment.
 2. Coordinate with all trades to insure proper placement of all items in forms and to provide proper blockouts wherever required.
- E. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, with no additional cost to the District.

- F. Form Not Required: Concrete footings may be poured directly against cut earth where feasible and when the Structural Engineers approval has been obtained.
 - 1. See structural drawings for requirements for placing concrete footings directly against earth without forms.
- G. Use ¾ inch minimum wood chamfer strips typical at all exposed corners unless noted otherwise on drawings.
- H. Space clamps, ties, hangers and other form accessories so that working capacities are not exceeded by loads imposed from concrete or concreting operations.
 - 1. Exposed conditions; the dimples left in concrete shall be true and align in vertical and horizontal directions.
 - a. Patch in accordance with Section 03 30 00 – Cast in Place Concrete.
- I. Brace, anchor and support all 'cast-in items' to prevent displacement or distortion.
- J. Notify District's Inspector of Record and Structural Engineer 48 hours prior to concrete placement, for purpose of checking reinforcing steel placement, general form compliance, and form dimensions.
 - 1. This review shall in no way relieve Contractor of his responsibility for safety of forms and shoring, or for proper dimensions.
 - 2. All inspections shall be made by the District's Inspector of Record and shall be in accordance with design unless approved otherwise.
- K. During and immediately after concrete placing, tightens forms, posts and shores. Readjust to maintain grades, levels and cambers.
- L. Slabs, walks, and curbs:
 - 1. Expansion joints: Install at locations indicated with backer rod and sealant.
 - 2. Contraction joints: Install specified keyed-type joint material where indicated on Drawings, and so that maximum distance between joints is 10' - 0" for exterior concrete, unless otherwise noted on Drawings.
 - 3. Isolation joints: Install premolded isolation joint material with backer rod and sealant cover between walls and slabs so that areas are isolated from all vertical features.

3.8 CLEANING OF FORMS

- A. All dirt, chips, sawdust, rubbish, water, etc. shall be completely removed from form by water hosing and air pressure before any concrete is deposited therein. No wooden ties or blocking shall be left in concrete except where indicated for attachment of other work.
- B. Thoroughly clean and patch all holes in formwork and re-coat as required before reusing. Forms not suited to obtain concrete surfaces and tolerances in conformity with Contract requirements will be rejected by District.

1. Reuse of forming materials shall be limited only as required to produce the finishes as specified, free from blemishes and other defects unless covered by other building materials in which case blemish free concrete is not required.

3.9 INSPECTION OF FORMS AND VAPOR BARRIER

- A. Notify the District's Inspector of Record and Structural Engineer at least 48 hours in advance of the beginning of pouring operations and at the completion of formwork and location of all construction joints.
 1. An inspection of forms and joints will be made for approval of finished work and general layout only.
 2. The foregoing inspection shall in no way relieve the General Contractor of responsibility of design and safety or formwork, bulkheads and shoring.
- B. Vapor barrier shall be inspected in accordance with Section 03 30 00 – Cast in Place Concrete.
 1. All penetrations left in place shall be sealed
 2. All holes shall be patched

3.10 FORM COATING

- A. Before placement of reinforcing steel, coat faces of all forms to prevent absorption of moisture from concrete and to facilitate removal of forms. Apply specified material in conformance with manufacturer's written directions.

3.11 REMOVAL OF FORMS, SHORES, WOOD AND/OR METAL SUPPORT STAKES AND BRACES

- A. Do not remove forms until concrete has attained sufficient strength to support its weight and any construction loading. Concrete must be allowed to cure long enough to avoid damage during form removal. General Contractor or his representative in charge of concrete construction shall be present during removal of forms and shores, and shall be personally responsible for safety of this operation at all times and under all conditions.
 1. Stakes which have penetrated thru the vapor barrier when removed shall require the vapor barrier be patched at each condition, refer to Section 03 30 00 – Cast in Place Concrete
- B. Remove without damage to concrete surfaces and vapor barrier.
- C. Sequence and timing of form removal shall insure complete safety of concrete structure.
- D. Forms, shores, stakes and braces, wood and/or metal shall remain in place for not less than the following periods of time. These periods represent cumulative number of days during which temperature of air in contact with concrete is 60°F or above. For each day the temperature falls below 60°F, add additional day to periods listed that forms are to remain in place, unless otherwise directed in writing by the District and Structural Engineer.

1. Concrete on grade: 24 hours
2. Walls and Columns: 3 days

3.12 PROTECTION AND CLEAN UP

- A. Refer to Division 1 Sections.
- B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
- C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
 1. Remove water from all excavations.
- E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no cost to the District.
- F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
 1. Leave entire area in a neat, clean, acceptable condition.
- G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in division – Project Closeout.
- H. Provide record drawings in accordance with Division 1 – Project Closeout.
- I. Close out, on-site inspection will be at the discretion of the Architect after he receives the General Contractor's NOTICE of "Certificate of Substantial Completion".

END OF SECTION.

SECTION 03 20 00 – CONCRETE REINFORCING

PART 1 – GENERAL

1.1 SUMMARY

- A. Work Included: Provide reinforcing for cast-in-place concrete work.
- B. Related Sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCES

- A. The following references, codes and standards are hereby made a part of this Section and all reinforcement shall conform to the applicable requirements therein except as otherwise specified herein or shown on the drawings. Nothing contained herein shall be construed as Permitting work that is contrary to code requirements.
- B. American Concrete Institute, ACI:
 - 1. ACI 301 – Specifications for Structural Concrete
 - 2. ACI 315 – Details and Detailing of Concrete Reinforcement.
- C. ANSI/AWS D1.4 – Structural Welding Code, Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute, CRSI:
 - 1. CRSI – Manual of Standard Practice, 29th Edition.
 - 2. CRSI –Placing Reinforcing Bars, 10th Edition.
- E. ASTM International (ASTM):
 - 1. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 2. ASTM A706 – Standard Specification for Deformed and Plain Low-alloy Steel Bars for Concrete Reinforcement.
- F. California Building Code (CBC) 2022 edition.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Fully detailed shop drawings, including bending schedules and bending diagrams, shall be submitted to the Engineer for review. Shop drawings shall show placing details and size and location of all reinforcing steel.
 - 2. Shop drawing shall be of such detail and completeness that all fabrication and placement at the site can be accomplished without the use of project or contract drawings for reference.
 - 3. Contractor shall check civil, landscape, architectural, structural, mechanical, plumbing, electrical and fire protection project or contract drawings for anchor bolt schedules and locations, anchors, inserts, conduits, sleeves, and any other items which are required to be cast in concrete, and shall make

necessary provisions as required so that reinforcing steel will not interfere with the placement of such embedded items.

4. Reinforcing steel shall not be fabricated or placed before the shop drawings have been reviewed by the Architect and returned to the Contractor. Review of shop drawings by the Architect will not relieve the Contractor of responsibility for errors or for failure in accuracy and complete placing of the work.
- B. Mill Test Reports: Certified mill test reports (tensile and bending) for each heat or melt of steel shall be submitted to the Architect before delivery of any material to the site. (See requirements above under "Source Quality Control".) Where reinforcing is required to be welded, mill test reports shall verify the weldability of the steel.

1.4 QUALITY ASSURANCE

- A. Where certified mill test reports (required hereinafter under "Submittals") are not furnished, conform to the following:
1. Reinforcing bars shall be tested in tension and bending as per ASTM A 615. Testing shall be done by the Contractor's independent testing agency. Furnish one copy of test reports to Architect, Structural Engineer, Owner and Contractor.
 2. Samples will be taken from bundles as delivered from the mill by the testing agency. Where bundles are identified by a heat number and a mill analysis accompanies to report, one tensile and one bending test specimen will be taken from each 10 tons or fraction thereof, of each size and kind of bar. Where positive identification of heat numbers cannot be made or where random samples are taken, one series of tests shall be made from each 2-1/2 tons or fraction thereof, of each size and kind of bar.
 3. The cost of tests, sampling and handling of reinforcing steel shall be paid by the Contractor.
 4. Include all material required to provide samples for testing.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcing to site properly bundled and tagged, and stored so as to prevent excessive rusting or fouling with grease or any coating that will interfere with bond. Segregate so as to maintain identification after bundles are broken. Do not use damaged, reworked, or deteriorated material.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Reinforcing Bars:
1. New, free of loose rust.
 2. Billet Steel Bars: ASTM A 615, including supplementary requirements S1. Grade 60 for all bars. Weldable (ASTM A706) where indicated or required.
- B. Welded Wire Fabric: As indicated on drawings.
- C. Tie Wire: #16 minimum, black and annealed.

- D. Reinforcement Splice Couplers: For use only where specified on the drawings. Submit other locations proposed for use to the Engineer for review. "L-series Bar Lock" Coupler Systems for Splicing Reinforcement Bars, IAPMO ER-319, by Dayton-Superior Corporation.
- E. Accessories: Metal or plastic spacers, supports, ties, etc., as required for spacing, assembling, and supporting reinforcing in place. Legs of accessories to be of type that will rest on forms without embedding into forms. Galvanize metal items where exposed to moisture, or use approved other non-corrodible, non-staining supports.

2.2 FABRICATION

- A. Comply with details on Drawings.
- B. Where specific details are not shown or noted, do all detailing and fabrication in conformance with, or superior to, requirements contained in the References, Codes and Standards Article and ACI 315.
- C. Clean bars of loose rust, loose mill scale and any substance which may decrease bond. Bend bars cold and accurately to details on reviewed shop drawings.
- D. Shop fabricate reinforcement.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Reinforcing steel shall be placed in accord with the Drawings and viewed shop drawings and the applicable requirements of the References, Codes and Standards Article. Install reinforcement accurately and secure against movement, particularly under the weight of workmen and the placement of concrete.
- B. Reinforcement Supports:
 - 1. Reinforcement shall be accurately located in the forms and held in place by means of supports adequate to prevent displacement and to maintain reinforcement at proper distance from form face. Supports and their placement shall comply with CRSI "Placing Reinforcing Bars". The use of wood supports and spacers inside the forms is not permitted except as noted in Concrete Forms Section.
 - 2. Support reinforcement for on-grade slabs by wiring to precast concrete blocks spaced 3'-0" o.c. (maximum) both ways, staggered. Size blocks so that reinforcing is maintained at the elevation shown in design drawings.
- C. Obstructions: Wherever conduit, piping, inserts, sleeves, etc., interfere with placing of reinforcing steel, obtain approval of method of procedure before any concrete is placed. Bending of bars around openings or sleeves is not permitted.
- D. Tying: Tie reinforcing rigidly and securely with steel tie wire at splices and at crossing points and intersections in the position shown. Bend tie wires, after cutting, in such a manner that concrete placement will not force the wire ends to surface of exposed concrete.
- E. Dowels: Dowels shall be tied securely in place before concrete is deposited. In the event there are no bars in position to which dowels may be tied, No. 3 bars (minimum) shall be added to provide proper support and anchorage. Bending of

dowels after placement of concrete will not be permitted.

- F. A minimum class B lap splice as defined by ACI 318 is required for all cases not otherwise shown on Drawings. Stagger splices wherever possible.
- G. Reinforcement Couplers: Install at all locations indicated and may be used as an alternate to lap splices in general. Install couplers in accordance with manufacturer's recommendations.
- H. Welding: Do welding by Cadweld T series for bars #10 and larger or as noted on Drawings. No welding of reinforcing steel or of attachments to reinforcing steel will be permitted unless the chemistry of the steel conforms to AWS D1.4 and is so established by the mill certificates. If welding is to be done, all welds shall be approved by the Structural Engineer and all welding shall comply with requirements and procedures established by AWS D1.4. All welding material, wire cuttings, and tramp metal shall be thoroughly cleaned from forms for exposed concrete before any concrete is placed.
- I. Minimum covers for reinforcement:
 - 1. As shown on drawings.
- J. Lap or spliced bars shall be a minimum of 48 bar diameters in concrete, but never less than 24" or as noted on design drawings.

3.2 CLEANING

- A. Reinforcement, at time of placing concrete, shall be free of coatings that would impair bond.

END OF SECTION.

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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings and foundation walls.
 - 2. Interior slabs-on-grade.
 - 3. Exterior slabs-on-grade.
- B. Special Coordination Requirements: Coordinate with the work of the following Sections to identify the finish flooring manufacturer's concrete slab requirements. Such requirements may be over and above the requirements of the Contract Documents and may require additional materials, means, or methods, which shall be included as part of the Work.
- C. Related Sections:
 - 1. Section 03 11 00: Concrete Formwork
 - 2. Section 03 20 00: Concrete Reinforcing.
 - 3. Division 22: Plumbing.
 - 4. Division 23: Mechanical.
 - 5. Division 26: Electrical.

1.3 DEFINITIONS

- A. Cementitious Materials:
 - 1. Portland cement alone or in combination with one or more of the following, subject to compliance with requirements:
 - a. Blended hydraulic cement.
 - b. Fly ash and other pozzolans.
 - c. Ground granulated blast-furnace slag.
 - d. Silica fume.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Steel Reinforcement Shop Drawings: See section 03 20 00.
- D. Certificates: Weighmaster's certificates.
- E. Material Certificates:
 - 1. For each of the following, signed by manufacturers:
 - a. Cementitious materials.
 - b. Admixtures.
 - c. Waterstops.
 - d. Curing materials.
 - e. Floor and slab treatments.
 - f. Bonding agents.
 - g. Adhesives.
 - h. Vapor retarders.
 - i. Semi-rigid joint filler.
 - j. Joint-filler strips.
 - k. Repair materials.
- F. Material Test Reports:
 - 1. For the following, from a qualified testing agency, indicating compliance with requirements:
 - a. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
 - b. Vapor retarder: Provide third part documentation that all testing was performed on a single production roll and a summary of test results per ASTM E1745.

1.5 QUALITY ASSURANCE

- A. Codes and Standards:

1. Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - a. CBC 2022 California Building Code (CCR Title 24, Part 2, as adopted and amended by DSA).
 - b. American Concrete Institute (ACI) Publications:
 - i. Comply with the following unless modified by requirements in the Contract Documents:
 - 1) ACI 301 – Specifications for Structural Concrete.
 - 2) ACI 117 – Specification for Tolerances for Concrete Construction and Materials and Commentary.
 - 3) ACI 302.1R – Guide to Concrete Floor and Slab Construction.
 - 4) ACI 302.2R – Guide for Concrete Slabs that receive Moisture-Sensitive Flooring Materials.
 - 5) ACI 305R – Guide to Hot Weather Concreting.
 - 6) ACI 306R – Guide to Cold Weather Concreting.
 - 7) ACI 318 – Building Code Requirements for Structural Concrete and Commentary.

B. Manufacturer Qualifications:

1. A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment:
 - a. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Source Quality Control: Furnish Weighmaster's certificates for all concrete.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

E. Concrete Testing Service: Engage a qualified independent testing agency approved by DSA to perform material evaluation tests and to design concrete mixtures.

F. Pre-Installation Meeting: Conduct meeting onsite. Include product and material manufacturers. Include all subcontractors. Include under slab vapor barrier supplier to ensure proper installation of material.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent

bending and damage.

PART 2 – PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete:
 - 1. Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in large sizes to minimize number of joints:
 - a. Plywood, metal, or other approved panel materials.
 - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - i. High-density overlay, Class 1 or better.
 - ii. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - iii. Structural 1, B-B or better; mill oiled and edge sealed.
 - iv. B-B (concrete form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4-inch by 3/4-inch minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Waterstops: Six inch dumbbell shaped, PVC, rated for use.
 - 1. Theut Products, Inc. (Bases of Design)
- F. Form-Release Agent:
 - 1. Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces:
 - a. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties:
 - 1. Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal:

- a. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. See section 03 20 00

2.3 CONCRETE MATERIALS

- A. Cementitious Material:

1. Use the following cementitious materials, of the same type, brand, and source throughout Project:
 - a. Portland Cement - ASTM C150, Type II/V. Supplement with the following:
 - i. Fly Ash: ASTM C618, Class F.

- B. Normal-Weight Aggregates:

1. ASTM C33:
 - a. Maximum coarse-aggregate size: Per plan.
 - b. Fine aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Water: ASTM C1602 and potable.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.

- B. Chemical Admixtures:

1. Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride:
 - a. Water-reducing admixture: ASTM C494/C494M, Type A.
 - b. Retarding admixture: ASTM C494/C494M, Type B.
 - c. Water-reducing and retarding admixture: ASTM C494/C494M, Type D.
 - d. High-range, water-reducing admixture: ASTM C494/C494M, Type F.
 - e. High-range, water-reducing and retarding admixture: ASTM C494/C494M, Type G.

- f. Plasticizing and retarding admixture: ASTM C1017/C1017M, Type II.

C. Integral Waterproofing Admixtures:

- 1. ASTM C494, Type S, complex catalyzed hydrous silicate, water and vapor proofing liquid admixture:
 - a. Product: Subject to compliance with requirements, provide Moxie International Inc.; Moxie Shield 1800 Concrete Admixture, P.O. Box 838 Loomis, CA 95650; Contact Manufacturer's representative: P:916-251-0825, F: 877-330-1930 Email: info@moxieshield.com.
 - b. Properties:
 - i. Water/cement ratio: Maximum 0.52.
 - ii. Water vapor transmission: Less than 0.1 perms (5.7g/Pa-s-m²).
 - iii. Water seepage or permeability: Not to exceed 7.00 x 10⁻⁹ cm/s @ 50psi (2.3x10⁻¹⁰ft/s).
- 2. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder:

- 1. ASTM E1745, Class A, 15 mils minimum, with a maximum permeance of less than 0.01 perms (grains/[ft²-hr-inHg]), as tested in accordance with mandatory conditioning tests per ASTM E1745 (all mandatory ASTM testing must be performed on a single production roll). Include manufacturer's recommended adhesive or pressure-sensitive tape:
 - a. Products are subject to compliance with requirements. Acceptable products:
 - i. Basis of Design:
 - 1) Stego Industries, LLC Stego Wrap 15 mil Class A.
 - ii. Grace Construction Products: Florprufe 120.
 - iii. W. R. Meadows, Inc.: Perminator 15 mil.
 - iv. Substitutions with Architect's approval, and pursuant to conditions of Divisions 00 and 01.

B. Vapor Retarder Accessories:

1. Seams:
 - a. Stego Tape by Stego Industries LLC.
 2. Sealing Penetrations of Vapor Barrier:
 - a. Stego Mastic.
 - b. Stego Tape.
 3. Perimeter/Terminated Edge Seal:
 - a. Do not use one-sided seaming tape for sealing at the terminated edge:
 - i. Stego Crete Claw (textured tape).
 - ii. Stego Term Bar.
 - iii. Stego Tack Tape (double-sided sealant tape).
 4. Penetration Prevention:
 - a. Beast Foot by Stego Industries LLC.
 - b. Beast Form Stake by Stego Industries LLC.
- C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch sieve and zero to five percent (0% - 5%) passing a No. 8 sieve.

2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately nine-ounces-per-square-yard when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.

2.7 RELATED MATERIALS

- A. Non-Shrink Grout:
 1. Factory premixed grout: ASTM C1107.
 2. Compressive strength: 7,000 psi at 28 days.
- B. Exterior Concrete Walks: Provide a capillary break consisting of two inches (2") of clean dry sand, ASTM C33, evenly spread on top of the compacted subgrade.

2.8 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301:
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
 - 2. All concrete mix designs shall be prepared and stamped by a California registered civil Engineer.
- B. Cementitious Materials:
 - 1. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - a. Fly Ash: 15 to 25 percent.
- C. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and Foundation Walls, Concrete Stairs, and Concrete Walls:
 - 1. Proportion normal-weight concrete mixture as follows:
 - a. Minimum compressive strength: 3,000 psi at 28 days unless otherwise noted.
 - b. Maximum water-cementitious materials ratio: 0.55.
 - c. Minimum cementitious materials content: 5.5 sacks of cement per cubic yard.
 - d. Slump limit: Four inches (4"), plus or minus one inch (1").
- B. Interior Slabs-on-Grade:
 - 1. Proportion normal-weight concrete mixture as follows:
 - a. Minimum compressive strength: 4,000 psi at 28 days.
 - b. Maximum water-cementitious materials ratio: 0.45.
 - c. Minimum cementitious materials content: Six (6) sacks of cement per cubic yard.
 - d. Slump limit: Four inches (4"), plus or minus one inch (1").
- C. Exterior Slabs-on-Grade:

1. Proportion normal-weight concrete mixture as follows:
 - a. Minimum compressive strength: 3,000 psi at 28 days.
 - b. Maximum water-cementitious materials ratio: 0.55.
 - c. Minimum cementitious materials content: 5.5 sacks of cement per cubic yard.
 - d. Slump limit: Four inches (4"), plus or minus one inch (1").

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete:
 1. Measure, batch, mix, and deliver concrete according to ASTM C94/C94M, and furnish batch ticket information:
 - a. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 90 minutes to 75 minutes; when air temperature is above 90 degrees F reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Avoid the use of stakes driven through vapor barrier by utilizing screed and forming systems that will not leave punctures in the vapor barrier.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- F. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting

drawings, templates, diagrams, instructions, and directions furnished with items to be embedded. In no case shall any bolt or anchor be stabbed in place while or after the concrete is poured:

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

A. General:

1. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained:
 - a. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
 - b. Do not strip vertical concrete in less than seven (7) days.
 - c. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring:
 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders:

1. Place, protect, and repair sheet vapor retarder according to ASTM E1643

and manufacturer's written instructions:

- a. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
- b. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise terminate (a) at a point acceptable to the structural Engineer or (b) where obstructed by impediments, such as dowels, water stops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam, or slab itself:
 - i. Seal vapor barrier to the entire slab perimeter using manufacturer's textured tape with a surface that creates a mechanical seal to freshly-placed concrete per manufacturer's instructions.

OR

- ii. Seal vapor barrier to the entire perimeter wall or footing/grade beam with manufacturer's double-sided tape, or both termination bar and double-sided tape per manufacturer's instructions. Ensure the concrete is cleaned and dry prior to adhering tape.
- c. Lap all joints six inches (6") and seal with manufacturer's recommended tape.
- d. Apply seam/textured/double-sided tape to a clean and dry vapor barrier.
- e. Seal all penetrations (including pipes) per manufacturer's tape.
- f. No penetration of the vapor barrier is allowed except for reinforcing and permanent utilities.
- g. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area six inches (6") and taping all four sides with tape.
- h. Do not saturate the sand cushion.
- i. If sand is saturated prior to placement of concrete, remove the sand and replace.
- j. Protect all installed moisture barrier construction from precipitation and water penetration by covering and providing positive drainage away from the moisture barrier.
- k. Cover slab openings and block-outs around columns to prevent water penetration of moisture barrier.

3.6 STEEL REINFORCEMENT

- A. General:
1. Comply with CRSI's "Manual of Standard Practice" for placing reinforcement:
 - a. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
 - b. Clean reinforcement and remove loose dust and mill scale, earth, oil, and other materials that reduce bond or destroy bond with concrete.
 - c. Position, support, and secure reinforcement against displacement by forms, construction, and the concrete placement operations. Provide metal chairs, dobies, or other aids manufactured for this purpose.
 - d. Place reinforcement to obtain the required concrete coverages for concrete protection.
- B. See also section 03 20 00

3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade:
1. Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one inch (1") as follows:
 - a. Grooved joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - b. Sawed joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide, 1/3-inch depth joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Saw cut slab as soon as surface has hardened to where it can support the equipment and operator, normally within two (2) hours after finishing. Use saw designed for cutting fresh concrete, such as "Soff-Cut" or equal.
- D. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate 1/2 of dowel length to prevent concrete bonding to one side of joint.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one (1) layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation:
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least six inches (6") into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete:
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement:
 - 1. Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures:
 - a. When average high and low temperature is expected to fall below 40 degrees F for three (3) successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

- b. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- c. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement:

- 1. Comply with ACI 301 and as follows:
 - a. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - b. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish:

- 1. As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities:
 - a. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish:

- 1. As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities:
 - a. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish:

- 1. Apply the following to smooth-formed finished as-cast concrete where indicated:
 - a. Smooth-rubbed finish: Not later than one (1) day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

- b. Grout-cleaned finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one-part portland cement to 1-1/2-parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 - c. Cork-floated finish: Wet concrete surfaces and apply a stiff grout. Mix one-part portland cement and one-part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related unformed surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Except as may be shown otherwise on Drawings, provide the following finishes at the indicated locations.
- B. Scratch Finish:
 - 1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4-inch in one direction:
 - a. Apply scratch finish to surfaces that are to receive concrete floor toppings or mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish:
 - 1. Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture:
 - a. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish:
 - 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

Grind smooth any surface defects that would telegraph through applied coatings or floor coverings:

- a. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic, or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
- b. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, ten-foot-long (10') straightedge resting on two (2) high spots and placed anywhere on the surface does not exceed 1/8 inch.
- c. Contractor shall anticipate that grinding will be required as a result of curling or other slab defects. Grinding required to bring the slab surface into acceptable tolerances for finished flooring installation shall be included as part of the Work.

E. Trowel and Fine-Broom Finish:

1. Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom:
 - a. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq.ft.xh before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture curing: Keep surfaces continuously moist for not less than seven (7) days.
 2. Moisture-retaining-cover curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Headed bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests:
 - 1. Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:
 - a. Testing frequency: Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding five (5) cubic yards, but less than 25 cubic yards, plus one (1) set for each additional 50 cubic yards or fraction thereof.
 - b. Testing frequency:
 - i. Obtain at least one (1) composite sample for each 50 cubic yards or fraction thereof of each concrete mixture placed each day, but not less than once for each 2,000 square feet of surface area for slabs or walls:
 - 1) When frequency of testing will provide fewer than five (5) compressive-strength tests for each concrete mixture, testing shall be conducted from at least five (5) randomly selected batches or from each batch if fewer than five (5) are used.
 - c. Slump: ASTM C143/C143M; one (1) test at point of placement for each composite sample, but not less than one (1) test for each day's

pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

- d. Air content: ASTM C231, pressure method, for normal-weight concrete; one (1) test for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture.
- e. Concrete temperature: ASTM C1064/C1064M; one (1) test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test (1) for each composite sample.
- f. Unit weight: ASTM C567, fresh unit weight of structural lightweight concrete; one (1) test for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture.
- g. Compression test specimens:
 - i. ASTM C31/C31M:
 - 1) Cast and laboratory cure two (2) sets of two (2) standard cylinder specimens for each composite sample.
 - 2) Cast and field cure two (2) sets of two (2) standard cylinder specimens for each composite sample.
- h. Compressive-strength tests:
 - i. ASTM C39/C39M; test one (1) set of two (2) laboratory-cured specimens at seven (7) days and one (1) set of two (2) specimens at 28 days:
 - 1) Test one (1) set of two (2) field-cured specimens at seven (7) days and one (1) set of two (2) specimens at 28 days.
 - 2) A compressive-strength test shall be the average compressive strength from a set of two (2) specimens obtained from same composite sample and tested at age indicated.
 - i. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 - j. Strength of each concrete mixture will be satisfactory if every average of any three (3) consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength.
 - k. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of

compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both seven (7) and 28-day tests.

- l. Nondestructive testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- m. Additional tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
- n. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- o. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

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DIVISION 4 – MASONRY

04 21 13 – Adhered Thin Brick Veneer

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SECTION 04 21 13 – ADHERED THIN BRICK VENEER

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this Section.

1.2 SUMMARY

- A. Scope of Work: Install OFCI thin brick veneer units from H.C. Muddox (manufacturer), over Masonry Adhered Veneer System (MAVS) Series 3000, manufactured by Omega Products International, including materials and accessories as indicated on drawings, as specified herein, and as needed for complete and proper installation.
- B. Work Associated: Rod and float brown coat to even, true surface for proper thin brick installation. Refer to Section 09 24 00.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 09 24 00 – Lath and Plaster.

1.4 REFERENCES AND STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. ANSI A108.5 – Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 2. ANSI A118.4 – Latex-Portland Cement Mortar.
 - 3. ANSI A118.6 – Ceramic Tile Grouts.
 - 4. ANSI A137.1 – American National Standard Specifications for Ceramic Tile
 - 5. ANSI A108.01 – A108.17 American National Standard Specifications for The Installation of Ceramic Tile
 - 6. ANSI A118.1 – A118.13 American National Standard Specifications for The Installation of Ceramic Tile
 - 7. ANSI A136.1 – American National Standard Specifications for The Installation of Ceramic Tile
- B. 2022 CBC, Sections 1404.10.1.4, 2103A, 2510, and 2512.
- C. TCA – Tile Council of North America, Inc.

D. ASTM International (ASTM):

1. ASTM C67 – Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
2. ASTM C91 – Standard Specification for Masonry Cement
3. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
4. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar
5. ASTM C150 – Standard Specification for Portland Cement
6. ASTM C207 – Hydrated Lime for Masonry Purposes.
7. ASTM C267 – Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing
8. ASTM C270 – Standard Specification for Mortar for Unit Masonry
9. ASTM C482 – Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement
10. ASTM C531 – Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes
11. ASTM C794 – Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
12. ASTM C905 – Standard Test Method for Apparent Density of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing
13. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
14. ASTM C955 – Standard Specification for Load Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases
15. ASTM C1088 – Standard Specification for Thin Veneer Brick Units Made from Clay or Shale.
16. ASTM C1780 – Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer
17. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
18. ASTM D227 – Standard Specification for Coal-Tar Saturated Organic Felt Used in Roofing and Waterproofing
19. ASTM D751 – Standard Test Method for Coated Fabrics

20. ASTM D751 – Standard Test Method for Rubber Property – Durometer Hardness
21. ASTM D1248 – Standard Test Method for Staining of Porous Substances by Joint Sealants
22. ASTM D2240 – Standard Test Method for Coated Fabrics
23. ASTM D4068 – Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane
24. ASTM D4263 – Standard Test Method for Indicating Moisture in Concrete by The Plastic Sheet Method
25. ASTM D4397 – Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
26. ASTM D4541 – Standard Test Method for Pull Off Strength of Coatings Using Portable Adhesion Testers
27. ASTM D4716 – Standard Test Method for Determining the (In Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geo-synthetic Using a Constant Head
28. ASTM E84 – Standard Test Method of Surface Burning Characteristics of Building Materials.
29. ASTM E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
30. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials
31. ASTM E413 – Standard Classification for Rating Sound Insulation
32. ASTM E492 – Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
33. ASTM E779 – Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
34. ASTM E989 – Standard Classification for Determination of Impact Insulation Class (IIC)
35. ASTM E1186 – Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
36. ASTM E2178 – Standard Test Method for Air Permeance of Building Materials
37. ASTM E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

- E. Masonry Veneer Manufacturers Association (MVMA) Installation Guide for Adhered Concrete Masonry Veneer, current edition.
- F. TMS 402 – Building Code Requirements for Masonry Structures.
- G. TMS 602 – Specification for Masonry Structures

1.5 SYSTEM DESCRIPTION

- A. General: The MAVS System is comprised of an approved substrate, bonding mortar, adhered veneer, and related accessories.
- B. Application Methods: The MAVS System is applied directly to a structure at the construction site.

1.6 QUALITY ASSURANCE

- A. Single Source: Provide Masonry Adhered Veneer System (MAVS) bonding mortar skim coat, bonding mortar, and grout from a single source, installed over an approved substrate.
- B. Masonry Tile / Veneer Contractor Requirements: Masonry Tile/Veneer contractor shall hold a valid California C29 contractor's license, be in good standing with the California State License Board. Contractor shall provide a signed, written statement of verification on company letterhead that states Contractor has prior project experience of similar type and size as this project. C-29 contractor shall provide documentation referencing successful qualifying prior experience and projects to the Owner and Architect.
- C. Installation Materials Manufacturer: Installation materials shall be manufactured or approved by Omega Products International and shall be distributed by the same or its authorized dealers. Source veneer installation materials from a single manufacturer to ensure quality and compatibility.
- D. Pre-installation Discussion:
 - 1. Product selection: Prior to the final selection of installation materials, contact Omega Products International to discuss proper selection of installation materials and system warranty.
 - 2. Pre-installation Meeting: Prior to the commencement of Work, representatives from the owner, general contractor, designer, masonry contractor, veneer manufacturer, and Omega Products International should meet to discuss conformance to the specification and job site conditions.

1.7 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: All product datasheets for each different thin brick veneer type, accessory, MAVS system, and other manufactured product indicated, evaluation reports, details, and warranty information that pertain to the project in accordance

with Section 01 33 00 – Submittals.

- C. Samples: Colored masonry mortar and grout samples showing full extent of colors available. Match existing colors on campus.
- D. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
 - 1. Mortar complying with property requirements of ASTM C270.
- E. Job Mock-Up:
 - 1. Prior to installation of masonry work, erect wall panel mock-up using materials, bond and joint tooling required for final work. Build mock-ups on site, on area noted on plans, of full thickness, indicating the texture and workmanship to be during construction as a standard for judging completed masonry work. Do not alter, move or destroy mock-up until work is completed. This area includes a control joint and sealant at control joints, and around ductwork.
 - 2. Provide list of material used in construction mockups, including:
 - a. Product names together with manufacturers, manufacturers' model numbers, lot numbers, batch numbers, source of supply, and other information as required to specifically identify exact materials used.
 - b. Include mix proportions for mortar and grout and source of aggregates.

1.8 TESTING AND INSPECTIONS

- A. The work of this section shall be subject to continuous inspection by an inspector. Owner shall employ and pay for the services of a testing laboratory.
- B. All tests and inspections herein are to be performed by an independent testing laboratory.

1.9 CONSTRUCTION TOLERANCES

- A. Variation from Plumb:
 - 1. For vertical lines and surfaces of walls and arises, do not exceed 1/4" in 10'-0", or 1/16" in 1'-0".
 - 2. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in 10'-0", or 1/16" in 1'-0.
 - 3. For multi-story buildings, do not exceed 1/4" inch per story, non-cumulative.
- B. Variation from Level: For lines of exposed lintels, sills, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20'-0" maximum, nor 1/2" in 40'-0" or more.

- C. Variation from Unit to Adjacent Unit: Do not exceed 1/32" maximum.
- D. Variation from Plane of Wall: Do not exceed 1/4" in 10'-0", and 1/16" in 1'-0".
- E. Variation from Level Coursing: Do not exceed 1/8" in 3'-0"; 1/4" inch in 10'-0"; 1/2" inch maximum.
- F. Variation of Joint Thickness: Do not exceed 1/8" in 3'-0".
- G. Maximum Variation from Cross Sectional Thickness of Walls: Do not exceed 1/4".

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.
- F. Scaffolding, runways, and ladders required for work under this section shall be provided by masonry contractor and shall be heavy trades type substantially built and in compliance with State labor laws, safety codes and other regulatory agencies as applicable to this project.

1.11 PROJECT CONDITIONS

- A. Environmental Requirements: Follow the product manufacturer's recommendations for environmental conditions and surface preparation.
 - 1. Temperatures: Before, during, and following the application of the MAVS mortars, the ambient and surface temperatures must remain above 40°F (4°C) until the mortar is fully dry. Material that is allowed to freeze before fully drying may suffer irreparable damage. Protect mortar from uneven and excessive evaporation, especially during hot, dry and/or windy weather.
 - 2. Substrates: All surfaces to receive application must be stable, structurally sound, clean and free of debris, dirt and dust, efflorescence, grease, oils, curing agents, cleaning solutions, coatings, sealers, or adhesive residues which may hinder bond. Smooth or painted cementitious surfaces can be prepared by mechanical means such as sandblasting or scraping. Do not apply MAVS mortars to substrates whose temperature is less than 40°F (4°C) or contain frost or ice.

3. Inclement Weather: Protect applied material from inclement weather until dry.
- B. Existing Conditions – Jobsite Resources: Provide access to electrical outlets, potable water, and a suitable work area at the construction site throughout the application of the adhered veneer.
- C. Protection of Masonry: During erection, cover top of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- D. Stain Prevention: Prevent grout, mortar and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar and soils that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
 2. Protect sills, ledges and projections from droppings of mortar.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.
 4. Contractor shall be responsible for leaving walls which are to receive finishes in a condition acceptable to the Architect. In the event that stains or spillages are not removed adequately, the Architect may direct the contractor to replace the work in question or (at the Architect's option) to provide a finish coating which will cover the defects involved. Such corrective work will be performed by the Contractor at no additional cost to the Owner.

1.12 MAINTENANCE

- A. The following materials shall be presented to the owner following the application of the Work:
 1. One box of veneer texture utilized on the project.
 2. A maintenance program for veneer as required.

1.13 WARRANTY / GUARANTEE

- A. System Warranty: Submit documentation on MAVS' standard system warranties. At the completion of Work, provide Omega Products International an application for a written system warranty and proof of purchase for the installation materials or confirmation from an Omega Products International representative. Omega Products International to provide a written warranty to the owner.
- B. Warranty Length: 20 years on the bonding mortars commencing at the time of substantial completion.
- C. Submit installers Warranty per Division 1 Specification Sections.

PART 2 – PRODUCTS

2.1 THIN BRICK VENEER MANUFACTURER AND PRODUCT – OFCI

- A. Provided by Owner: Thin Brick Veneer is provided by H.C. Muddox, to match manufacturer, product, size, and colors as existing on campus.

2.2 MASONRY ADHERED VENEER SYSTEM (MAVS) MANUFACTURER AND PRODUCT

- A. Manufacturer: Omega Products International (www.omega-products.com)
- B. System: MAVS 3000 (Masonry Adhered Veneer System).

2.3 SYSTEM FOR ADHERED THIN BRICK VENEER

- A. System shall consist of the following:

1. Prepared Substrate
2. Brown Coat
3. Bonding Mortar Skim Coat
4. Bonding Mortar – High Strength
5. Adhered Thin Brick Veneer
6. Masonry Mortar
7. Sanded Grout

2.4 THIN BRICK VENEER – FOR REFERENCE ONLY

- A. General: Comply with referenced masonry standards and other requirements indicated below applicable to each form of thin brick unit required.
1. Thin Brick Veneer Size and Shape: ASTM C1088, Type TBS, Grade Exterior.
 - a. “Norman”: Nominal size of 11-1/2 inch long by 2-1/2 inch high by 1/2 inch thick.
 - b. Soldier Course Brick: Nominal size of 11-1/2 inch long by 2-1/2 inch high by 1 inch thick.
 - c. 90 Degree Corners: One piece outside corners, nominal size of 11-1/2 inch long by 2-1/2 inch high by 3-5/8 inch return by 1/2 inch thick. No cutting allowed, except where trimming is required to fit dimensions shown on drawings.
 - i. Provide Lintel Corners where exposed.
 - ii. Provide Edge Corners where exposed.

- iii. Provide End Edge Corners where exposed.
- iv. Provide special shapes, as indicated for sills, jambs, control joints, expansion joints, headers, and other special conditions as required to complete the required installation of the replaced thin brick veneer.

2. Thin Brick Veneer Colors:

- a. Type 1 (Field): Blend of “Mission” with “Old Town Red”.
 - i. Contractor to submit a physical mock-up sample of color blend to match existing on site. Contractor must schedule a meeting with the Thin Brick Veneer supplier on site to determine the exact blend used prior to submitting physical color mock up. Digital pattern / color blend shall be submitted as well, for a large area (approximately 50' x 20'). Both the digital sample as well as the physical sample must be reviewed and approved prior to installation.
- b. Type 2 (Trim): “Frosted Almond”.

2.5 BONDING MORTAR

- A. General: Bonding mortar shall be polymer modified and exceed minimum local building code requirements and veneer manufacturer's requirements.
- B. Product: MAVS 3000 is a highly polymer-modified, factory blended masonry mortar that exceeds ASTM C270, TMS 402/602 shear strength, entire ANSI A118.4, entire ANSI A118.11, and entire ANSI A118.15 requirements manufactured by Omega Products International.

2.6 GROUTING MORTAR FOR THIN BRICK VENEER

- A. Product: MAVS Masonry Mortar & Grout with E-FX Admix and AkroLoc, manufactured by Omega Products International.
- B. Grout Materials: Manufactured with portland cement, lime, masonry aggregates and other proprietary additives. Exceeds ASTM C270 Type S or Type M mortar and ANSI A118.6 grout requirements.
 - 1. Compressive Strength: 3500 psi minimum, at 28 days.
 - 2. Color: As selected by Owner, CM, and Architect from thirty-six (36) standard colors to match existing on site.
- C. Admixtures
 - 1. E-FX Admix: Liquid admix to significantly reduce efflorescence.
 - 2. Omega AkroLoc: Liquid admixtures that reduce cracking and increase tensile, bond, and flexural strengths.

D. Finished Mortar and Grout: Resistant to urine, dilute acid, dilute alkali, sugar, brine and food waste products.

E. Expansion Joint Sealant: Polyurethane type complete with back-up rod and bond breaker materials as necessary. Refer to Section 07 92 00.

2.7 ADDITIVES AND ADMIXTURES

A. General: Additives and admixtures to mortar or grout shall not be used.

B. Sealant: MAVS Adhesive Sealant is a professional grade, fast-drying, non-sag sealant for use in expansion joints complying with ASTM 920 Type S, Grade NS, Class 50, Use T, M, G, A, O manufactured by Omega Products International, color as selected by Owner, CM, and Architect, to match existing on site.

C. Antifreeze Compounds: Antifreeze liquids, chloride salts or other such substances shall not be used in mortar or grout.

D. Air Entrainment: Air-entraining substances shall not be used in mortar or grout unless tests are conducted to determine compliance with the requirements of Section 2103A. Color: Only pure mineral oxide, carbon black or synthetic color may be used. Carbon Black shall be limited to a maximum of 3 percent of the weight of the cement.

E. Bonding Agent: Sika, "Grout-Aid" Type II or approved equivalent.

2.8 MASONRY CLEANERS

A. Job-Mixed Muriatic Solution: Solution of 1 part muriatic acid and 10 parts clean water, mixed in a nonmetallic container with acid added to water. Confirm acceptability of this solution with manufacturer prior to use.

2.9 MIXES

A. MAVS Bonding Mortar: Mixing instructions are contained in the appropriate product data sheets by Omega Products International.

B. Grout: Mixing instructions are contained in the appropriate product data sheets by Omega Products International.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with requirements for installation tolerances and other specific conditions, and other conditions which would affect the performance of the adhered thin brick veneer.

B. Prior to the application of the bonding mortar, the masonry contractor shall ensure that:

1. Surface and project conditions are met and are ready to receive Work.

2. Grounds and Blocking: Verify that the items within the walls for other sections of Work have been installed.
- C. Flashings: All flashing around windows, at deck attachments, utility penetrations, roof lines, etc. and all kick-out flashing must be properly installed prior to application of MAVS.
- D. Unsatisfactory conditions shall be reported to the general contractor and/or builder and/or architect and/or owner. Do not proceed until all unsatisfactory conditions have been corrected. Beginning of installation means acceptance of existing conditions.
- E. Examine as-built existing construction to verify actual locations prior to installation.

3.2 SUBSTRATE EXAMINATION AND PREPARATION

- A. Substrate: Clean the substrate to which the MAVS is to be applied, ensuring that there are no foreign materials present that could inhibit bond; including, but are not limited to, oil, dirt, dust form release agents, efflorescence, paint, wax, water repellants, moisture, and or frost. Verify that surfaces to be covered with thin brick veneer are not leveled with gypsum or asphalt based compounds.
- B. Surrounding Areas: Protect surfaces near this section's work from damage, disfiguration, and contact with mortar. Mask off all dissimilar materials.
- C. Refer to Section 09 24 00.

3.3 INSTALLATION – GENERAL

- A. Contractor to obtain recommended installation instructions for job specific requirements.
- B. This specification includes materials and methods of installation in more than one specification section but is not intended to limit or define scope of subcontractor work. Contractor is to determine specific responsibility between trades.
- C. Comply with referenced thin brick veneer unit standard and other requirements indicated applicable to each type of installation included in Project.
- D. Protect all existing to remain equipment, materials, and building.
- E. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- F. Make cut edges smooth, even and free from chipping. Do not split veneer units.

3.4 THIN BRICK VENEER INSTALLATION

- A. Install thin brick veneer to comply with referenced Manufacturer's Association (MVMA) "Installation Guide for Adhered Concrete Masonry Veneer", veneer manufacturer's specific written installation instructions, ASTM C1780 Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer, Tile Council of North America (TCNA) TCA 202, and ANSI A108.5 installation

standards for exterior applications over brown coat installation provided by Section 09 24 00 – Lath and Plaster.

- B. Prepared Substrate: Prepped and clean plaster system; substrate must be stable, structurally sound, clean and free of debris, dirt and dust, efflorescence, grease, oils, curing or release agents, cleaning solutions, coatings, sealers, or adhesive residues which may hinder bond prior to repair of brown coat or application of bonding mortar skim coat. The responsibility to ensure this surface properly prepared is the both the responsibility of the masonry contractor and lath and plaster contractor.
- C. Setting Bed / Brown Coat: As specified in Section 09 24 00.
- D. Bonding Mortar Skim Coat and Bonding Mortar Coat:
 - 1. **Refer to manufacturer's installations.**
 - 2. Mix and install bonding mortar skim coat and bonding mortar coat per the manufacturer's instructions as well as the adhered thin brick veneer's manufacturer's instructions.
 - 3. Bonding Mortar Skim Coat:
 - a. Exceed ASTM C270, TMS 402/602 shear strength, ANSI A118.4, ANSI 118.11, and ANSI 118.15 requirements
 - b. Efflorescence-resistant, which reduces chance of efflorescence from the mortar bed
 - c. Apply bond coat of modified mortar to a nominal thickness of 1/8 inch or nonsagging adhesive in accordance with the manufacturer's instructions.
 - d. Bonding mortar shall be polymer modified and exceed minimum local building code requirements and veneer manufacturer's requirements.
 - 4. Bonding Mortar – High Strength:
 - a. Exceeds ASTM C270, TMS 402/602 shear strength, ANSI A118.4, ANSI 118.11, and ANSI 118.15 requirements.
 - b. Efflorescence-resistant, which reduces chance of efflorescence from the mortar bed
 - c. Bonding mortar shall be polymer modified and exceed minimum local building code requirements and veneer manufacturer's requirements.
 - 5. Ensure complete coverage of bonding mortar skim coat and bonding mortar coat between the stucco basecoat and the back side of the thin veneer units.
 - 6. Quality control testing should be performed before and during application to ensure proper bond is achieved.
 - 7. Spread only as much as can be covered while the mortar surface is still wet

and tacky.

8. Fit thin veneer units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance.
9. Mortar, modified with latex or other suitable polymers, shall be applied to a thickness of 3/8 to 1-1/4 inches, with a minimum shear strength between the thin brick and substrate of 50 psi (345 kPa):
10. Per CBC 1404.10.1.4.3, the masonry veneer units shall be adhered to the mortar scratch coat with a nominal 1/2" thick (12.7 mm) setting bed of mortar complying with Sections 2103A and 2512.2 applied to create a full setting bed for the back of the masonry veneer units. The masonry veneer units shall be worked into the setting bed resulting in a nominal 3/8-inch (9.5 mm) setting bed after the masonry veneer units are applied.
11. When hot, dry, or windy conditions exist, provide additional moisture or other protection to prevent flash drying of the mortar.

E. Adhered Thin Brick Veneer:

1. Allowing for a mortar joint of 3/8"–1/2", calculate and mark off the number of courses required. Adjust joint size to minimize horizontal cutting. Run level guide lines to ensure proper placement of bricks. Mix brick from several boxes at a time to achieve a pleasing blend of color and texture.
2. Allow thin-set bond coat setting bed to cure for a minimum number of days as recommended by manufacturer, before application of mortar and thin brick. Allow longer mortar bed cure time if influenced by environmental conditions at jobsite.
3. Immediately prior to applying mortar, saturate substrate surface evenly but without leaving surface water.
4. Trowel (back-butter) 1/8 inch to 3/16-inch thick mortar on back of each veneer unit, completely, from edge to edge. DO NOT COVER JUST THE PERIMETER.
5. Use the proper sized notched trowel to ensure full adhesion of the veneer product. Notched trowels with 1/4" x 3/8" x 1/4" (6 mm x 9 mm x 6 mm) notches are often used for smaller veneer, and 1/2" x 1/2" x 1/2" (12 mm x 12 mm) notches are used for large or heavy veneer.
6. Key (press or burn) a thin layer of mortar into the substrate using the flat edge of a trowel.
7. Comb on additional mortar using the notched side of the trowel. Do not allow mortar to skin over (begin drying) before applying veneer.
8. Apply additional mortar to back of the veneer (back-buttering) to ensure sufficient mortar to completely fill the space between the veneer and the substrate.

9. Set the veneer over freshly notched troweled wet mortar, applying firm pressure to flatten the ridges so mortar is exuded at all edges assuring complete bond. buttered masonry veneer units should be firmly worked onto the wet notched adhesive coat and slid slightly back and forth or with a slight rotating motion.
10. Tight fitted masonry veneer should be applied from the corners toward the middle of the wall, and from the bottom toward the top of the wall.
11. Align tile or veneer immediately after placement. Veneers that have been set for more than 10 - 15 minutes should not be readjusted. If any adjustment is needed after set time, scrape off existing mortar and reapply with fresh mortar as described above.
12. Periodically check already placed veneer to verify that the notches are completely flattened and there is 100% coverage on both the substrate and veneer.
13. Clean excess latex portland cement mortar from masonry veneer and joints between pieces before mortar dries.

F. Grouting:

1. Install grout per grout and veneer manufacturer's product datasheets. Apply grout to match approved appearance.
2. Verification: Verify the grout color matches the approved sample and/or mock-up prior to installation.
3. Verify grout joints are free of dirt, debris or spacers. Sponge or wipe dust/dirt off veneer face and remove any water standing in joints. Surface and air temperature must be between 40-90°F (4-32°C).
4. Keep grout out of spaces to receive sealants.
5. Fill joints completely using a grout bag, grout float, mortar gun or other mortar delivery device, as allowed by manufacturer. Apply material as needed to cover all voids and gaps to ensure that the material is well compacted. When grout has started to set, approximately thumbprint hard, rake out excess mortar, compact and seal edges around stones. A wet brush or sponge should never be used to treat the mortar joints as this will cause staining that will be difficult or impossible to remove.

G. Expansion and Control Joints:

1. Joints in the substrate must align with joints in substrate. Provide expansion or control joints as shown in contract drawings and/or per local codes.
2. Joints in the substrate must be carried through the veneer.
3. Joints should be provided where the veneer abuts restraining surfaces or changes in plane.

- H. Drying & Curing: Curing and/or drying time may vary due to climate and job conditions. Drying should occur within 24 hours at an ambient and surface temperature of 70°F (21°C) and 55% R.H. When hot, dry, or windy conditions exist, protection should be provided. All freshly applied material must be protected from inclement weather until fully dry. Full adhesion strength should take three to seven days. Full curing strength typically occurs in approximately 28 days.

3.5 CONSTRUCTION TOLERANCES

- A. Comply with construction tolerances of referenced unit masonry standard.

3.6 LAYING ADHERED THIN BRICK VENEER WALLS

- A. Place masonry to lines and levels indicated to the following tolerances:
1. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
 2. Variation from Plane of Wall: 1/4 inch to 10 feet, and 1/16 inch in 1 foot.
 3. Variation from Plumb: 1/4 inch per story non-cumulative.
 4. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
 5. Variation of Joint Thickness: 1/8-inch in 3 feet.
 6. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Do not install cracked, broken, or chipped masonry units.
- D. Lay only dry masonry units.
- E. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- F. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- G. Bond Pattern for Exposed Masonry: Lay exposed masonry to match existing bond pattern.
- H. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Built-in Work: As the work progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

3.7 REPAIR, POINTING, AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning:
 - 1. Keep clean. Remove excess materials and mortar droppings daily.
 - 2. Cleaning: Clean unwanted mortar from surfaces with clean water and/or brush before it hardens. Remove any and all materials used and all protective masking.
 - 3. After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - a. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - b. Test cleaning methods on sample wall panel; leave ½ panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - c. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
 - d. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
- D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer that ensures unit masonry work is without damage and deterioration at time of Substantial Completion.

END OF SECTION.

DIVISION 5 – METALS

05 12 00 – Structural Steel Framing

05 50 00 – Metal Fabrications

05 52 13 – Pipe and Tube Railings

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SECTION 05 12 00 – STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
- B. Related Requirements:
 - 1. Section 05 50 00 – Metal Fabrications, for miscellaneous steel fabrications and other steel items not defined as structural steel.

1.3 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Protected Zone: Structural members or portions of structural members indicated as "protected zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- D. Demand-Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the seismic-load-resisting system and which are indicated as "demand critical" on Drawings.

1.4 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at project site.

1.6 ACTION SUBMITTALS

A. Product Data:

1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Anchor rods.
4. Threaded rods.
5. Shop primer.
6. Galvanized-steel primer.
7. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand-critical welds.
8. Identify members not to be shop primed.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand-critical welds.

1.7 INFORMATIONAL SUBMITTALS

A. Welding certificates.

- B. Mill test reports for structural-steel materials, including chemical and physical properties.
- C. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 - 2. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 3. Shear stud connectors.
- D. Survey of existing conditions.

1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, **[Category ACSE]**.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.
 - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 1. ANSI/AISC 303.
 2. ANSI/AISC 341.
 3. ANSI/AISC 360.
 4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 1. Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

- A. Plate and Bar: ASTM A36, ASTM A572, Grade 50 where indicated on drawings
- B. Wide-flange shapes: ASTM A992.
- C. Angles and Channel: ASTM A36.
- D. Cold-Formed Hollow Structural Sections: ASTM A500 Grade C.
- E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125, Grade A325 Type 1, heavy-hex steel structural bolts;
- B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125, Grade A490 , Type 1, heavy-hex steel structural bolts
- C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125 Grade F1852, Type 1, heavy-hex or round head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH , heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers.
 1. Finish: Plain

- D. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

- A. Unheaded Anchor Rods: ASTM F1554, Grade as indicated on drawings, weldable
 1. Configuration: Straight .
 2. Nuts: ASTM A563 (ASTM A563M) heavy hex carbon steel.
 3. Plate Washers: ASTM A36/A36M carbon steel.
 4. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.
 5. Finish: Plain.

2.5 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, Pretensioned or Slip critical as indicated on drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
 - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2.9 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces unless indicated to be painted
 - 6. Surfaces enclosed in interior construction.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 - 1. SSPC-SP 2.
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a

minimum dry film thickness of 1.5 mils . Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

- E. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 2. Bolted Connections: Inspect and test shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
 4. Prepare test and inspection reports.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates: Clean bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection, unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened, Pretensioned or Slip critical as indicated on drawings.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
 1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
 4. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 5. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - i. Liquid Penetrant Inspection: ASTM E165/E165M.
 - ii. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - iii. Ultrasonic Inspection: ASTM E164.
 - iv. Radiographic Inspection: ASTM E94/E94M.

END OF SECTION.

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SECTION 05 50 00 – METAL FABRICATIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: Items of miscellaneous metal and related accessory items required for the project and which are not specified elsewhere. Such items include, but are not necessarily limited to:
1. Structural Straps/Connectors.
 2. Sleeves for miscellaneous metal items.
 3. Grouting required for setting miscellaneous metal items.
- B. Related Sections:
1. Section 09 9100, Painting.
 2. Division 26 00 00, Electrical.

1.2 SUBMITTALS

- A. Shop Drawings: Show dimensions, sizes, thicknesses, gages, finishes, joining, attachments, and relationship of work to adjoining construction. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from Drawings.
1. Where materials must be set to exact locations to receive work, furnish assistance and direction necessary to permit other trades to properly locate their work.
 2. Where welded connectors and inserts are required to receive work, show exact locations required. Furnish drawings to the trades responsible for installing the connectors or inserts.
 3. Catalog work sheets showing illustrated cuts of item to be furnished, scale details and dimensions may be submitted for standard manufactured items.
 4. Design shop drawings under direct supervision of professional engineer experienced in design of this work, licensed in the State of California.

1.3 QUALITY ASSURANCE

- A. Qualifications: Welding procedures, welders, and tackers for structural metal work shall be qualified in accord with CBC.
- B. References and Standards: The following references and standards are hereby made a part of this Section. Miscellaneous and ornamental metal work shall conform to the applicable requirements therein except as otherwise specified herein or shown on the Drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements or governing rules and regulations.

1. "Code for Arc and Gas Welding in Building Construction" of the American Welding Society, AWS D1.1, latest edition with current supplements, revisions and addenda. Welded connections; use standard AWS A2.0 welding symbols. Indicate net weld lengths.
2. "Pipe Railing Manual", published by National Assn. of Architectural Metal Manufacturers (NAAMM).
3. "Metal Bar Grating Manual", published by National Assn. of Architectural Metal Manufacturers (NAAMM).
4. Steel Structures Painting Council (SSPC) Surface Preparation Specifications, Vol. 2, Painting Manual.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Standard Structural Steel Shapes, Bars and Plates: ASTM A36, latest edition and ASTM A283, latest edition.
- B. Architectural and Miscellaneous Steel Items: ASTM A 283, latest edition, grade optional.
- C. Steel Tubing:
 1. Cold Formed: Grade A or B per ASTM A 500 latest edition.
 2. Hot Formed: Welded or seamless per ASTM A 501 latest edition.
- D. Steel pipe:
 1. ASTM A 53, Grade B,
- E. Sheet steel: ASTM A 446, grade B, structural quality with galvanized coating.
- F. Fastenings - General: Furnish bolts, nuts, screws, clips, washers and other fastenings necessary for proper erection of items specified herein. Use stainless steel or hot dip galvanized on exterior. On interior, match adjacent material. Bolts, ASTM Grade A 307.
- G. Welding Electrodes: As permitted by AWS Code D1.1. Where exposed, select filler metal to match base metal. Use E70xx electrodes.
- H. Paint Primer: Fed. Spec. TT-P-86, Type II or TT-P-645, zinc chromate.
- I. Non-Shrink Grout: Sauereisen No. F-100, Sonneborn-Contech "Fondag", Upco "Upcon", 5-Star, Master Builders "Masterflow 713", or approved equal, non-metallic, non-staining, premixed grout having a min. compressive strength at 28 days as required by Structural Drawings.

2.2 FINISHES

- A. Finishes shall be as noted in the following paragraphs, except as otherwise noted on the drawings or specified.
- B. Exterior Ferrous Metal and Interior Ferrous Metal Exposed to Continuing Moisture: Welds, burrs, and rough surfaces ground smooth after fabrication and completed assembly hot-dipped galvanized and then given one shop prime coat of paint.
- C. Interior Ferrous Metal: Welds, burrs, and rough surfaces ground smooth and completed assembly cleaned, hot phosphate treated, and given one shop prime coat of paint. Hot phosphate treatment not required on items that are not exposed in the finished work or on those items where size prohibits such treatment. Indicate on shop drawings where size prohibits such treatment. Indicate on shop drawings where treatment is proposed to be omitted.
- D. Exposed Fastenings: Match color and finish of adjacent material.

2.3 QUALITY

- A. Structural steel used for metal fabrications of this section shall conform to ASTM A 36, ASTM A500, or ASTM A53.
- B. Welds used shall be made with E70XX electrodes.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Inspect surfaces to receive metal work and report defects that would interfere with the installation to the Architect. Starting work implies acceptance of surfaces as satisfactory.

3.2 CONSTRUCTION

- A. General Requirements:
 - 1. Verify measurements at project site.
 - 2. Coordinate metal work with adjoining work for details of attachment, fittings, etc. Do cutting, shearing, drilling, punching, threading, tapping, etc., required for metal or for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.
 - 3. Conceal fastenings where practical. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.
 - 4. Make permanent connections in ferrous metal surfaces using welds where possible; do not use bolts or screws where they can be avoided.
 - 5. Provide lugs, clips, anchors, and miscellaneous fastenings necessary for the complete assembly and installation.

6. Set work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed moldings and frames unless otherwise noted.
7. Do grouting of frames, plates, sills, bolts, and similar items with non-shrink grout.
8. Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.
9. Protect dissimilar metals from galvanic corrosion.

B. Welding:

1. Perform all welding in accord with AWS Code D 1.1.
2. Welds shall be made only by operators experienced in performing the type of work indicated.
3. Welds normally exposed to view in the finished work shall be uniformly made and ground smooth.
4. Where welding is done in proximity to glass or finished surfaces, protect such surfaces from damage due to weld sparks, spatter, or tramp metal.

C. Bolted, Screwed, and Riveted Connections:

1. In general, use bolts for field connections only and then only as detailed. Provide washers under all heads and nuts bearing on wood. Draw all nuts tight and upset threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.
2. Where screws must be used for permanent connections in ferrous metal, use flat head type, countersunk, with screw slots filled and finished smooth and flush.
3. Where rivets are used, they shall be machine driven tight, heads centered, countersunk, and finished flush and smooth.

D. Surface Treatment and Protective Coatings:

1. Cleaning: Thoroughly clean mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to galvanizing, hot phosphate treatment or painting. Conditions that are too severe to be removed by hand cleaning methods shall be cleaned as per SSPC "Surface Preparation Specifications", "Solvent Cleaning, SSPC-SP1-63"; "Power Tool Cleaning, SSPC-SP 3-36"; or "Brush-Off Blast Cleaning, SSPC-SP 7-63", as required.
2. Hot Phosphate Treatment: Conform to SSPC-PT-4.
3. Painting: After material has been properly cleaned and treated, apply shop prime coat of paint to surfaces except those encased in concrete or masonry. Apply paint as per manufacturer's directions. Spot paint abrasions and field

connections after assembly. Shop coat must be dry prior to shipment to project site. Unless otherwise specified or directed, do not apply shop prime coats or stenciled or painted identification markings to galvanized surfaces.

4. Galvanizing: Conform to ASTM A 123-78 for rolled, pressed and forged shapes, plates, bar and strip; A 153-78 for hardware items and A 386-78 for assembled steel products. Conform to ASTM A 384-76 and A 385-76, Recommended Practices, pertaining to galvanized assembled steel products. Unless otherwise permitted, do galvanizing after fabrication, in largest sections practicable. Where galvanizing is removed by welding or other assembly procedure, touch-up abraded areas with molten zinc or zinc-rich paint.

3.3 PROTECTION AND CLEANING

- A. Remove soil and foreign matter from finished surfaces and apply such protective measures as may be required to prevent damage or discoloration until acceptance of project. Protection of work and initial cleaning shall be the responsibility of each installer or erector until the installation is completed, whereupon the responsibility for subsequent protection and final cleaning shall pass to the General Contractor for the entire project. Remove protective coverings prior to acceptance of Work.

END OF SECTION.

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SECTION 05 52 13 – PIPE AND TUBE RAILINGS

PART 1 – GENERAL

1.1 PRINCIPAL WORK IN THIS SECTION

- A. The requirements of the District's General Conditions, Supplementary Conditions, and Division 1 - General Requirements apply to the work of this Section.
- B. Coordinate the work of this Section with related trades.
- C. Verify applicable dimensions at the jobsite.
- D. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified herein and as necessary to complete the work required by project conditions, including but not limited to:
 - 1. Metal handrails: Welded and seamless handrail assembly including attachment to varied substrates including but not limited to; stringers, guardrails, steel beams, misc. structural framing & concrete and/or work as indicated on the drawings and as herein specified.
 - 2. Metal guardrails: Welded and seamless handrail, including attachment to varied substrates including but not limited to; stringers, steel beams, misc. structural framing & concrete and/or work as indicated on the drawings and as herein specified.
 - 3. Skate Deterrents.

1.2 RELATED WORK/SECTIONS

- A. Related work includes, but is not limited to, the following:
 - 1. Concrete flatwork
 - 2. Cast in Place Concrete
 - 3. Painting
- B. Related Sections include, but are not limited to the following:
 - 1. Section 01 45 23 – Testing and Inspections
 - 2. Section 02 41 19 – Selective Demolition
 - 3. Section 03 20 00 – Concrete Reinforcing
 - 4. Section 03 30 00 – Cast-In-Place Concrete
 - 5. Section 09 91 00 – Painting
- C. Related Documents include, but are not limited to the following:
 - 1. Supplemental Conditions

1.3 REFERENCE STANDARDS

- A. 2022 California Code of Regulations (CCR), Title 24, California Building Standards Commission (CBSC) www.bsc.ca.gov current edition at time of permit issuance.
- B. Title 24, California Code of Regulations, California Building Standards Commission.
- C. ATBCB ADAAG – Americans with Disabilities Act Accessibility Guidelines, current version.
- D. CBC Energy Code, California Code of Regulations, Title 24, Part 6, California Building Standards Commission
- E. Title 24, Chapter 11 – California Green Building Standards Code
 - 1. Non-residential new construction
 - a. All occupancy types
 - b. First time Tenant Improvements
- F. Refer to specifications, including, but not limited to Division 1 Sections in reference to Building Codes, Associations, Standards, Definitions and Miscellaneous Requirements.
- G. Aluminum Association (AA):
 - 1. Aluminum Standards and Data
 - 2. Designation System for Aluminum Finishes
- H. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 605.1 Specification for High Performance Organic Coatings on Architectural Extrusions and Panels
 - 2. AAMA 605.2 Specification for High Performance Organic Coatings Architectural Extrusions and Panels
 - 3. AAMA 606.1 Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
 - 4. AAMA 607.1 Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
 - 5. AAMA 608.1 Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- I. American Concrete Institute (ACI):
 - 1. ACI 347-14 Recommended Practice for Concrete Formwork

J. American Institute of Steel Construction (AISC):

1. Manual of Steel Construction
2. ASD Manual of Steel Construction
3. Manual of Steel Construction

K. American Iron and Steel Institute (AISI):

1. Steel Products Manual:
 - a. Carbon Steels
 - b. Stainless and Heat Resisting Steels

L. American National Standards Institute (ANSI):

1. ANSI A117.1 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People
2. ANSI A1264.1 Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems
3. ANSI Z97.1 Safety Performance Specifications & Methods of Test for Safety Glazing Material Used in Buildings. Amended by Supplement Z97.1

M. American Society of Civil Engineers (ASCE): www.asce.org

1. ASCE 7-22 Minimum Design Loads for Buildings and Other Structures

N. American Society for Testing and Materials (ASTM):

1. ASTM A36 Specification for Structural Steel.
2. ASTM A47 Malleable Iron Castings.
3. ASTM A48 Gray Iron Castings.
4. ASTM A53 Black and Hot-Dipped, Zinc-Coated, Welded and Seamless Steel Pipe.
5. ASTM A123 Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Shapes, Plates, Bars, and Strip
6. ASTM A167 Stainless Steel & Heat Resisting Chromium-Nickel Steel for Plate, Sheet & Strip
7. ASTM A269 Seamless & Welded Austenitic Stainless Steel Tubing for General Service
8. ASTM A312 Seamless and Welded Austenitic Stainless Steel Pipe.
9. ASTM A473 Stainless and Heat-Resisting Steel Forgings.
10. ASTM A500 Cold-Formed Welded & Seamless Carbon Steel Tubing in Rounds & Shapes
11. ASTM A501 Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
12. ASTM A743 Corrosion-Resistant Iron-Chromium, Iron-Chromium-Nickel, and Nickel Base Alloy Castings for General Application.

13. ASTM B26 Aluminum-Alloy Sand Castings.
14. ASTM B43 Standard Sizes of Seamless Red Brass Pipe.
15. ASTM B62 Composition Bronze or Ounce Metal Castings.
16. ASTM B209 Aluminum Alloy Sheet and Plate.
17. ASTM B210 Aluminum Alloy Drawn Seamless Tubes.
18. ASTM B221 Aluminum Alloy Bars, Rods, Wires, Shapes and Tubes.
19. ASTM B241 Aluminum Alloy Seamless Pipe and Seamless Extruded Tube.
20. ASTM B247 Aluminum Alloy Die and Hand Forgings.
21. ASTM B429 Aluminum Alloy Extruded Structural Pipe and Tube.
22. ASTM B455 Copper-Zinc-Lead Alloy (Leaded Brass) Extruded Shapes.
23. ASTM B584 Copper Alloy Sand Castings for General Applications.
24. ASTM C595 Blended Hydraulic Cements.
25. ASTM E894 Test Method for Anchorage of Permanent Metal Railing Systems and Rails
26. ASTM E935 Test Method for Performance of Permanent Metal Railing Systems and Rails
27. ASTM E985 Specification for Permanent Metal Railing Systems and Rails
28. ASTM E1481 Terminology of Railing Systems and Rails for Buildings

O. American Welding Society (AWS):

1. AWS A5.10 Aluminum and Aluminum Alloy Bare Welding Rods and Electrodes.
2. AWS A5.3 Aluminum and Aluminum Alloy Covered Arc Welding Electrodes.
3. AWS A5.7 Copper and Copper Alloy Bare Welding Rods and Electrodes.
4. AWS A5.6 Covered Copper and Copper Alloy Arc Welding Electrodes.
5. AWS A5.9 Corrosion-Resisting Chromium & Chromium-Nickel Steel Bare & Composite Metal Cored and Stranded Arc Welding Electrodes & Welding Rods.
6. AWS A5.4 Corrosion-Resisting Chromium & Chromium-Nickel Steel Covered Electrodes.
7. AWS A5.22 Corrosion-Resisting Chromium & Chromium-Nickel Steel Electrodes, Flux Cored
8. AWS A5.14 Nickel and Nickel-Alloy Bare Welding Rods and Electrodes.
9. AWS A5.11 Nickel and Nickel-Alloy Covered Welding Electrodes.
10. AWS At.1 Steel, Carbon, Covered Arc Welding Electrodes.
11. AWS A5.20 Steel, Carbon, Electrodes for Flux Cored Arc Welding.
12. AWS A5.18 Steel, Carbon, Filler Metals for Gas Shielded Arc Welding.
13. AWS D1.1 Structural Welding Code – Steel
14. AWS D1.3 Structural Welding Code - Sheet Steel
15. AWS Welding Procedure and Performance Qualification

P. Copper Development Association (CDA):

1. Standards Handbook, Wrought Copper and Copper Alloy Mill Products, Part 2 – Alloy Data.
2. Standards Handbook, Cast Copper and Copper Alloy Products, Part 7 – Alloy Data.
3. Copper, Brass and Bronze Design Handbook for Architectural Applications.

Q. General Services Administration (GSA), Federal Specifications (FS):

1. TT-P-641G (1) Primer Coating; Zinc Dust Oxide (for Galvanized Surfaces).
2. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.

R. National Association of Architectural Metal Manufacturers (NAAMM):

1. Metal Finishes Manual
2. Metal Stairs Manual
3. Pipe Railing Manual

S. National Fire Protection Association (NFPA): 101 Life Safety Code

T. NOMMA: Guideline 1 - Joint Finishes

U. SSPC: Steel Structures Painting Manual, Volume 11

V. Steel Structures Painting Council (SSPC):

1. SP2 Specification for Hand Tool Cleaning.
2. SP3 Specification for Power Tool Cleaning.

1.4 PERFORMANCE, TESTING AND INSPECTION

A. General:

1. Comply with manufacturer's standards.
2. Comply with Building Code.
3. Job site inspections shall be done as herein specified and as listed in drawings.
4. Refer to Division 1 for additional requirements for DSA-Reviewed Projects

B. Standards:

Item	Name of Test	Performance	Testing Std.
Welds	Type	Ornamental Quality, Type 1	NAAMM AMP 521-01
Welding personnel	Qualifications	Welding: All welding shall be done by certified welders per AWS	AWS D1.1

Assembly	Welded connections / assembly	Comply	NAAMM AMP 521-01
	Structural Design		ASTM E894, E935, E985 & E1481 ASCE 7 ANSI A117.1 & A1264.1 NFPA 101
Railing assembly	Allowable vertical and horizontal loading	<p>Handrail: (top rail) <u>Lateral load:</u> The mounting of the handrail shall be such that the completed handrail and supporting structure are capable of withstanding a load of at least 200 pounds applied in any direction at any point on the rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails. <u>Vertical load:</u> The mounting of the handrail shall be such that the completed handrail and supporting structure are capable of withstanding a load of at least 200 pounds applied in any direction at any point on the rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails.</p> <p>Guardrails: (top rail) <u>Lateral Load:</u> The mounting of the guardrail shall be such that the completed guardrail and supporting structure are capable of withstanding a load of at least 50 pounds per linear foot applied horizontally at right angles to the top rail. These loads shall not be assumed to act cumulatively with loading on intermediate rails.</p> <p>Intermediate rails: <u>Lateral load:</u> Intermediate rails, panel fillers & their connections shall be capable of withstanding a load of 25 pounds per square foot applied horizontally at right angles over the entire tributary area, including openings and spaces between rails. Reactions due to this loading need not be combined with those of the top rail.</p>	Building Code
Refer to drawings and as herein specified			

C. Construction Testing:

Item	Name of Test	Performance Results	Testing Std.
Handrails, Intermediate rails and Guardrails	Loading	As herein specified	Building code and as herein indicated

D. Construction Monitoring/Observations by others:

Item	Name of Test	Performance Results	By Whom
Metal	Const. Waste Management	Comply	Refer to Section 01 50 13 – Construction Waste Management and Recycling

1.5 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittals, Substitutions and Deviations.
- B. Submit O&M (Operation and Maintenance) manuals in accordance with Section 01 77 00 and as herein specified.
- C. Submit Manufacturer’s data and shop drawings.
 - 1. Dimensioned erection drawings, elevations, and details which clearly show:
 - a. Indicate locations of all railing systems in relationship to building components
 - b. Indicate all railing materials and provide finish samples with appropriate finish
 - c. Provide all shop drawings at ¼" scale including 3"=1'-0" scale details
 - d. Elevations which indicate:
 - i. Profiles, sizes, connection attachment, reinforcing, anchorage, openings, size and type of fasteners, and accessories.
 - e. Connecting and joining methods and the relationship to adjoining work by others for railing system and material.
 - f. Indicate welded connections using standard AWS welding symbols.
 - g. Indicate net weld lengths
 - h. Show locations for anchor and bolt installation
 - i. Structural Engineering calculations.

- i. All sheets of the drawings shall be stamped and wet signed by a California Professional Engineer; including the cover sheet of the design calculations.
- ii. Painting in accordance with Section 09 91 00.

1.6 QUALITY ASSURANCE

- A. Refer to Section 01 45 23 – Testing and Inspections.
- B. Contractor /Installer/Fabricator shall have been in business for five (5) years. providing/installing/finishing projects of similar size and complexity.
- C. Manufacturer shall have been in business for five (5) years providing/installing/finishing projects of similar size and complexity.
- D. Material with lead times in question or confirmed to be in conflict with meeting the schedule and sequence of construction must be documented at time of bid
- E. Stipulations:
 1. All loading conditions resulting in eccentricities or torsion to beams and/or columns shall be resolved by the installation of stiffeners and diagonal struts, designed, supplied, and installed by the General Contractor & engineered by Professional Engineer licensed in the State of California.
- F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
 1. Agenda for meeting shall include, but not be limited to;
 - a. Substrates
 - b. Layout
 - c. Finishing
 2. General Contractor shall request meeting 5 days in advance of construction.

Miscellaneous Criteria: All the work shall be designed and approved with written certification and structural calculations prepared and wet signed by a Professional Engineer, registered to practice in the State where project is located.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 66 00 – Product Delivery, Storage and Handling.
- B. Deliver all parts ready for erection; store in close proximity to final locations.
- C. Deliver materials to the job site in good condition and properly protected against damage to finished surfaces.

D. Storage on site:

1. Store material in a location and in a manner to avoid damage.
 - a. Stacking shall be done in a way which will prevent bending.
2. Store aluminum, bronze and stainless steel components and materials in clean, dry location, away from uncured concrete and masonry.
 - a. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that will permit circulation of air inside the covering.

E. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of materials.

1. For carbon steel, comply with the Code of Practice, Sections 6 and 7 of the AISC Manual of Steel Construction on delivery and erection.

1.8 JOB CONDITIONS

- A. Field-verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

1.9 PROTECTION

- A. Protect finish surfaces at all times from surfaces and material adjacent to them.
- B. Finish work defaced with other materials on surface shall be replaced.
- C. Protect work under this section from damage by other trades.

1.10 GUARANTEE / WARRANTY

- A. Refer to Sections 01 77 00 – Contract Closeout and Final Cleaning and 01 78 36 – Warranties.
- B. Furnish one (1) year written warranty signed by manufacturer and installer agreeing to repair and/or replace work which has failed as a result of defects in materials or workmanship.
 1. Upon notification of District within the warranty period, such defects shall be repaired and replaced at no cost to the District.

1.11 SYSTEMS DESCRIPTION

A. Performance requirements:

1. Handrails, guardrail and railing assemblies shall be constructed & installed from listed materials & misc. items as required to complete assemblies.
2. Complete engineering shall be designed & provided along with shop drawings.

1.12 OPERATION AND MAINTENANCE DATA

- A. Submit as part of project closeout:
 - 1. Complete instructions regarding maintenance of the materials, finishes, etc.
 - 2. Comply with Sections 01 77 00 – Contract Closeout and Final Cleaning and 01 78 23 – Operation and Maintenance Data.

1.13 SEQUENCING AND SCHEDULING

- A. Schedule work and sequence with General Contractor.
- B. Schedule required testing, prior to the installation of materials, components, etc.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single source responsibility, specified items shall be from one manufacturer.
- B. Acceptable manufacturer / fabricator shall be one of the following and as herein listed and in Drawings:
 - 1. Wagner / Braun, www.wagnercompanies.com, 888.243-6914
 - 2. Reviewed Equivalent by Architect.
 - a. Substitutions and deviations shall require Architect's approval and shall be given in letterform.
 - b. Refer to Division 1, Section 01000 and Section 01 33 00 – Submittals Procedures Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
- D. Refer to drawings, details, and other related specification section whether listed or not.
- E. Details shall set basic requirements for size and configuration of systems.

2.2 MATERIALS

- A. General:
 - 1. Carbon Steel:
 - a. Structural Plate: ASTM A36
 - b. Structural Shapes and Bars: ASTM A36

- c. Structural Pipe: ASTM A53
 - i. Black and Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe
- d. Structural Tubing: ASTM A500
 - i. Cold Formed Welded and Seamless Tubing in Rounds and Shapes
- e. Castings:
 - i. ASTM A47 Malleable Iron Castings (Grade 32510)
 - ii. ASTM A48 Gray Iron Castings (Class 30) Where Applicable
- B. Other Materials: Recommended by manufacturer and subject to Architect's and Engineer's review and acceptance. Provide all materials required to complete and make system operational.
- C. Railing System:
 - 1. Railing system shall be permanently anchored.
 - 2. Rails and Posts:
 - a. Fabricate rails and posts from indicated material and size, conforming to finish herein indicated. Provide reinforcements compatible with the metal used for posts.
 - b. Steel Tubing: Cold formed, ASTM A500-B & A513
 - c. Steel Pipe: ASTM A53, Type & grade selected by fabricator as required by design loads, design and applicable codes.
 - d. Rail diameter = 1.5 inches o.d. max. (1.25" o.d. min)
 - e. All connections, joints, splices, elbows and T-shapes shall be pre-manufactured constant section and radius fittings with sleeve connector inside shoulders.
 - f. All mechanical fasteners used in the assembly to structure shall be 1/4" thick steel galvanized plate as indicated, pre-drilled for mechanical mounting, or welding as required.
 - g. Refer to drawings for handrails and railing configuration and elevation.
 - h. Perforated metal panels.
- D. Reinforcing Bars: ASTM A615, Grade 40, deformed

- E. Posts: Fabricated posts from indicated material and sizes, conforming to finish herein indicated. Provide reinforcements compatible with the metal used for posts.
- F. Fittings:
1. Fabricated elbows, tees, splice-connections, end caps, etc. from indicated material, sizes and finishes to match railing type.
 - a. All connections shall be welded.
- G. Sleeves and Inserts: Furnish only, for installation by others, all necessary sleeves and inserts fabricated from materials compatible with specific railing system.
- H. Mounting Flanges and Anchor Plates: Fabricate mounting flanges and anchor plates where indicated from indicated materials, sizes and finish to match railing type.
- I. Handrail Brackets:
1. Metal: Match specific railing system material and finish.
 2. Type: Extruded.
 3. Style: As shown on Architect’s details.
- J. Skate Deterrents
1. Manufacturer: Stake Stoppers, www.skatestoppers.com
 2. Products: Skate Deterrents
 3.

<u>Series:</u>	<u>Model:</u>	<u>Product:</u>	<u>Type:</u>	<u>Pipe Radius</u>
Handrails	HR1.6	Smooth curve	Surface applied	1.6” O.D.
Handrails	HR1.9	Smooth curve	Surface applied	1.9” O.D.
Handrails	HRAS1.5	Grooved curve	Surface applied	1.5” O.D
Handrails	HAND1.6	Stepped top	Surface applied	1.6” O.D.
Handrails	HAND1.9	Stepped top	Surface applied	1.6” O.D.
Handrails	HR1.6	Stepped Top	Surface applied	1.9” O.D.
Handrails	OakHAND1.9	Leaf	Surface applied	1.9” O.D.
SurfaceOval	Strip	4.0” x .25”		N/A
 4. Material: Cast Aluminum, 6061-T6
 5. Color: Clear

6. Spacing: 24" o.c. maximum and evenly spaced with joints
7. Mounting: Per Manufacturer's recommendations

2.3 OTHER MATERIALS – FILLER METAL

A. Aluminum: AWS

1. AWS A5.3 Aluminum and Aluminum Alloy Covered Arc Welding Electrodes
2. AWS A5.10 Aluminum and Aluminum Alloy Bare Welding Rods and Electrodes

B. Copper Alloys:

1. For "white metal", nickel and nickel alloys, specify AWS A 5.11 or A 5.14.
2. AWS A5.6
3. AWS A5.7

C. Carbon steel: AWS [A 5.1-] [A 5.18-] [A 5.20-].

1. AWS A5.18 Carbon Steel Electrodes and Fluxes for Submerged Arc Welding, E70S-X or E70U-1 Electrode
2. AWS A5.20 Carbon Steel Electrodes for Flux Cored Arc Welding, E70T-X Electrode

D. Stainless steel:

1. AWS A5.4 Covered Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Electrodes
2. AWS A5.9 Corrosion-Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Welding Electrodes and Welding Rods
3. AWS A5.22 Flux Cored Corrosion-Resisting Chromium and Chromium-Nickel Steel Electrodes

E. Carbon and low alloy steel:

1. AWS A5.1 Covered Carbon Steel Arc Welding Electrodes
2. AWS A5.5 Low Alloy Steel Covered Arc Welding Electrodes

2.4 OTHER MATERIALS – FASTENINGS

A. Mechanical types:

1. Exposed fasteners allowed at concealed locations only. Seamless welds required at all exposed conditions.

- a. Install stainless steel fastenings for aluminum railings.
- B. Adhesive: Structural adhesive, as approved by railing manufacturer. Submit product information for review.
- C. Cement: Hydraulic, quick-setting, factory prepared with accelerator.

2.5 FINISH

- A. All exposed surfaces shall be smooth, clean of rust, scale, grease, and foreign matter prior to finishing.
- B. Surface Preparation: Remove loose scale, rust, grease, oil, moisture or other foreign materials to properly prepare the surface for subsequent coating application.
 - 1. Remove mill scale, rust and dirt following SSPC-SP2 for hand cleaning and SSPC-SP3 for power tool cleaning.
- C. Galvanizing: Products fabricated from shapes, plates, bars and strips shall be galvanized in accordance with ASTM A123.
- D. Painting: Painted surfaces: Primer paint two coats at items indicated to be painted. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
 - 1. Finish coats of paint (2 coats min.), field applied to achieve smooth finish, refer to Section 09 91 00.
 - a. Color as selected by Architect.

PART 3 – EXECUTION

3.1 INSPECTION/EXAMINATION

- A. Verification of Conditions:
 - 1. Examine areas and conditions under which work is to be performed.
 - 2. Identify conditions detrimental to proper or timely completion of work and coordinate with General Contractor to rectify.
- B. Surface: Examine and verify that receiving conditions of substrate have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.

3.2 COORDINATION

- A. Refer to Section 01 31 13 – Project Coordination.
- B. General Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.3 PREPARATION

- A. Prepare work, substrates, etc. in accordance with manufacturer's recommendations.

3.4 FABRICATION

A. General:

1. Verify dimensions on site prior to shop fabrication.
2. Fabricate items with joints tightly fitted, secured, true to line and level with accurate angles & surfaces and with straight sharp edges.
3. Fit and shop assemble sections in largest practical sizes for handling through building openings.
4. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius. (Comply with NAAMM Guideline 1 - Joint Finishes for Finish #3)
5. Make exposed joints butt tight, flush, and hairline.
6. Accurately form components required for anchorage to each other and to building structure.
7. Remove burrs from all exposed cut edges.
8. Blend in color discrepancies on anodized aluminum areas, due to welding, exposed fasteners, etc., using approved lacquer.
9. Touch up welds and abraded areas on galvanized pipe with zinc-rich paint as herein specified.

B. Railings, Handrails & Guardrails:

1. General:

- a. Maintain uniform curvature & cylindrical cross-section at all bends of pipe rails.
- b. Provide continuous welds that are all ground smooth prior to finishing.
- c. Vertical posts shall be spaced and located per contract documents.
- d. Railing outside diameter shall be 1-1/4" dia.min - 1-1/2" dia.max.
- e. Provide such that top handrail design provides a continuous grip surface in accordance with Building Code and ADA (Americans with Disability Act)

- f. System shall be designed to accommodate lateral & vertical loading as directed by California Building Code and as listed within these specifications.
- g. Sample of railing system shall be fabricated to indicate typical conditions for Custom railing.
- h. Form elbow bends and wall returns to uniform radius, free from buckles and twists, with smooth finished surfaces (prefabricated bends are acceptable provided all connections are seamless).
- i. Locate intermediate rails equally spaced between top rail and finish floor or center line of tread.
- j. Close exposed ends of pipe and tube by welding metal closure in place or by use of prefabricated fittings.
- k. For posts set in concrete, furnish matching sleeves or inserts not less than 5 in. long.
- l. Provide pressure relief holes at closed ends of pipe and/or tube.
- m. Fabricate joints which will be exposed to the weather so as to exclude water, or provide weep holes where water may accumulate.
- n. Removable railings: Provide slip-fit sleeves.
- o. On posts set on stair stringers, field weld bottom of post directly to top center of metal stringer flange.
- p. For aluminum, use 3/8 in. thick plate welded to bottom of post and fastened to top flange of stringer.
- q. Design railing systems in accordance with contract documents and as specified herein but not limited to:
 - i. Railing and/or Guardrail system
 - 1) Provide system that matches contract document details, plans & elevations.
 - 2) Design such that railing system does not extend more than 3-1/2" into stair width measured from inside of stringer.
 - 3) Vertical plate posts and or tube post shall be fully welded to stringer.

3.5 INSTALLATION

- A. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.

B. Posts:

1. General: Set posts plumb and aligned to within 1/4" in 12 feet.
2. Footings: Excavate footing holes not less than 18" deep in native grade for post concrete.
3. Sleeves:
 - a. Drill hole diameter at least 3/4" larger than O.D. of post for grouting.
 - b. Clean dust and foreign matter from sleeves.
 - c. Moisten interior of holes and surrounding surfaces with clean water.
 - d. Prepare and use cement in accord with manufacturer's directions.
 - i. Proprietary fast-drying cement is preferred; Sulphur is not acceptable.
 - e. Place railing in position and brace until grout sets.
 - f. Pour mixture into annular space until it overflows the hole.
 - g. Wipe off excess, (leave 1/8" build-up, sloped away from post at exterior conditions).

C. Rails:

1. Set rails horizontal or parallel to rake of steps or ramp to within 1/4" in 12 feet.
2. Support wall handrails on brackets spaced not more than 4 feet on centers, and as indicated in Drawings.

D. Fitted Assembly:

1. Assemble pipe and/or tube with pressure-fit fittings at joints and drive together to provide tight joints.
2. Use wood blocks and padding to prevent damage to pipe and/or tube and fittings.
3. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of pipe.

E. Expansion Joints:

1. Provide at intervals of not more than 40 feet.
2. Provide slip joint with internal sleeve extending 2" beyond joint each side.

3. Fasten internal sleeve securely to one side.
4. Locate joints within 6 in. of posts.
5. Drill holes of proper size for screws and countersink to a flush fit.

3.6 TREATMENT OF FIELD WELDS-GALVANIZED PIPE

- A. Touch up welds by application of 2 coats of galvanizing repair paint as herein specified.

3.7 REPAIR OF DEFECTIVE WORK

- A. Remove stained, rusted or otherwise defective work and replace with material that meets specification requirements.

3.8 PROTECTION AND CLEAN UP

- A. Refer to Section 01 77 00 – Contract Closeout and Final Cleaning.
- B. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others.
- C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
 1. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
- D. Perform work in accordance with manufacturer's recommendations, as herein specified and in accordance with drawings.
- E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no cost to the District.
- F. After completion of work in this section, remove all erection equipment and implements of service, and debris.
 1. Leave entire area in a neat, clean, acceptable condition.
- G. Provide Guarantee/Warranties and Bonds as required in this specification section and as listed in Division 1 Sections.
- H. Provide record drawings in accordance with Section 01 78 39 – Record Documents.
- I. Close out, on-site inspection will be at the discretion of the Architect after he receives the General Contractor's NOTICE of "Certificate of Substantial Completion".

END OF SECTION.

DIVISION 6 – WOOD AND PLASTICS

- 06 10 00 – Rough Carpentry
- 06 17 00 – Structural Composite Lumber
- 06 18 00 – Glue Laminated Construction
- 06 40 23 – Interior Architectural Woodwork

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SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION

- A. Work Included: Rough carpentry, light hardware and miscellaneous items of work not included in another Section. This Section also includes:
 - 1. Structural wood supports, grounds, backing and blocking required for millwork and casework items and which are an integral part of wall, floor and/or ceiling construction.
 - 2. Plywood sheathing.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03 10 00 – Concrete Forms.
- B. Section 06 18 00 – Glued Laminated Construction.
- C. Section 07 21 00 – Building Insulation.
- D. Section 07 92 00 – Joint Sealants.
- E. Section 08 71 00 – Finish Hardware.
- F. Section 09 24 00 – Lath and Plaster
- G. Section 09 29 00 – Gypsum Wallboard.

1.4 REFERENCES, CODES AND STANDARDS

- A. The following references, codes and standards are hereby made a part of this Section and carpentry work shall conform to applicable requirements therein except as otherwise specified herein or shown on the Drawings. Nothing contained in the Drawings or these Specifications shall be construed as permitting work which is contrary to code requirements.
 - 1. "Standard Grading and Dressing Rule #17, of the West Coast Lumber Inspection Bureau".
 - 2. "Grading Rules for Western Lumber" of the Western Wood Products Assn.
 - 3. "Standard Specifications for Grades of California Redwood Lumber" of the Redwood Inspection Service.
 - 4. American Wood Preservers Assn. (AWPA) Standard C1-03, "All timber products- Preservative Treatment by Pressure Processes".

1.5 QUALITY ASSURANCE

- A. Lumber and plywood shall be grade or quality marked by WWPA, WCLIB, APA, AWPB or by other grading and inspection agencies acceptable to the Architect.

Grade marks shall include the designation "S-DRY"(or "MC-15" as applies) where applicable. Grade and quality marks shall not be apparent on surfaces exposed in the finished work.

1.6 PRODUCT STORAGE

- A. Store kiln dried materials in enclosed areas, protected from moisture and separated from contact with concrete or soil.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Temporary Construction: Clean lumber at Contractor's option, rough or smooth, as usage requires.
- B. Lumber Not Otherwise Specified or Noted: Douglas fir or larch, graded and grademarked according to Reference Standard 1.4 A.1 or 1.4.A.2, #1 grade.
 - 1. Boards: Construction Grade.
- C. Sill Plates (On Concrete): Light Framing, pressure treated as hereinafter specified.
 - 1. As noted on plans
- D. Plywood for walls and roofs – as noted on plans.
 - 1. Unless glue type is otherwise specified, exterior plywood, interior plywood exposed to continuing moisture and pressure treated plywood shall be fabricated with exterior glue. Plywood with interior glue shall be fully protected from soaking or continuing moisture at all times.
- E. Rough Hardware: Nails, spikes, bolts, screws, tacks and framing connectors of standard manufacture as required. Hot dip galvanize items exposed to moisture or to exterior and those items which are in contact with wood pressure treated with waterborne salts.
 - 1. Bolts and Nuts: ASTM A307, Grade A.
 - 2. Lag Screws: Fed. Spec. ANSI/ASME B18.2.1. Pre-drill per CBC.
 - 3. Nails: Fed. Spec. ASTM F1667, common unless otherwise noted or specified.
 - 4. Joist Hangers and Framing Connectors: Simpson or approved equal, unless otherwise noted.
 - 5. Power Driven Fasteners: Hilti, Ramset, or approved equal, each use and fastener type subject to prior approval of Architect.
- F. Pressure Treatment (Decay and Termite Prevention):
 - 1. Pressure treat for decay and termite prevention, Douglas fir or larch wood

materials which are embedded in or set against concrete.

2. Treat in accordance with Reference Standard 1.4.A.4 and quality mark as per Reference Standard 1.4.A.2.
 3. Treat with any of the following processes at Contractor option. Creosote type preservatives are not permitted. Products that contain arsenic like CCA treated material are not permitted.
 - a. Penta in an LPG carrier ("Cellon") or Penta in Hydrocarbon Solvent-Type D (Dow Process)
 - b. Disodium Octaborate Tetrahydrate (DOT) such as Advance Guard/Hi-bor by Osmose, Inc.
 - c. Members treated with waterborne salts shall be dried to a moisture content not exceeding 19% after treatment.
 4. Where possible, precut material before treatment.
 5. Holes and cutoffs and handling and storage shall be in accordance with AWPA M-4.
 6. Ensure that ferrous metal fastenings and items in contact with wood treated with waterborne salts are hot dip galvanized (1.25 oz. coating) where required by ICC reports.
- G. Building Paper and Felt: Kraft waterproof building paper or 15# unperforated asphalt saturated rag felt per ASTM D226
- H. Framing Connectors: Simpson Strong Tie Corp., or equal.

2.2 MOISTURE CONTENT

- A. 19% maximum at initial use for 2x thickness and less; 19% maximum at initial use for thickness greater than 2x and less than 4x; and 19% maximum at initial use for thickness greater than 4x.

2.3 SIZES

- A. Surfaced to "DRY" sizes. Sizes noted are nominal unless shown as net.

2.4 SURFACING

- A. All wood materials exposed in the finished work shall have resawn surfaces of clean natural color unless noted or specified otherwise. Concealed framing lumber shall be S4S.

PART 3 – EXECUTION

3.1 ERECTION AND INSTALLATION: Code references refer to CBC Code.

- A. Framing: Conform to CBC where same covers points not indicated on Drawings.

Properly lay out framing with pieces closely fitted, accurately plumbed, leveled and aligned and rigidly secured in place.

- B. Except as specifically shown on Structural Drawings, cutting of all wood, etc., is limited to those cuts permitted by CBC.
- C. Bridging and Blocking: Conform to CBC. Provide 2X blocking at intersections of finished surfaces for adequate bearing and at points where required to support fixtures, cabinets, hardware and other equipment mounted on walls.
- D. Plywood (General): Unless more stringent requirements are indicated on the Drawings or required by Code, application of plywood shall be in accordance with recommendations of the American Plywood Association.
- E. Connections and Fastenings: Conform to CBC. Unless otherwise specified or shown on the Drawings, conform to minimum nailing requirements of CBC. For bolted connections, provide washers under heads and nuts bearing on wood, and draw nuts tight. Retighten before closing in framing. Exercise care in nailing through exposed sheathing and siding and ensure that fasteners penetrate into framing members.

END OF SECTION.

SECTION 06 17 00 – STRUCTURAL COMPOSITE LUMBER

PART 1 – GENERAL

1.1 SUMMARY

- A. The requirements of the General Conditions and Division 1 – General Requirements, apply to the work of this Section.
- B. Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication, delivery and erection of all Structural Composite Lumber (SCL) as shown on the drawing, herein specified and necessary to complete the work.
- C. All blocking, bridging, etc., for the installation of members.
- D. Clips, angles, straps, hangers, etc., incidental to installation of joists.
- E. Nails, bolts, washers and other fasteners used for erecting and securing members.

1.2 RELATED SECTIONS

- A. Section 05 50 00 – Metal Fabrications
- B. Section 06 10 00 – Rough Carpentry.

1.3 REFERENCES

- A. Comply with applicable provisions of the following standards and references: 2022 California Building Code (CBC), Volumes 1, 2.

1.4 SUBMITTALS

- A. Comply with the provisions of Section 01 33 00 – Submittals.
- B. Submit shop drawings of materials to be furnished under this section. Shop drawings shall include, but not be limited to;
 - 1. Erection plans, sizes, types, location and specific designation of SCL members.
 - 2. Installation instructions.
 - 3. Details of member connections.
- C. Drawings shall also indicate sizes and location of blocking, hangers, etc., with sufficient detailing to ensure correct installation.

1.5 QUALITY ASSURANCE

- A. Refer to Division 1 Sections.
- B. The fabricator shall have been engaged in the continuous manufacturing of SCL members for a minimum of five years.

C. Manufacturer Requirements:

1. Manufacturing facility shall be approved by an independent ICC approved inspection agency.
2. All members shall bear a stamp indicating the grade, plant number, independent inspection agency, logo and report number.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 66 00 – Product Storage and Handling.
- B. Deliver members tagged, unload carefully and handle only as recommended by the manufacturer; protect from adverse environmental conditions until members are installed and protected by permanent means.
- C. If members must be stored prior to erection, they shall be stored in a vertical position off the ground, covered and protected from light weather.

1.7 WARRANTY

- A. Refer to Section 01 77 00 – Project Closeout, Section 01 78 36 – Warranties and Bonds, and Section 01 78 38 – Guarantees.
- B. The products delivered will be free from any manufacturing errors or defects in workmanship and material. The design of members shall be adequate to carry the loads specified by the purchaser for the normal and expected life of specified project.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Single source responsibility, specified items shall be from one manufacturer.
- B. Manufacturer shall be subject for compliance with all requirements of the documents (both Drawings and Specifications), provide products from one of the following Acceptable manufacturers.
 1. WEYERHAUSER, www.iLevel.com P.O. Box 8449, Boise, Idaho 83706, Area Code 208/429-3715.
 2. BOISE CASCADE WOOD PRODUCTS, LLC www.bc.com/wood/eqp P.O. Box 2400 White city, Oregon 97503-0400 (541) 826-0200
 3. RedBUILT, 200 East Mallard Dr., Boise, Idaho 83706, Tel: 1-866-859-6757.
 4. Reviewed Equivalent by Architect.
- C. Substitutions and Deviations shall require Engineer's approval and shall be given in letter form.
- D. Refer to specifications Section 01 33 00 – Submittals.

- E. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- F. Specified materials indicated are as manufactured by "Weyerhaeuser" and shall be installed according to current listed specification requirements.

2.2 MATERIALS

- A. General: SCL joists and types indicated on Drawings and specified here are as herein listed. Other manufacturers' joists complying with these Specifications and having equivalent properties and dimensions shall be subject to Architect's and Structural Engineer's review upon submission of substantiating data, and may be used only if equivalent, in Architect's and Structural Engineer's opinion, to the SCL joists specified. Structural capacities shall be evaluated by ASTM D2559 and independent structural testing.
- B. Lumber:
 - 1. LVL: RedLam, manufactured in accordance with ICC Report No. ESR-2993. Species shall be Douglas Fir, Southern Pine or Western Hemlock. Minimum grade shall be 2.0 E unless noted otherwise on the structural drawings.
 - 2. Various SCL products shall only be used where specifically indicated on the drawings. No substitutions shall be made without written approval.
- C. Adhesive: Exterior type in conformance with ASTM D2559.
- D. Types:
 - 1. Sizes, properties and additional information as shown on the drawings.
 - 2. Accessories to be furnished and installed as indicated on the Drawings are as follows:
 - a. Blocking, diaphragm blocking, miscellaneous blocking required by penetrations.
 - b. Hangers, brackets, straps, ties, etc., shown on Drawings.
 - c. Miscellaneous accessories incidental to erection and installation of members.

2.3 FABRICATION

- A. Fabrication shall be in compliance with specified standard and industry specifications and requirements of the reports indicated.
- B. Fabrication shall be in accordance with best practices with adequate plant and equipment and under supervision of properly qualified personnel.
- C. Moisture content of components at time of gluing shall not be less than 7 percent nor more than 16 percent.

PART 3 – EXECUTION

3.1 ERECTION AND HANDLING

- A. Structural Composite Lumber (SCL) is to be erected and installed in accordance with plans, manufacturer's drawings and installation suggestions.
- B. Temporary construction loads which cause stresses beyond design limits are not permitted.
- C. Holes, cuts or notches not previously approved by manufacturer's engineering shall not be permitted.
- D. General Contractor is to give notification before enclosing members to provide opportunity for inspection of the installation.
- E. Use equipment and methods that avoid damages that may impair strength of SCL members. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

3.2 INSTALLATION

- A. Members are to be erected and installed in accordance with the drawings and manufacturers recommendations. Comply with all manufacturers' recommendations concerning temporary construction loads and erection bracing.

3.3 PROTECTION AND CLEANING

- A. Refer to Division 1 Sections.
- B. Keep areas of work free from debris as work progresses.
- C. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- D. Protect work and materials of this Section prior to and during installation and protect the installed work and materials of other trades.
- E. Clean adjacent surfaces free of caulking or sealant with mechanical action or solvent as necessary, avoiding damage to other materials.
- F. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no cost to the District.
- G. After completion of work remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory items used in or resulting from said work, and legally dispose of off the site.
- H. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01 78 36 – Warranties.
- I. Provide record drawings in accordance with Section 01 77 00 – Project Closeout.

END OF SECTION.

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SECTION 06 18 00 – GLUE-LAMINATED CONSTRUCTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SCOPE

- A. Provide all labor, materials, tools, appliances, facilities and equipment required for the fabrication and delivery to job site of all glued-laminated wood members.

1.3 RELATED WORK INCLUDED IN OTHER SECTIONS

- A. Section 06 10 00 – Rough Carpentry.

1.4 QUALITY ASSURANCE

- A. Qualifications of Manufacturer: The fabricator shall have been engaged in the continuous manufacturing of glued-laminated timbers for a minimum of at least two years and shall have the authority to use the AITC "Quality Inspected Stamp". Each timber member shall be stamped and placed in such a position not to be visible on finished erected members.
- B. Submittals (Submit under provisions of Section 01 33 00):
 - 1. Shop drawings showing full dimensions of each member and layout of entire structural system.
 - 2. Show large scale details of connections, connectors and other accessories.
 - 3. Indicate species and laminating combination, adhesive type, and other variables in required work.
- C. Tests and Inspections:
 - 1. Each structural glued-laminated member shall be stamped with an identifying mark. Mark shall include all pertinent data, such as grade and species of lumber, type of glue, extremes of moisture content and other such information as may be required.
 - 2. Certificate of compliance with the above data.
- D. Standards and References: (Latest Edition unless specified otherwise)
 - 1. 2022 California Building Code (CBC), Volumes 1, 2.
 - 2. National Design Specification for Wood Construction (NDS). Current edition
 - 3. American Institute of Timber Construction, "Standard Specifications for Structural Glued-Laminated Timber of Softwood Species, AITC 117.

4. ANSI/AITC Standard A190.1 and ASTM D3737 “Design and Manufacture of Structural Glued-Laminated Timber”.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to site in manufacturer's protective wrappings with legends intact. Store on site secure from weather, soil and physical damage. Maintain wrappings in place until immediately prior to roof deck installation.
- B. Transport, handle and store in strict accordance with the manufacturer's recommendations. Use padded, non-marring slings.
- C. Premium appearance grade members shall be shipped, handled and stored with complete weather and damage protection wrapping.
- D. Glue-laminated timber members shall be wrapped in a water-resistant covering during transit. Be responsible for protection during hauling and unloading at job site.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Lumber: Lumber used for laminating structural members shall be well manufactured and shall conform to requirements of Standard Grading and Dressing Rule No. 17, West Coast Lumber Inspection Bureau. Such lumber shall be inspected, identified by individual piece, and certified as meeting requirements of said Standard Specifications by an approved lumber grading agency. It is assumed that each lamination is graded on basis of requirement for nominal size of individual lamination. When lumber is resawn, it shall be regraded on basis of new size.
- B. Type:
 1. Glulam:
 - a. Species: Douglas Fir or Western Larch; stress Grade AITC
 - b. Combination: Per Dwg S1.0.
 - c. Adhesives: Wet use
 - d. Appearance Grade: AITC Industrial for concealed uses, Architectural appearance at exposed uses.
 - e. Portions of beams exposed to weather shall be pressure treated.
 2. Provide outer tension laminations or proof load testing as required by ANSI/AITC A190.1.
 3. Shop seal all surfaces with 2 coats of clear penetrating sealer.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Prior to installation of the work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this installation may properly commence.
- B. Verify that specified items may be installed in accordance with the approved design.
- C. In the event of discrepancy, immediately notify Contractor. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.2 FABRICATION

- A. Fabrication shall be in compliance with the above standards and references.
 - 1. Fabrication shall be in accordance with best practices with adequate plant and equipment and under supervision of properly qualified personnel.
 - 2. Laminations shall be machine finished to a smooth surface, but not sanded, and to a uniform thickness with a maximum allowable variation of 1/64 inch. Warp, twist, or other characteristics which will prevent intimate contact of adjacent glued faces or interfere with uniform bending to a required curvature when under clamping pressure shall not be permitted. Surfaces to be glued shall be clean and free from oil, dust and other foreign material which would be detrimental to satisfactory gluing.
 - 3. Moisture content of lumber at time of gluing shall be not less than 7 percent nor more than 12 percent.
 - 4. Slips, misses, and wane are not permitted.
 - 5. Field cuts and holes shall be preservative treated and sealed.

3.3 HANDLING DURING ERECTION

- A. Use equipment and methods that avoid scarring corners and faces or otherwise injuring members. Sharp instruments and unprotected wire rope, chain slings and the like shall not be permitted.

3.4 PROTECTION

- A. Protect work and materials of this Section prior to and during installation and protect the installed work and materials of other trades.
- B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

END OF SECTION.

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SECTION 06 40 23 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Laminate Clad Cabinets and Casework.
 - 2. Laminated Clad Countertops.
 - 3. Edge Banding.
 - 4. Hardware.
 - 5. Structural supports incorporated into wood casework.
 - 6. Factory finishing.
 - 7. Hardwood Trim.
 - 8. Miscellaneous Cabinets and Storage Items.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 09 65 13 – Resilient Wall Base and Accessories.
- C. Section 09 91 00 – Painting.
- D. Electrical: Wiring to electrical fixtures and equipment.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. ANSI 208.1, Particle Board, latest edition.
- C. ANSI 208.2, MDF, latest edition.
- D. North American Architectural Woodwork Standards (NAAWS), latest edition, published by the Woodwork Institute and the Architectural Woodwork Manufacturer's Association of Canada.
- E. NEMA LD-3, High Pressure Decorative Laminate, latest edition.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Fire-retardant-treatment data for material impregnated by pressure process to reduce combustibility. Include certification by treating plant that treated materials comply with Section 2-407 (I) Title 24 C.C.R.
- D. Shop Drawings:
 - 1. Submit shop drawings in conformance with the requirements of the NAAWS.
 - 2. Shop drawings to show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- E. Documentation: Product Data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- F. Samples: If requested, samples for selection purposes of the following in form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Submit samples of each material.
 - 2. Submit a sample in the specified finish of each hardware item that will be visible at exposed surfaces when the job is complete.
- G. Product Certificates: Must be signed by woodwork manufacturer certifying that products comply with specified requirements.
- H. Qualification Data: Required for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

1.6 QUALITY ASSURANCE

- A. Work shall be in accordance with grade or grades specified of the North American Architectural Woodwork Standards (NAAWS).
- B. Manufacturer Qualifications: Firm experienced in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- C. Installer Qualifications: Arrange for installation of architectural woodwork by a firm which can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this project.

- D. NAAWS Quality Standard: Comply with applicable requirements of "Manual of Millwork" published by North American Architectural Woodwork Standards (NAAWS), unless otherwise indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
 - 1. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in Project Conditions, below.
- B. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.
 - 1. Delivery of architectural millwork shall be made only when the area of operation is enclosed, all plaster and concrete work is dry and the area broom clean.
 - 2. The work area shall be well ventilated and protected from direct sunlight, excessive heat, rain, or moisture. Temperature shall be maintained between 600°F and 900°F and relative humidity between 45% and 65%. The HVAC system shall be on and running.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Obtain and comply with woodwork manufacturers and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with manufacture of woodwork without field measurements. Coordinate other construction to ensure that actual dimensions correspond to guaranteed dimensions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Wilsonart International

2.2 MATERIALS

- A. General: Provide materials that comply with requirements of the North American Architectural Woodwork Standards (NAAWS) grade specified and the item being fabricated.
- B. Lumber: Lumber shall be in accordance with the North American Architectural Woodwork Standards (NAAWS) grade specified and the product being fabricated. Moisture content shall be 6% to 12% for boards up to 2" nominal thickness and shall not exceed 19% for thicker pieces.
- C. Core for laminated panels shall be as follows:
 - 1. Core for components at sink cabinets shall be water resistant MDF or water-resistant particle board. Water resistant particle board and MDF shall have a 24 hour swell factor of 5% or less, and a water absorption factor of 10% or less.
 - 2. Core for cabinets at locations other than sink cabinets, shall be CARB II compliant MDF or particle board.
- D. Plastic Laminate: High pressure decorative laminate (HPDL).
- E. Melamine: Low pressure surfacing.
- F. Epoxy Resin: A panel produced from a composite of epoxy resin, silica, inert fillers, and organic hardeners.
- G. Adhesives used shall be either:
 - 1. Type I: Waterproof. Use in wet environments.
 - 2. Type II: Water Resistant. Satisfactory in most environments.

2.3 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Corners of cabinets and edges of solid wood (lumber) members less than 1" in nominal thickness: 1/16".
 - 2. Edges of rails and similar members more than 1" in nominal thickness: 1/8".
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

- D. Factory-Cut openings to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.

2.4 LAMINATE (HPDL) CLAD CABINETS / CASEWORK

- A. Quality Standard: Comply with NAAWS.
- B. Grade: Custom.
- C. NAAWS Construction Style: Style A Frameless
- D. NAAWS Construction Type: Type I – multiple self-supporting units fastened together. All upper cabinetry shall have minimum 12" clear inside depth throughout.
- E. NAAWS Door and Drawer Front Style: Flush overlay.
 - 1. Drawers:
 - a. Sides: To be MDF or particle board with melamine overlay on semi exposed surfaces.
 - b. Bottoms: To be MDF with melamine faces.
 - c. Construction: To be lock joint, dowelled, or dowel screwed, as shown on plans.
- F. Laminate Cladding: High pressure decorative laminate complying with the following requirements:
 - 1. Colors, Patterns, and Finishes: Provide materials from laminate manufacturer's full range of colors (standard and premium), patterns and finishes. Provide for a maximum of 10 laminate selections.
 - 2. Laminate Grade for Exposed Exterior and Exposed Interior Surfaces: Provide laminate cladding complying with the following requirements for type of surface and grade.
 - a. Horizontal Surfaces Other Than Tops: GP-50 (0.050-inch nominal thickness).
 - b. Postformed Surfaces: PF-42 (0.042-inch nominal thickness).
 - c. Vertical Surfaces: GP-50 (0.050-inch nominal thickness).
 - d. Edge Band: 3mm Edge Band or Plastic Laminate, as designated in the plans.
 - e. Exposed Interior Surfaces of doors, bookcases, and drawer fronts shall be HPDL, per NAAWS Premium Grade, matching the material,

pattern, color, and thickness as the door or drawer face.

3. Laminate Grade for Semi-Exposed Surfaces: Provide surface materials indicated below:
 - a. White, grey or almond low-pressure laminate as selected by Owner.
- G. Cabinet backs at base cabinets shall be removable, if required for plumbing and/or electrical chase.
- H. Adjustable Shelves: Adjustable shelves shall be in accordance with NAAWS requirements subject to a 50 pound per square foot uniformly spaced load not to exceed 200 pounds per shelf.

2.5 LAMINATE CLAD COUNTERTOPS

- A. Quality Standard: Comply with NAAWS.
- B. Type of Top: High pressure decorative laminate, complying with the following:
 1. Grade: Custom.
- C. Laminate Cladding for Horizontal Surface: High pressure decorative laminate, complying with NEMA LD 3 and as follows:
 1. Colors, Patterns, and Finishes: Provide materials from laminate manufacturer's full range of colors (standard and premium), patterns and finishes. Provide for a maximum of 10 laminate selections.
 2. Grade: GP-50 (0.050-inch nominal thickness).
 3. Core: Core material shall be particle board or MDF.
 4. Back Splashes: Back splashes shall be butt jointed in non-wet areas. Back splashes to be integral in wet areas, typ.
 - a. Back and end splash construction shall be deck mount.
 5. Edge Band shall be 3mm PVC matching exposed surfaces.
 6. Grade: GP-50 (0.050-inch nominal thickness).
- D. Countertop Front Edge: Countertop front edges to be waterfall type edge, unless noted otherwise on the plans.
- E. Outside Corners: All outside corners of countertops shall have a radius of 1-1/2" min., whether or not shown on the plans.
- F. Inside Corners: All inside corners of countertops shall be mitered, except where countertop depth differs.

2.6 CABINET HARDWARE AND ACCESSORY MATERIALS

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items which are specified in Section 08 71 00 – Finish Hardware.
- B. Cabinet Hardware Schedule: Refer to schedule at end of this section for cabinet hardware required for architectural cabinets.
- C. Hardware Standard: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers or referenced to this standard.
- D. Exposed Hardware Finishes: Provide exposed hardware with satin black finish.
- E. Concealed Hardware Finishes: Provide manufacturer's standard finish that complies with product class requirements of ANSI/BHMA A156.9.

2.7 FASTENERS AND ANCHORS

- A. Screws: Select material, type, size and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
- B. Nails: Select material, type, size and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- C. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion-resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

2.8 FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. Quality Standard: Comply with NAAWS.
- B. General: The entire finish of interior architectural woodwork is work of this section, regardless of whether factory-applied or applied after installation.
 - 1. Finishing: The extent to which the final finish is applied to architectural woodwork at factory is Contractor's option, except factory apply at least prime/base coat to the greatest extent possible before delivery.
- C. General: The primary and prefinishing (if any) of interior architectural woodwork required to be performed at factory is specified in this section. Refer to Division 9 Section "Painting" for final finishing of installed architectural woodwork and for material and application requirements of prime coats for woodwork not specified to receive final finish in this section.
- D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

- E. Opaque Finish: Comply with requirements indicated below for grade, finish system, color, effect, and sheen:
 - 1. Grade: Custom.
 - 2. WI Finish System #3: Catalyzed polyurethane
 - 3. Color: Transparent finish.
 - 4. Sheen: Semigloss bright rubbed effect 55-60 deg.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of time substrates are to be built.
- C. Before installing architectural woodwork, examine shop-fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with NAAWS for same grade specified in Part 2 of this section for type of woodwork involved.
- B. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.
- E. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
- F. Countertops: Anchor securely to base units and other support systems as indicated.
- G. Complete the finishing work specified in this section to whatever extent not

completed at shop or before installation of woodwork.

3.3 ADJUSTMENT AND CLEANING

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up factory-applied finishes to restore damaged or soiled areas.

3.4 CLEANUP

- A. Upon completion of installation the installer shall clean all installed items of pencil and ink marks, and broom clean his area of operation, depositing debris in containers provided by the general contractor.

3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensures that woodwork is being without damage or deterioration at time of Substantial Completion.

3.6 HARDWARE SCHEDULE

- A. Locks: Provide locks at all doors, cabinets, and drawers. Products are listed below; finishes shall be 626:
 - 1. Cabinet Lock: Schlage, Model CL777R.
 - 2. Drawer Lock: Schlage, Model CL888R.
- B. Cabinet Door Hardware: Hinged doors shall have Blum B71T-655 series for overlay doors or approved equal. All hinges to be attached with screws to both the door and the face frame of the cabinet, to be self closing, and include soft closing door dampers for each door.
 - 1. Doors 48" and under shall have two (2) 170 deg. hinges per door.
 - 2. Doors 48"-60" shall have three (3) 170 deg. hinges per door.
 - 3. Doors over 60" shall have four (4) 170 deg. hinges per door.
- C. Wall Mounted Countertop Brackets: Provide extended concealed steel brackets, similar or equal to U.S. Futaba, Inc. Model EC18 or EC24, to fit the countertop sizes shown on plans.
- D. Elbow Catch: Heavy duty elbow catch, with both catch and strike plate to have slots to provide adjustment. Strike plate to have an extra screw hole to prevent spinning on plastic laminate. Equivalent to EPCO 1018-N.

- E. Drawer Hardware:
1. Provide glides to properly accommodate each drawer size and style.
 2. Standard Drawers: Equip each standard drawer with side mounted, ball-bearing, nylon roller drawer guide, full extension, soft / slow close, with load rating of 100 lbs. equivalent to KV 8450 series factory installed.
 3. File Drawers: Equip each file drawer with side mounted, ball-bearing, nylon roller drawer guide, full extension, overtravel of 1-1/2", with load rating of 150-175 lbs., as listed below:
 - a. File Drawers up to 30" Wide: Equivalent to KV 8505, load rating of 150 lbs, and overtravel of 1-1/2".
 - b. File Drawers up to 36" Wide: Equivalent to KV 8525, load rating of 175 lbs, and overtravel of 1-1/2".
 - c. File Drawers up to 42" Wide: Equivalent to KV 8520, load rating of 175 lbs.
- F. Cabinet Drawer & Door Pulls: 4" x 1-5/16" x 5/16" satin chrome pulls. Equivalent to EPCO MC 402-4.
- G. Shelf Supports: Earthquake clip shelf supports; to be clip style supports, no pre-drilled holes required. Equal to Tenn-Tex, Model T-803 – Institutional Shelf Support.
- H. Coat Hooks: Satin chrome double hook.
- I. File Drawer Inserts: Provide file drawer metal frame inserts to accommodate "letter" and "legal" size hanging files in all file drawers, whether or not noted on the plans.
- J. Closet Bars: Closet rods cut to length with end brackets; size and wall thickness as required to support full continuous hanging of clothing. Equivalent to KV 750-1 Series.
- K. Grommets: At penetrations of countertops for wiring and where indicated on drawings, solid plastic grommets, two inch (2") diameter, with lip flange. Solidly glued into place.

END OF SECTION.

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

- 07 13 25 – Self-Adhesive Sheet Waterproofing
- 07 21 10 – Thermal Insulation
- 07 25 00 – Weather Barriers
- 07 41 15 – Preformed Metal Roof Panels
- 07 54 19 – Single Ply Membrane Roofing System
- 07 62 00 – Sheet Metal Flashing and Trim
- 07 92 00 – Joint Sealants

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SECTION 07 13 25 – SELF-ADHESIVE SHEET WATERPROOFING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. The work of this section includes, but is not limited to, the following:
 - 1. Self-adhesive rubberized asphalt sheet membrane waterproofing, and all accessories needed for installation.
 - 2. Prefabricated drainage composite
 - 3. Protection board

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 07 60 00 – Flashing and Sheet Metal
- C. Section 07 92 00 – Joint Sealants

1.4 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. 2022 California Building Code (CBC) with Amendments.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM C836 – Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - 2. ASTM D412 – Standard Test Methods for Rubber Properties in Tension
 - 3. ASTM D570 – Standard Test Method for Water Absorption of Plastics
 - 4. ASTM D882 – Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
 - 5. ASTM D903 – Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - 6. ASTM D1876 – Standard Test Method for Peel Release of Adhesives

7. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
8. ASTM D3767 – Standard Practice for Rubber - Measurements of Dimensions
9. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials
10. ASTM E154 – Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.5 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00.
- B. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations. Include certification of data indicating VOC (Volatile Organic Compound) content of all components of waterproofing system.
- C. Samples: Submit representative samples of the following for approval if requested:
 1. Sheet membrane
 2. Protection board
 3. Prefabricated drainage composite

1.6 QUALITY ASSURANCE

- A. Manufacturer: Sheet membrane waterproofing shall be manufactured and marketed by a firm with a minimum of 20 years of experience in the production and sales of self-adhesive sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past 5 years.
- B. Installer: A firm which has at least 3 years of experience in work of the type required by this section.
- C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
 1. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
 2. Protect mastic and adhesive from moisture and potential sources of ignition.

3. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.

B. Sequence deliveries to avoid delays but minimize on-site storage.

1.8 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.9 WARRANTY

A. Sheet Membrane Waterproofing: Provide written 5 year material warranty issued by the membrane manufacturer upon completion of the work.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:

1. Bituthene 3000, manufactured by Grace Construction Products.
2. CCW MiraDRI 860/861, manufactured by Carlisle Coatings.
3. MEL-ROL, manufactured by W. R. Meadows, Inc.

2.2 MATERIALS

A. Self-Adhesive Sheet Membrane Waterproofing: Self-adhesive, cold-applied composite sheet consisting of a thickness of 56 mil of rubberized asphalt and 4 mil of cross-laminated, high density polyethylene film. Provide rubberized asphalt membrane covered with a release sheet, which is removed during installation. No special adhesive or heat shall be required to form laps.

1. Tensile Strength: 325 psi minimum; ASTM D412.
2. Tensile Strength, Film: 5,000 psi minimum, ASTM D882.
3. Ultimate Elongation: 300% minimum; ASTM D412.
4. Puncture Resistance: 60 lbs minimum; ASTM E154.
5. Permeance: 0.05 perms maximum; ASTM E96
6. Low Temperature Flexibility: Unaffected at -45°F; ASTM D1970, 1" mandrel.
7. Thickness: 60 mils, ASTM D3767.
8. Hydrostatic Head: 230 ft of water, ASTM D751

9. Water Absorption: 0.1% maximum, ASTM D570

2.3 ACCESSORY PRODUCTS

- A. Prefabricated Drainage Composite: Drainage Composite shall be designed to promote positive drainage while serving as a protection course, as shall be used as recommended by the manufacturer for each condition.
- B. Protection Board:
1. Expanded Polystyrene Protection Board: 25 mm (1 in.) thick for vertical applications with the following characteristics. Adhere to waterproofing membrane with Bituthene Protection Board Adhesive.
 2. Asphalt Hardboard: A premolded semi-rigid protection board consisting of bitumen, mineral core and reinforcement. Provide 3 mm (0.125 in.) thick hardboard on horizontal surfaces not receiving steel reinforced slab. Where steel reinforcing bars are to be used, apply two layers of 3 mm (0.125 in.) thick hardboard or one layer of 6 mm (0.25 in.) thick hardboard.
- C. Waterstop: Use a hydrophilic non-bentonite waterstop for non-moving concrete construction joints, as recommended by manufacturer.
- D. Miscellaneous Materials: Surface primer, conditioner, mastic, sealants, backing rod, liquid membrane, tape and accessories specified or acceptable to manufacturer of sheet membrane waterproofing.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION OF SUBSTRATES

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.
- B. Cast-In-Place Concrete Substrates:
1. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed coarse aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parget coat.

2. Do not proceed with installation until concrete has properly cured and dried (minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete).
 3. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the unrepaired areas.
 4. Two-stage drains shall have a minimum 3 inch flange and be installed with the flange flush and level with the concrete surface.
 5. Surfaces at cold joints shall be on the same plane.
 6. Fill form tie rod holes with concrete and finish flush with surrounding surface.
 7. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
 8. Remove scaling to sound, unaffected concrete and repair exposed area.
 9. Grind irregular construction joints to suitable flush surface.
- C. Wood Substrates: Apply waterproofing membrane over securely fastened sound surface. All joints and fasteners shall be flush to create a smooth surface.
- D. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.3 INSTALLATION

- A. Refer to and comply with manufacturer's literature for recommendations on installation, including but not limited to, the following:
1. Apply primer at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer.
 2. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.
 3. Seal daily terminations with troweled bead of mastic.
 4. Apply protection board and related materials in accordance with manufacturer's recommendations.

3.4 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.
- B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END OF SECTION.

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SECTION 07 21 00 – THERMAL INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Thermal Insulation
 - 2. Rigid Insulation
- B. All sound walls as identified on the plans, and all otherwise noted walls in the documents, are to receive building insulation to the underside of the structural deck as defined in this section.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 07 54 19 – Single Ply Membrane Roofing System.
- C. Section 09 29 00 – Gypsum Board Assemblies.

1.4 DEFINITIONS

- A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.5 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.
- B. ASTM International:
 - 1. ASTM C612 – Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 2. ASTM C665 – Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 3. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

4. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
5. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
6. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.
7. ASTM E814 – Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

1.6 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including R-values, fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.
- D. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence compliance of plastic foam insulations with building code in effect for Project.

1.7 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
 1. Surface Burning Characteristics: ASTM E84.
 2. Noncombustibility: ASTM E136.
- B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage and protection during installation.

- B. Protect Insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.
 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Provide only insulating materials that have been certified by the Manufacturer to comply with the California Quality Standards for insulating materials.

2.2 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:
1. Manufacturers of Fiber Glass (Batt) Insulation:
 - a. CertainTeed Corporation.
 - b. Knauf Insulation.
 - c. Johns Manville.
 - d. Owens Corning.
 2. Manufacturers of Rigid Insulation (XPS):
 - a. Kingspan Insulation LLC.
 - b. Owens Corning.

2.3 THERMAL AND ACOUSTICAL BATT INSULATION MATERIALS

- A. General: Provide insulating materials which comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.
 2. Mineral Fiber Type: Fibers manufactured from glass.
 3. Flanged Units: Provide blankets/batts fabricated with facing incorporating 4-inch-wide flanges along their edges for attachment to framing members.
 4. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction.

Identify products with appropriate markings of applicable testing and inspecting organization. This is for all concealed and exposed insulating materials.

- a. Maximum Flame Spread: Not more than 25.
 - b. Smoke Developed Index: Not more than 450.
5. Combustibility and Surface Burning Characteristics:
- a. Kraft-Faced Insulation shall comply with the following standards: ASTM C665 Type II, Class C, Category 1.
 - b. Foil-Scrim-Kraft Faced Insulation shall comply with the following standards: ASTM C665 Type III, Class A, Category 1, and ASTM E84 Max Flame Spread Index 25, Max Smoke Developed 50.
- B. Exterior Wall Thermal Insulation:
1. Batt Insulation:
 - a. Thermal Resistance: R-21
 - b. Thickness: 5-1/2 inch
 - c. Facing:
 - i. Where Covered by Finishes: Kraft-Faced.
 - ii. Where Exposed: Foil-Scrim-Kraft.
- C. Roof and Ceiling Thermal Insulation:
1. Batt Insulation:
 - a. Thermal Resistance: R-38.
 - b. Thickness: 10 inch.
 - c. Facing: Foil-Scrim-Kraft facing.
 2. Rigid Insulation (XPS):
 - a. Rigid Insulation (XPS) Thickness: 1 inch, R-5 minimum.
 - b. Locations: Where shown on plans.
- D. Interior Partition Wall Acoustical Insulation (at all Interior Walls):
1. Thermal Resistance: R-21.
 2. Thickness: 5-1/2 inch.

3. Facing: Unfaced.

2.4 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding insulation, anchors, or substrates.
- B. Adhesively Attached Pin Anchors: Perforated plate, 2 inches square, welded to projecting pin, with self-locking washer, complying with the following requirements:
 1. Plate: Zinc-plated steel, 0.106 inch thick.
 2. Pin: Copper-coated low carbon steel, fully annealed, 0.106 inches in diameter, length to suit depth of insulation indicated and, with washer in place, to hold insulation tightly to substrate behind insulation.
 3. Self-Locking Washer: Mild steel, 0.016 inch thick, size as required to hold insulation securely.
- C. Wire Hanger Supports: To secure batt-type insulation in place between joists, with chisel cut ends dig into joists for permanent holding. Overall length is 1/2" less than over center joist spacing, 13 gauge, carbon steel wire, at 24" o.c. within all joist spacing where required.

2.5 PROTECTION BOARD

- A. Premolded, semi-rigid asphalt/fiber composition board, 1/2 inch thick, formed under heat and pressure, standard sizes.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions with Installer present, for compliance with requirements of the Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders.

3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.
- B. Extend insulation full thickness as indicated to envelop entire area to be insulated.

Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic or sealant as recommended by insulation manufacturer.
- C. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
- D. Set reflective, foil-faced units accurately with not less than 0.75-inch air space in front of foil as indicated.

3.5 INSTALLATION OF RIGID INSULATION

- A. As recommended by insulation and metal roofing manufacturers, and as shown and details on the plans.

3.6 PROTECTION

- A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuses, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION.

SECTION 07 25 00 – WEATHER BARRIERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Weather Barrier Membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

1.3 RELATED SECTIONS

- A. Section 04 21 13 – Adhered Thin Brick Veneer.
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 09 24 00 – Lath and Plaster
- D. Section 09 29 00 – Gypsum Board Assemblies

1.4 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193 – Standard Guide for Use of Joint Sealants
 - 3. ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D1117 – Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E96 – Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E1677 – Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178 – Test Method for Air Permeance of Building Materials
 - 9. ASTM E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

- B. AATCC – American Association of Textile Chemists and Colorists: Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI:
 - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
 - 2. Test Method T-460; Air Resistance (Gurley Hill Method)
- D. 2022 California Building Code (CBC) with Amendments.

1.5 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittals.
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals:
 - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
 - 2. Manufacturer Instructions: Provide manufacturer’s written installation instructions.
 - 3. Manufacturer’s Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
- E. Closeout Submittals:
 - 1. Refer to Section 01 77 00 – Project Closeout.
 - 2. Weather Barrier Warranty: Manufacturer’s executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.6 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer shall have experience with installation of commercial weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with weather barrier manufacturer’s installation guidelines and recommendations.
 - 3. Source Limitations: Provide commercial weather barrier and accessory materials produced by single manufacturer.

B. Mock-Up:

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - a. Mock-up size: 10 feet by 10 feet.
 - b. Mock-up Substrate: Match wall assembly construction, including window opening.
 - c. Mock-up may remain as part of the work.
2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

C. Pre-installation Meeting:

1. Refer to Section 01 31 19 – Project Meetings.
2. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Engineer, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01 66 00 – Product Storage and Handling.
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by weather barrier manufacturer.

1.8 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.
- C. The preferred order of installation for Weather Barriers is prior to the installation of windows and doors.

1.9 WARRANTY

- A. Refer to Section 01 78 36 – Warranties and Bonds.
- B. Special Warranty:
 - 1. Special weather-barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
 - 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty are required.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following:
 - 1. To establish a standard of quality, design and performance, DuPont™ Tyvek® CommercialWrap® D, manufactured by DuPont, has been selected as a Basis of Design product. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Architect shall be the sole determinant of equivalency.
 - a. DuPont™ Tyvek® CommercialWrap® D, manufactured by DuPont
1-800-44-TYVEK (8-9835)
<http://www.construction.tyvek.com>

2.2 MATERIALS

- A. Basis of Design: Spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.
- B. Performance Characteristics:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2357
 - 2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E96, Method B.
 - 3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.4 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 5. Air Resistance: Air infiltration at >750 seconds, when tested in accordance

with TAPPI Test Method T-460.

6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D882, Method A.
7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

- A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape for commercial applications.
- B. Fasteners:
 1. Wood Frame Construction: Tyvek® Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
 2. Masonry Construction: Masonry tap-con fasteners with Tyvek® Wrap Caps as distributed by DuPont: 2-inch diameter plastic cap fasteners.
- C. Sealants:
 1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 2. Products: Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
 1. Provide adhesive recommended by weather barrier manufacturer.
 2. Products:
 - a. SIA 655
 - b. Or adhesives recommend by the weather barrier manufacturer.
- E. Primers:
 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 2. Products:
 - a. SIA 655
 - b. Permagrip 105
 - c. Or primers recommended by the flashing manufacturer
- F. Flashing: Per the manufacturer's direction, use one of the following:
 1. DuPont™ FlexWrap™: flexible membrane flashing materials for window

openings and penetrations.

2. DuPont™ FlexWrap™: flexible membrane flashing materials for window openings and penetrations.
3. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
4. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
5. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION – WEATHER BARRIER

- A. Install 2 layers of weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap Weather Barrier:
 1. Exterior Corners: Minimum 12 inches.
 2. Seams: Minimum 6 inches.
- H. Weather Barrier Attachment:

1. Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
 2. Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommended fasteners, spaced 12-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.
- I. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with non-flanged windows – all cladding types)

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (for use with non-flanged windows – all cladding types)

- A. Cut 9-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.
- D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start DuPont™ StraightFlash™ at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont™ FlexWrap™ DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION (for use with flanged windows)

- A. Cut weather barrier in an "I-cut" pattern. A modified "I-cut" is also acceptable
 1. Cut weather barrier horizontally along the bottom and top of window opening.
 2. From top center of the window opening, cut weather barrier vertically down to the sill.
 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.7 FLASHING (for use with flanged windows)

- A. Cut 7-inch (for 2x4 framing) or 9-inch (for 2x6 framing) wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening is not required for DuPont™ FlexWrap™ NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.

- F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.8 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall.
- I. Apply sealant bead at each termination.

3.9 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

3.10 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.

- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.11 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4" minimum beyond opening.
- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

3.12 FIELD QUALITY CONTROL

- A. Notify manufacturer's designated representative to obtain periodic observations of weather barrier assembly installation.

3.13 PROTECTION

- A. Protect installed weather barrier from damage.

END OF SECTION.

SECTION 07 41 15 – PREFORMED METAL ROOF PANELS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal roofing and accessories as indicated on the drawings and specified herein.

1.3 RELATED REQUIREMENTS

- A. Section 05 12 00 – Structural Steel.
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 07 21 00 – Thermal Insulation.
- D. Section 07 62 00 – Flashing and Sheet Metal.
- E. Section 07 92 00 – Joint Sealants.

1.4 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.
- B. American Architectural Manufacturer's Association (AAMA):
 - 1. AAMA 621 – Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
 - 2. AAMA 809.2 – Voluntary Specification Non-Drying Sealants.
- C. American Society of Civil Engineers (ASCE): ASCE 7 – Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International (ASTM):
 - 1. ASTM A653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A792/A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 3. ASTM C645 – Specification for Nonstructural Steel Framing Members.

4. ASTM E1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- E. International Accreditation Service (IAS): IAS AC 472 – Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.
- F. Underwriters Laboratories, Inc. (UL): UL 580 – Tests for Uplift Resistance of Roof Assemblies

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's technical representative, inspection agency and related trade contractors.
 1. Coordinate building framing in relation to metal panel system.
 2. Coordinate openings and penetrations of metal panel system.
 3. Coordinate work of openings and penetrations, and manufacturer's accessories with installation of metal panels.

1.6 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.
- B. Manufacturer Qualifications:
 1. Approved manufacturer listed in this Section with minimum ten years of experience in manufacture of similar products in successful use in similar applications.
 2. Manufacturer shall provide proof of \$2,000,000 liability insurance for their metal roof system and comply with current independent testing and certification as specified. See specific product literature for testing information.
 3. Panel manufacturers without full supporting literature, Flashings & Details Guides, Guide Specifications and Technical Support shall not be considered equal to the specified product.
- C. Installer Qualifications: Experienced Installer with minimum of five years of experience with successfully completed projects of a similar nature and scope.
 1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway.

1.7 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical product data, installation instructions and recommendations for each type of roofing panel required. Include data substantiating

that materials comply with requirements.

- B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work.
 - 1. Indicate points of supporting structure that must coordinate with metal panel system installation.
 - 2. Include data indicating compliance with performance requirements.
 - 3. Include structural data indicating compliance with requirements of authorities having jurisdiction.
- C. Samples: Provide 12-inch-long section of each metal panel profile. Provide color chips for full range of manufacturer's colors for Owner / Architect selection.

1.8 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicating compliance of products with requirements, witnessed by a professional engineer.
- B. Qualification Information: For Installer firm and Installer's field supervisor.
- C. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC 472.
- D. Manufacturer's Warranty: Sample copy of manufacturer's standard warranty.

1.9 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
- B. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
- C. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.
- D. Handle panels with non-marring slings.
- E. Do not bend panels.

- F. Store panels above ground, with one end elevated for drainage.
- G. Protect panels against standing water and condensation between adjacent surfaces. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
- H. Remove any strippable film coating prior to installation and do not allow it to remain on the panels in extreme cold, heat or in direct sunlight.

1.11 COORDINATION

- A. Coordinate sizes, profiles, and locations of roof curbs and other roof-mounted equipment and roof penetrations, based upon sizes of actual selected equipment.

1.12 WARRANTY

- A. Contractor / Installer Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following Project Substantial Completion date.
- B. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within one year from date of Substantial Completion.
- C. Special Weathertightness Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail to remain weathertight, including leaks, within 20 years from date of Substantial Completion.
- D. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within 25 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following:
 - 1. To establish a standard of quality, design and performance, the following manufacturer has been selected as Basis of Design. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Architect shall be the sole determinant of equivalency.
 - a. AEP Span, A Division of ASC Profiles Inc., 2110 Enterprise Boulevard, West Sacramento, CA 95691. 800-733-4955, www.aepspan.com.
- B. Substitutions: Refer to Sections 01 25 00 and 01 62 00.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Roof Classification: Class A.
- C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:
 - 1. Evaluation Report: Must provide a product with an evaluation report that is acceptable under DSA IR A-5.
 - 2. Wind Loads: Per CBC 2022, Chapter 16A, determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings and per CBC Chapter listed above.
 - a. Wind Uplift Testing: Certify capacity of metal panels by actual testing of proposed assembly per ASTM E1592 or UL 580.
 - 3. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of the span as required by UL 250 with no evidence of failure.
 - 4. Seismic Performance: Comply with ASCE 7 – Section 9, "Earthquake Loads."
- D. Wind Uplift Resistance: Comply with UL 580 for wind-uplift class.

2.3 METAL ROOF PANELS

- A. Roof Panels: Structural, exposed fastener metal roof panel consisting of formed metal sheet with vertical ribs at panel edges, installed by lapping and mechanically interlocking edges of adjacent panels, and attaching panels to supports in a weathertight installation.
 - 1. Basis of Design Product: HR-36® Roof Panels, by AEP Span
- B. General:
 - 1. Material: Steel conforming to ASTM A792 Zinalume®/Galvalume®, minimum yield 50,000 psi, thickness 20 gauge.
 - 2. Protective Coating: Conform to ASTM A792, AZ50 (Zinalume/Galvalume).
 - 3. Nominal Coated Thickness: 20 gauge.
 - 4. Net Coverage: 36 inches.
 - 5. Rib Depth: Rib Depth 1-1/2" @ 7.2" o.c.
 - 6. Exterior Finish: DuraTech® 5000 (Polyvinylidene Fluoride), full 70% Kynar® 500/Hylar 5000® consisting of a baked-on 0.15-0.20 mil corrosion resistant

primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 10-30% when tested in accordance with ASTM D523 at 60°.

a. Color: Manufacturer's standard selection of not less than 22 colors.

7. Interior Finish:

a. Primer Coat Material: Corrosion-resistant primer; primer coat dry film thickness: 0.15 mils; finish coat material: polyester paint, finish coat dry film thickness: 0.35 mils.

b. Color: Off-White.

2.4 METAL ROOF PANEL ACCESSORIES

A. Panel Accessories: Provide components required for a complete metal panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal roof panels.

2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

B. Flashing and Trim: Formed: Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endroofs, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

C. Panel Clips: Provide panel clip of type specified, at spacing indicated on approved drawings and shop drawings.

D. Panel Fasteners: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized steel fasteners for surfaces exposed to the interior. Provide metal or neoprene washers as recommended by manufacturer for installation.

E. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes.

F. Steel Sheet Miscellaneous Framing Components: ASTM C645, with ASTM A653, G60 (Z180) hot-dip galvanized zinc coating.

2.5 FABRICATION

- A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Unless otherwise shown on drawings or specified herein, panels shall be full length. Fabricate flashings and accessories in longest practical lengths.
- C. Roofing panels shall be factory formed. Field formed panels are not acceptable.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

2.6 FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. DuraTech® 5000: Polyvinylidene Fluoride, full 70 percent Kynar 500® or Hylar 5000®, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees, to meet normal weathering conditions of a minimum of 20 years.
- C. Interior Finish: 0.5 mil total dry film thickness consisting of primer coat and wash coat of manufacturer's standard light-colored acrylic or polyester backer finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine metal panel system substrate and supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.
 - 1. Inspect metal panel support substrate to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
 - 2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:
 - a. 1/4 inch (6 mm) in 40 foot (6.1 m) in any direction.
- B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal roof panel system installation.

3.2 EXISTING CONDITIONS

- A. Inspect installed work of other trades and verify that such work is complete to a point

where this work may continue.

- B. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.

3.3 PREPARATION

- A. Miscellaneous Supports: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C754 and manufacturer's written instructions.
- B. Surface Preparation: Clean and dry surfaces prior to applying sealant.
- C. Flashings: Provide flashings as required to complete metal roof panel system. Install in accordance with Section 07 62 00 – Sheet Metal Flashing and Trim, and approved shop drawings.

3.4 PROTECTION

- A. Treat, or isolate with protective material, and contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
- B. Require workmen who will be walking on Roofing Panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material, which could cause damage or discoloration.
- C. Protect work of other trades against damage and discoloration.

3.5 FIELD MEASUREMENTS

- A. Verify prior to fabrication.
- B. If field measurements differ from drawing dimensions, notify Architect/Engineer prior to fabrication.

3.6 PANEL INSTALLATION

- A. Follow roof panel manufacturer's directions.
- B. Install panel seams (choose one) vertically or horizontally.
- C. Lap panels away from prevailing wind direction.
- D. Do not stretch or compress panel side-laps.
- E. Secure panels without warp or deflection.
- F. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

3.7 FLASHING INSTALLATION

- A. Follow manufacturer's directions and architect approved Shop Drawings.
- B. Overlap roof panels at least 6 inches.
- C. Install flashings to allow for thermal movement.
- D. Remove strippable protective film, if used, immediately preceding flashing installation.

3.8 ACCESSORY INSTALLATION

- A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - 3. Provide concealed fasteners except where noted on approved shop drawings.
 - 4. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.
- B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, with products recommended by manufacturer and in accordance with manufacturer's written instructions.

3.9 CUTTING AND FITTING

- A. Neat, square and true. Torch cutting is prohibited where cut is exposed to final view.
- B. Openings 6 inches and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
- C. Where necessary to saw-cut panels, debur cut edges.

3.10 PANEL DAMAGE AND FINISH SCRATCHES

- A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.
- B. Do not apply touch-up paint to damaged paint areas that involve minor scratches.
- C. Panels or flashings that have paint and/or substrate damage shall be replaced as

directed by the Architect's or Owner's representative.

3.11 CLEANING AND PROTECTION

- A. At completion of each day's work and at work completion, sweep panels, flashings and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.
- B. Remove debris from project site upon work completion or sooner, if directed.

END OF SECTION.

SECTION 07 54 19 – SINGLE PLY MEMBRANE ROOFING SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Mechanically fastened TPO membrane roofing system.
- B. Cover board.
- C. Roof insulation.
- D. Vapor retarder.
- E. Base sheet.
- F. Substrate board.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 07 62 00 – Flashing and Sheet Metal.
- C. Section 07 92 00 – Joint Sealants.

1.4 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.
- B. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:
 - 1. ASTM D1079 – Standard Terminology Relating to Roofing and Waterproofing.
 - 2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
 - 3. Roof Consultants Institute "Glossary of Building Envelope Terms."
- C. Sheet Metal Terminology and Techniques: SMACNA – Architectural Sheet Metal Manual.

1.5 DESIGN CRITERIA

- A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- C. Installer shall comply with current code requirements based on authority having jurisdiction.
- D. Wind Uplift Performance: Roofing system shall meet the intent of systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

1.6 SUBMITTALS

- A. Product Data: Manufacturer's data sheets for each product to be provided.
- B. Detail Drawings: Provide roofing system details and details of attachment to other work, including:
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Crickets, saddles, and tapered edge strips, including slopes.
 - 4. Insulation fastening and adhesive patterns.
- C. Verification Samples: Provide for each product specified.
- D. Installer Certificates: Confirmation that installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Maintenance Data: Refer to manufacturer's latest published documents.
- F. Guarantees: Provide manufacturer's current guarantee form.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and who is eligible to receive the specified manufacturer's guarantee.
- B. Manufacturer Qualifications: Qualified domestic U.S. owned and based manufacturer that has UL listing or accredited testing agency listing for roofing system identical to that used for this Project.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E329.

- D. Test Reports:
1. Roof drain and leader test or submit plumber's verification.
 2. Core cut, if required.
 3. Roof deck fastener pullout test, if required.
- E. Moisture Survey (if required by manufacturer or Owner): Submit prior to installation, results of a non-destructive moisture test of roof system completed by approved third party. Utilize one of the approved methods:
1. Infrared Thermography
 2. Nuclear Backscatter
- F. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system shall be labeled by the single source roofing manufacturer issuing the guarantee.
- G. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
1. Exterior Fire-Test Exposure: Class A; UL 790, for application and roof slopes indicated.
 2. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.10 GUARANTEE

- A. Provide manufacturer's system guarantee equal to Johns Manville's Peak Advantage No Dollar Limit Roofing System Guarantee.
1. Single-Source special guarantee includes roofing membrane, base flashings, roofing membrane accessories, all other roofing products, and other single-source components of roofing system marketed by the manufacturer.
 2. Guarantee Period: 20 years from date of Substantial Completion.
- B. Installer's Guarantee: Submit roofing Installer's guarantee, including all components of roofing system for the following guarantee period:
1. Guarantee Period: Five (5) years from date of Substantial Completion.
- C. Existing Guarantees: Guarantees on existing building elements should not be

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following:
1. To establish a standard of quality, design and performance, Johns Manville products as listed below have been selected. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Owner and Architect shall be the determinant of equivalency. See Sections 01 25 00 – Substitution Procedures and 01 62 00 – Product Substitutions, for details.

2.2 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE – TPO

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Basis of design: JM TPO
1. Membrane Thickness: 60 mils (1.52 mm), nominal.
 2. Exposed Face Color: White.

2.3 AUXILIARY ROOFING MATERIALS – SINGLE PLY

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's internally reinforced or scrim reinforced.
 1. Basis of design: JM TPO 60 mil
- C. Sheet Flashing (Self-Adhered): 60 mil (1.5 mm) thick, manufacturer's internally reinforced or scrim reinforced with weldable selvage edges on each side of roll, one encapsulated edge and self-adhering capabilities in a wide installation temperature range.
 1. Basis of design: JM TPO SA – Flashing Membrane.
 2. Serviceable Installation Substrate Temperature: 20°F (-7°C) and rising.
- D. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
 1. Basis of design: JM Membrane Bonding Adhesive (TPO&EPDM) or JM LVOC Membrane Adhesive (TPO & EPDM).
 2. Serviceable Installation Ambient Air Temperature: 25°F and rising.
- E. Flashing Adhesive: Manufacturer's standard-solvent-based bonding adhesive for base flashings. Basis of design:
 1. Basis of design: JM Membrane Bonding Adhesive (TPO&EPDM) or JM LVOC Membrane Adhesive (TPO & EPDM).
 2. Serviceable Installation Ambient Air Temperature: 25°F and rising.
- F. Roofing Asphalt: ASTM D312, Type IV
- G. Liquid Applied Flashing: Manufacturer's single ply liquid and fabric reinforced flashing system created with a fleece polyester scrim and a two-component polyurethane-based liquid applied flashing material, consisting of a liquid resin and a curing agent.
 1. Basis of design: JM SP Liquid Flashing Resin and JM SP Liquid Flashing Scrim
- H. Liquid Applied Flashing Primer: Manufacturer's single ply liquid flashing primer.
 1. Basis of design: JM SP Liquid Flashing TPO and PVC Primer.
- I. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.
 1. Basis of design: JM Polyester Mat Protection Slipsheet.
- J. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors.
 1. Basis of design: JM Termination Systems

K. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

1. Basis of design: As recommended by manufacturer for specified product:

- a. JM High Load Fasteners and Plates
- b. JM Extra High Load Fasteners and Plates
- c. JM Purlin Fasteners

L. Polymer Fasteners: Glass-reinforced nylon fasteners with ¼" square drive and 1" head with Galvalume®*-coated 2" metal stress plates, designed to lock into the fastener head. Fasteners designed for fastening roof insulation to substrate and furnished by roofing system manufacturer.

1. Basis of design: Polymer Auger Fasteners and Plates

M. Miscellaneous Accessories: Provide all accessories to meet the roofing manufacturer's guarantee requirements.

2.4 WALKWAYS AND SAFETY STRIPS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer.

1. Basis of design: JM TPO Safety Walkpad

B. Safety Strips: Manufacturer's minimum 65 mils total thickness, comprise of 30 mil yellow non-reinforced TPO membrane laminated to 35 mil white cured seaming tape. Basis of design: JM Single Ply Safety Strip

1. Exposed Face Color: Yellow

2.5 COVER BOARD

A. Gypsum Board: ASTM C1177, coated glass-mat facer, water-resistant gypsum substrate for mechanically attached roof applications, 1/4 inch (6 mm).

1. Basis of Design: DEXcell Glass Mat Roof Board.

2.6 ROOF INSULATION

A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grades 2 (20 psi) and 3 (25 psi).

1. Basis of design: ENRGY 3

2. Provide insulation package with minimum R Value as required by CBC.
3. Provide insulation package with thickness as shown on drawings.
4. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.

2.7 TAPERED INSULATION

- A. Tapered Insulation: ASTM C1289, Type II, Class 1, Grade 2 (20 psi), provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.

1. Basis of design: Tapered ENRGY 3

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

- B. Provide saddles, crickets, tapered edge strips, and other insulations shapes where indicated for sloping to drain. Fabricate to slopes indicated.

1. Basis of design: Tapered Fesco Edge Strips.

- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer.

1. Basis of design: UltraFast Fasteners and UltraFast Plates.

- D. Polymer Fasteners: Glass-reinforced nylon fasteners with 1/4" square drive and 1" head with Galvalume®-coated 3" metal stress plates, designed to lock into the fastener head. Fasteners designed for fastening roof insulation to substrate and furnished by roofing system manufacturer.

1. Basis of design: Polymer Auger Fasteners and Plates

- E. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate.

1. Basis of design: JM Two-Part Urethane Insulation Adhesive (UIA).

- F. Wood Nailer Strips: Comply with requirements in Section 06 10 00 – Rough Carpentry.

2.9 VAPOR RETARDER

- A. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.

1. Basis of design: GlasPly IV.

B. Torch Applied SBS Vapor Retarder: ASTM D6163, Grade S, Type I, glass-fiber-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified.

1. Basis of design: DynaWeld Base

C. Asphalt Primer: ASTM D41.

1. Basis of design: JM Asphalt Primer

D. Self-Adhered SBS Vapor Retarder: Tri-laminate woven polyethylene, nonslip UV protected top surface; suitable for application method specified.

1. Basis of design: JM Vapor Barrier SAR.

E. Polyethylene Vapor Retarder: ASTM D4397, 10 mils (0.25 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

2.10 BASE-SHEET MATERIALS

A. Base Sheet: ASTM D4601, Type II non-perforated, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.

1. Basis of design: GlasBase Plus

B. Base-Sheet Fasteners: Tube, disk and locking staple design, factory-coated steel fasteners and Galvalume metal battens meeting corrosion-resistance provisions in FMG 4470, designed for fastening base-sheet to substrate, tested by manufacturer for required pullout strength, and provided by the roofing system manufacturer.

1. Product: UltraLok Locking Impact Fastener

C. Base Sheet Fasteners: 32 gauge, 1-5/8" diameter tin caps with 11-gauge annular ring shank nails.

2.11 EDGE METAL COMPONENTS

A. Expansion Joints: Provide factory fabricated weatherproof, exterior covers for expansion joint openings consisting of flexible rubber membrane, supported by a closed cell foam to form flexible bellows, with two metal flanges, adhesively and mechanically combined to the bellows by a bifurcation process. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee.

1. Basis of design: Expand-O-Flash.

B. Coping System: Manufacturer's factory fabricated coping consisting of a base piece and a snap-on cap. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee.

1. Basis of design: Presto-Lock Coping

- C. Fascia System: Manufacturer's factory fabricated fascia consisting of a base piece and a snap-on cover. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee.
- D. Metal Edge System: Manufacturer's factory fabricated metal edge system used to terminate the roof at the perimeter of the structure. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee.
 - 1. Basis of design: JM TPO-Coated Metal
- E. Metal Flashing Sheet: Metal flashing sheet is specified in Section 07 62 00 – Sheet Metal Flashing and Trim.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.
 - 1. General:
 - a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 2. Wood Decks:
 - a. Verify that wood decking is visibly dry and free of moisture.
 - b. Verify that wood has ability to provide minimum fastener pull-out resistance.
 - i. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.
 - 3. Gypsum Deck:
 - a. Verify that gypsum is visibly dry, free of moisture, and that there are no signs of staining.
 - b. Inspect deck for cracking and deflection of bulb tees.
 - c. Verify that gypsum has ability to provide minimum fastener pull-out resistance.
 - i. Provide documentation of pull-out resistance values in accordance with ANSI/SPRI FX-1 2016.

- d. Provide documentation of adhesion resistance values in accordance with ANSI/SPRI 1A-1 2015
- 4. Ensure general rigidity and proper slope for drainage.
- 5. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner's Representative and shall be corrected prior to installation of roofing system.

3.2 PREPARATION

- A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.
- C. If applicable, prime surface of deck at a rate recommended by roofing manufacturer and allow primer to dry.
- D. Proceed with each step of installation only after unsatisfactory conditions have been corrected.

3.3 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to wood deck to resist uplift pressure at corners, perimeter, and field of roof per roofing system manufacturer's written instructions.

3.4 BASE-SHEET INSTALLATION

- A. Install one lapped base sheet course and mechanically fasten to substrate per roofing system manufacturer's written instructions.
 - 1. Enhance fastening rate in perimeter and corner zones per code requirements, wind uplift system approvals or manufacturer's guarantee requirements, whichever is more stringent.
- B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

3.5 VAPOR-RETARDER INSTALLATION

- A. Depending on chosen vapor retarder, installation instructions are below:

1. Install polyethylene-sheet vapor retarder as a loosely laid single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively.
 - a. Seal side and end laps.
2. Install 2 glass-fiber felt plies lapping each sheet 19 inches (483 mm) over preceding sheet. Embed each sheet in a solid mopping of hot roofing asphalt per manufacturer's written instructions.
3. Install modified bituminous vapor retarder sheet per roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 - a. Unroll roofing membrane sheets and allow them to relax for minimum time required by manufacturer.
 - i. Heat weld vapor retarder to substrate per roofing system manufacturer's written instructions.

OR
 - ii. Adhere vapor retarder in a full mopping of hot asphalt to substrate per roofing system manufacturer's written instructions.

OR
 - iii. Self-adhere vapor retarder to substrate per roofing system manufacturer's instructions.
4. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 - a. Repair tears and voids in laps and lapped seams not completely sealed.
5. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.6 INSULATION INSTALLATION

- A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.

- D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.
- E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- H. Preliminarily Fastened Insulation for Mechanically Fastened Membrane System: Install insulation with fasteners at rate required by roofing system manufacturer.
 - 1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.

3.7 COVER BOARD INSTALLATION

- A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
- C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.
 - 1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
 - 1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Preliminarily Fastened cover board for Mechanically Fastened Systems: Install cover board with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
- F. Mechanically Fastened Cover Board: Install cover board and secure to deck using mechanical fasteners designed and sized for fastening specified cover board to deck type.
 - 1. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.8 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.
- B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.
- C. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Asphalt Heating: Heat roofing asphalt to temperature recommended by roofing manufacturer to flux modified membrane. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.
- E. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.9 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.
 - 1. Unroll roofing membrane and allow it to relax before installing.
 - 2. Install sheet in accordance with roofing system manufacturer's written instructions.
- B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- D. Always install membrane laps perpendicular to the steel deck flutes. "Picture Frame" installation method is not permitted.
- E. Apply roofing membrane with side laps shingled with roof slope, where possible.

- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - a. Remove and repair any unsatisfactory sections before proceeding with work.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.
- G. Spread sealant or mastic bead over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
- I. Install roofing membrane and auxiliary materials to tie into existing roofing.

3.10 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Apply water-based bonding adhesive in two-sided application, at required rate, and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- D. Self-Adhere membrane to smooth approved substrates, when substrate temperatures are 40°F (4.5°C) and rising.
 - 1. The use of SA Primer or SA LVOC Primer is required for flashing applications on curbs and parapet walls for temperatures between 40°F (4.5°C) and 20°F (-7°C).
 - 2. The use of SA Primer or SA LVOC Primer is required for flashing applications over approved substrates with a porous or rough surface, including: Dens Deck Prime, Dens Deck, DEXcell, concrete and smooth faces CMU.
- E. Apply single ply liquid applied flashing system per manufacturer's written instructions.
- F. Flash penetrations and field-formed inside and outside corners per manufacturer's installation instructions.

- G. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- H. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.11 EDGE METAL INSTALLATION

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Provide edge details as indicated on the Drawings. Install in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual."
- C. Join individual sections in accordance with the membrane manufacturer's requirements and SMACNA's "Architectural Sheet Metal Manual."

3.12 SLIP SHEET INSTALLATION

- A. Install polyester slip sheet as a loosely laid single layer above single ply membrane, per manufacturer's written instructions.

3.13 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld and adhere walkway products to substrate according to roofing system manufacturer's written instructions.
- B. Roof-Paver Walkways: Install walkway roof pavers with applicable slip sheet per manufacturer's written instructions in locations indicated, to form walkways.

3.14 FIELD QUALITY CONTROL

- A. Owner or designated representative will provide on-site observation and inspection during installation.
- B. Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect.
- D. Repair or remove and replace components of roofing system where test results or inspections indicate that they do 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.

3.15 PROTECTION AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION.

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Extent of work of this Section is indicated on drawings and by provisions of this section.
- B. All flashing and sheet metal components indicated in this section associated with the metal roofing system are to be supplied by the metal roofing manufacturer.
- C. Types of work specified in this section include the following:
 - 1. Metal flashing integral with preformed metal roof panel system.
 - 2. Metal flashing integral with single ply membrane roofing system.
 - 3. Gutters, downspouts, and scuppers.
 - 4. Parapet caps and flashing.
 - 5. Miscellaneous sheet metal accessories and flashing.
 - 6. Metal fascias
 - 7. Tie downspouts into the storm drain system.

1.3 RELATED SECTIONS

- A. Section 07 41 15 – Preformed Metal Roof Panels.
- B. Section 07 54 19 – Single Ply Membrane Roofing System.
- C. Section 07 92 00 – Joint Sealants.
- D. Section 09 24 00 – Lath and Plaster.
- E. Section 09 91 00 – Painting.
- F. Division 23 sections.
- G. Division 33 sections.

1.4 REFERENCES

- A. 2022 California Building Code with Amendments.

B. ASTM International (ASTM):

1. ASTM A167 – Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
2. ASTM A653 – Steel Sheet Zinc-Coated (Galvanized) or Zinc Alloy Coated (Galvanized) by the Hot-Dip Process
3. ASTM B32 – Solder Metal
4. ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate
5. ASTM D173 – Bitumen-Saturated Cotton Fabrics Used in Roofing and Waterproofing
6. ASTM D412 – Vulcanized Rubber and Thermoplastic Elastomers-Tension
7. ASTM D1187 – Asphalt Base Emulsions for Use as Protective Coatings for Metal
8. ASTM D1784 – Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
9. ASTM D3656 – Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
10. ASTM D4586 – Asphalt Roof Cement, Asbestos Free

C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
Architectural Sheet Metal Manual.

D. National Association of Architectural Metal Manufacturers (NAAMM): AMP 500-06
Metal Finishes Manual

1.5 QUALITY CONTROL

- A. Warranty: All work which is an integral part of other systems requiring a warranty shall fully comply with the requirements of that system and shall carry the same warranty as the system.
- B. Conform to SMACNA Manual for architectural sheet metal flashing and installation details.

1.6 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data, Flashing, Sheet Metal, and Accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.
- C. Shop drawings showing layout, profiles, methods of joining, and anchorages details,

including major counter-flashings, trim/fascia units, and expansion joint systems.
Provide layouts at 1/4 inch scale and details at 3 inch scale.

1.7 PROJECT CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.
- B. Pre-Construction / Pre-Roofing Conferences: Participate in pre-construction conferences as required by Division 1. Do not proceed with fabrication without written certification of compliance with the requirements of affected systems.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 66 00.
- B. Stack pre-formed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

PART 2 – PRODUCTS

2.1 SHEET METAL FLASHING, CAPS, AND TRIM MATERIALS

- A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A653, G90 hot-dip galvanized, mill phosphatized where indicated for painting; 0.0359 inch thick (20 gage) except as otherwise indicated.
- B. Galvanized Steel: ASTM A924/A924M, Grade A, G90 zinc coating.
- C. Aluminum Sheet: ASTM B209, alloy 3003-H14, clear anodized finish; 0.032-inch thick (20 gage) except as otherwise indicated.
- D. Stainless Steel: ASTM A167, Type 302B, dead soft temper.
- E. All roof to wall or roof to curb counterflashing dimensions to be 10" minimum.

2.2 FLEXIBLE SHEET MEMBRANE FLASHING

- A. Elastic Sheet Flashing/Membrane: Nonreinforced flexible, black elastic sheet flashing of 50 to 65 mils' thickness and complying with the following:
 - 1. Shore A Hardness (ASTM D2240): 50 to 70.
 - 2. Tensile Strength (ASTM D412): 1200 psi.
 - 3. Tear Resistance (ASTM D624, Die C): 20 lbs. per linear inch.

4. Ultimate elongation (ASTM D412): 250 percent.
5. Low temperature brittleness (ASTM D746): Minus 30°F.
6. Resistance to ozone aging (ASTM D1149): No cracks for 10 percent elongated sample for 100 hours in 50 pphm (50.5 mPa) ozone at 104°F.
7. Resistance to heat aging (ASTM D573): Maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212°F (100°C).

2.3 GUTTERS, SCUPPERS, PARAPET CAPS, FASCIAS, SOFFITS, AND TRIM MATERIALS

- A. Materials: 18 gauge steel conforming to ASTM A653, G-90 Galvanized, minimum yield 40,000 psi with substrate coating that conforms to ASTM A924 G-90 galvanized.
- B. Fabrication: Fabricated and installed in accordance with the SMACNA Architectural Manual. The following plate references are for this project:
 1. Gutters: Plate 2, style A, plate 19, figure A. Gutters shall be 20 gauge, and pre-finished to match roof color.
 - a. Joints in gutters to be lapped 1", riveted on 2" centers, and sealed with appropriate sealant as recommended by manufacturer.
 - b. Gutter Expansion Joint: Plate 7.
 - c. Gutter Strap: 20 ga. galvanized spaced at 24" O.C.
 - d. Size: Minimum size shall be 6" x 6" or as otherwise shown on drawings.
 2. Scupper: Plate 27, figure A, (without conductor head).
 3. Fascia: As detailed on drawings. Standard 10'-0" lengths with matching concealed joint splice plates. Fascia shall be 20 gauge, and finish shall match roof color.
 4. Parapet Caps: As detailed on drawings. Standard 10'-0" lengths with matching concealed splice plates. Parapet Caps shall be 24 gauge and shall match adjacent material in color.

2.4 DOWNSPOUT MATERIALS

- A. Downspouts: 3-1/2" Schedule 20 (4" O.D.), heavy duty galvanized pipe. Painted.
- B. Downspout Hanger: Plate 35, figure A.
 1. Zinc-Coated Steel: 20 gauge steel conforming to ASTM A653 G-90 Galvanized, minimum yield 40,000 psi with substrate coating that conforms to ASTM A924 G-90 galvanized.

- C. **All roof drains and downspouts shall be connected to an underground drainage system. No on-grade/splash blocks.**

2.5 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Fasteners: #12 x 1-1/4" stainless steel screws. Provide hex head and conical neoprene washers at parapet caps and fascias. Match finish of exposed heads with material being fastened.
- C. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.
- E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim to remain watertight.
- F. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- G. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
- H. Paper Slip Sheet: 5-lb. rosin-sized building paper.
- I. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film; resistant to decay per FS-L-P-512.
- J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
- K. Elastic Flashing Filler: Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.
- L. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
- M. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncorrosive. Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated, with factory-mitered and -welded corners and junctions.
1. Basis of Design Manufacturer: Fry Reglet Corporation.

2. Basis of Design Models:
 - a. Surface-Mounted Type: Model SM
 - b. Stucco Type: Model ST.
3. Material: Stainless steel, 0.0188 inch thick (26 gage).
4. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
5. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
6. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
7. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.6 FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams.
 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

- E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. All joints shall be watertight per SMACNA standards.
- G. All downspouts shall have fully welded joints and be ground smooth. Provide T-shaped bracket welded to back of downspout for bolting to building. See drawings for additional information.
- H. All downspouts that spill to grade shall have a 45-degree elbow of same pipe profile fully welded to bottom of downspout.
- I. All downspouts connecting to underground storm drainage systems shall be provided with a cleanout tee at grade.
- J. Prefinished Cap Flashings: Provide prefinished flashing on minimum 24 gauge sheet metal cap flashings and similar exposed units; 1.5 mil dry film thickness. Custom color as selected by Architect. Solder all joints.

PART 3 – EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual". Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.
- B. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- D. Install reglets to receive counter-flashing in manner and by methods indicated.
- E. Install counter-flashing in reglets, either by snap-in seal arrangement, or by wedging in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
- F. Install elastic flashing in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.
- G. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3 inch overlap, to form a

continuous waterproof system.

3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION.

SECTION 07 92 00 – JOINT SEALANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Joint Sealants.

1.3 RELATED REQUIREMENTS

- A. Section 07 44 50 – Cementitious Siding.
- B. Section 07 62 00 – Flashing and Sheet Metal.
- C. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. General: Versions of the following, cited standards current as of the date of issue of the project apply to the Work of this Section.
- B. 2022 California Building Code with Amendments.
- C. ASTM International (ASTM):
 - 1. ASTM C510 – Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
 - 2. ASTM C661 – Standard Test Method for Indentation Hardness of Elastomeric Type Sealants by Means of a Durometer.
 - 3. ASTM C719 – Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 - 4. ASTM C794 – Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
 - 5. ASTM C834 – Specification for Latex Sealants.
 - 6. ASTM C920 – Specification for Elastomeric Joint Sealants.
 - 7. ASTM C1087 – Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
 - 8. ASTM C1193 – Guide for Use of Joint Sealants.
 - 9. ASTM C1247 – Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids.

10. ASTM C1248 – Test Method for Staining of Porous Substrate by Joint Sealants.
 11. ASTM C1311 – Specification for Solvent Release Sealants.
 12. ASTM C1330 – Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 13. ASTM D412 – Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
 14. ASTM D624 – Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 15. ASTM D2203 – Standard Test Method for Staining from Sealants.
 16. ASTM D2240 – Test Method for Rubber Property – Durometer Hardness.
 17. ASTM E814 – Standards Test Method for Fire Tests of Through-Penetration Fire Stop.
 18. ASTM E1966 – Standard Test Method for Fire Resistive Joint Systems.
- D. Sealant, Waterproofing, and Restoration Institute (SWRI): SWRI Validation Program.
- E. U. S. Environmental Protection Agency (EPA) (www.epa.gov): 40 CFR 59, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.
- B. Preinstallation Conference: Conduct conference at Project Site.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of joint sealant product specified, including:
 1. Preparation instructions and recommendations.
 2. Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.
- B. Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and color, for each application. Utilize joint sealant designations included in this Section.
- C. Samples for Color Selection: For each joint sealant type.

- D. Samples for Verification: For each exterior joint sealant product, for each color selected.
- E. Joint Sealant Schedule: Include application, location, drawing designation, manufacturer and product name, and selected color.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified applicator.
- B. Greenguard Certificates (if listed as required): For each sealant and accessory product specified to meet volatile organic emissions standards of the Greenguard Children and Schools Certification.
- C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- D. Warranty: Sample of unexecuted manufacturer and installer special warranties.
- E. Preconstruction Compatibility and Adhesion Test Reports: From manufacturer. Include written interpretation of reports and recommendations for primers and substrate preparation.
- F. Preconstruction field-adhesion test reports.
- G. Field quality control adhesion test reports.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Company with minimum of three years of experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.
- B. Single Source Responsibility: Provide exterior joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.
- C. Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit samples of each substrate or adjacent material that will be in contact with or affect joint sealants. Current manufacturer test data of products on matching substrates will be acceptable.
 - 1. Adhesion: Use ASTM C719 and ASTM C794 to determine requirements for joint preparation, including cleaning and priming.
 - 2. Compatibility: Use ASTM C1087 to determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant color.
 - 3. Stain Testing: Use ASTM C510, ASTM C1248, or ASTM D2203 to verify non-staining characteristics of proposed sealants on specified substrates.

4. Immersion Adhesion: Use ASTM C1247 to determine performance of proposed immersed sealant in contact with potable water or other liquids.
 5. Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.
- D. Preconstruction Field-Adhesion Testing: Prior to installing joint sealants, field test adhesion to joint substrates using ASTM C1193 Method A. Verify adhesion is adequate. Modify joint preparation recommendations for failed joints and re-test. Submit written test report.
- E. Mockups: Provide joint sealant application within mockups required in other sections identical to specified joint sealants and installation methods.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Accept materials on site in manufacturer's unopened original packaging.
- B. Store primers and sealants in dry location with ambient temperature range of 60° to 80°F.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40°F.

1.11 SCHEDULING

- A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
- B. Ensure sealants are cured before covering with other materials.

1.12 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that demonstrate deterioration or adhesive or cohesive failure under normal use within warranty period specified.
 1. Warranty Period for Silicone Sealants: Five (5) years date of Substantial Completion.
- B. Special Installer's Warranty: Original statement on Installer's letterhead in which Installer agrees to repair or replace joint sealants that demonstrate deterioration or failure within warranty period specified.
 1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
1. Tremco, Inc. (www.tremcosealants.com)
 2. Dow Corning Corporation (www.dowcorning.com)
 3. Sika Corporation (usa.sika.com)
 4. Pecora Corporation (www.pecora.com)
 5. Hilti (www.hilti.com).
 6. 3M (www.3m.com)

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.
- B. Joint Sealant Standard: Comply with ASTM C920 and other specified requirements for each joint sealant.
- C. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.
- D. Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600.
- E. Joint Sealant Use Types, Grades, Classes, and Uses: The following are definitions of the abbreviations used in this specification:
1. Types:
 - a. Type S: Single component
 - b. Type M: Multi-component
 2. Grades:
 - a. Grade P: Pourable
 - b. Grade NS: Non-sag

3. Classes:
 - a. Class XX: Movement capability, percent
 - b. Class XX/YY: Movement capability, percent, expansion/contraction
4. Exposure Use:
 - a. Exposure Use T: Traffic
 - b. Exposure Use NT: Non-traffic
5. Substrate Uses:
 - a. Substrate Use G: Glass
 - b. Substrate Use M: Mortars
 - c. Substrate Use A: Aluminum
 - d. Substrate Use O: Other

2.3 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant:

1. ASTM C920, Type S, Grade NS, Class 100/50, Use NT, A, O; SWRI validated.
 - a. Volatile Organic Compound (VOC) Content: 26 g/L maximum.
 - b. Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - c. Color: As selected by Architect from manufacturer's standard line of not less than 12 colors.
2. Uses: High-modulus sealant for dynamically moving joints, including material having a high coefficient of linear expansion such as aluminum curtain walls, precast concrete panels, metal panels and window perimeters. Formulated for expansion, control, lap joints, and EIFS applications.
3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed silicone joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Spectrem 1, by Tremco, Inc.
 - b. 790 Silicone Sealant, by Dow Corning.

B. Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant:

1. ASTM C 920, Type S, Grade NS, Class 50, Use NT, M, O.

- a. Volatile Organic Compound (VOC) Content: 32 g/L maximum.
 - b. Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - c. Color: As selected by Architect from manufacturer's standard line of not less than 10 colors.
2. Uses: Low-modulus, high performance, construction-grade silicone sealant. Formulated to seal porous stone, EIFS, metal panels, masonry and pre-cast concrete joints, with low polar attraction to dirt; extremely low stain potential; low-modulus and low Shore A hardness; primerless adhesion to most porous substrates; extended tooling time and workability in high temperatures; low-VOC, zero solvent content.
 3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed silicone joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Spectrem 3, by Tremco, Inc.
 - b. Or equal.
- C. Multi-Component, Nonsag, Non-Staining, Field-Tintable Neutral-Curing Silicone Joint Sealant:
1. ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - a. Volatile Organic Compound (VOC) Content: 20 g/L maximum.
 - b. Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
 - c. Color: As selected by Architect from manufacturer's standard line of not less than 50 colors.
 2. Uses: Multi-component, neutral-curing, nonstaining, low dirt pick up, low-modulus silicone sealant specially formulated for use in dynamically moving building joints, offering color flexibility, with the opportunity to tint the material on site. Typical applications include EIFS, expansion and control joints, tilt-up panel joints, precast concrete panel joints, and perimeter caulking (windows, door, panels).
 3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed silicone joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Spectrem 4-TS, by Tremco, Inc.
 - b. Or equal.
- D. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant:
1. ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, O. Must meet the following criteria:

- a. Volatile Organic Compound (VOC) Content: 36 g/L maximum.
 - b. Color: White or Clear, with fungicide.
2. Uses: Acetoxy silicone sealant for general construction, which cures to a flexible rubber when exposed to moisture present in the air. Sealant produces a weathertight seal to glass, metal, porcelain, ceramic and most painted surfaces. Includes integrated fungicide for use where sanitary joints need added protection against fungi and bacteria.
3. Available Products and Manufacturers: Subject to compliance with requirements, mildew-resistant, single-component, acid-curing silicone joint sealant which may be incorporated in the work include, but are not limited to, the following:
- a. Tremsil 200 Sanitary, by Tremco, Inc.
 - b. 786 Silicone Sealant, by Dow Corning.
 - c. Sikasil GP, by Sika Corporation.

2.4 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Moisture-Cure, Polyurethane Joint Sealant:

1. ASTM C920, Type S, Grade NS, Class 50:
 - a. Volatile Organic Compound (VOC) Content: 40 g/L maximum.
 - b. Color: As selected by Architect from manufacturer's standard line of not less than 20 colors.
2. Uses: A high performance, medium-modulus, low-VOC, UV-stable, non-sag polyurethane sealant. Can adhere to damp and green concrete, is paintable and will not crack, craze or yellow under extreme UV exposure. Uses include expansion and control joints; precast concrete panel joints; perimeter caulking (windows, door, panels); aluminum, masonry and vinyl siding.
3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed urethane joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Dymonic 100, by Tremco, Inc.
 - b. Sikaflex-1a+, by Sika Corporation.

B. Single-Component, Nonsag, Moisture-Cure, Polyurethane Hybrid Joint Sealant:

1. ASTM C920, Type S, Grade NS, Class 35, Use NT, O, A, M.
 - a. Volatile Organic Compound (VOC) Content: 12 g/L maximum.
 - b. Color: As selected by Architect from manufacturer's standard line of not less than 15 colors.
 - c. Tack Free Time: 3 to 4 hours

2. Uses: Best when used for joints or gaps connecting dissimilar substrates, a durable, flexible, sealant that offers excellent performance in moving joints and exhibits tenacious adhesion once fully cured. Typical applications include expansion and control joints, precast concrete panel joints, perimeter caulking (windows, door, panels), EIFS, aluminum, masonry and vinyl siding
3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed urethane joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Dymonic FC, by Tremco, Inc.
 - b. SikaHyflexc-150 LM, by Sika Corporation.
 - c. DynaTrol I-XL Hybrid, by Pecora Corporation

C. Single-Component, Nonsag, Polyurethane Joint Sealant:

1. ASTM C920, Type S, Grade NS, Class 25, Use NT, one-part, moisture-curing, gun-grade polyurethane sealant.
 - a. Volatile Organic Compound (VOC) Content: 60 g/L maximum.
 - b. Color: As selected by Architect from manufacturer's standard line of not less than 15 colors.
2. Uses: Exterior only. General-purpose sealant designed for use on poured and precast concrete, masonry work, window and door perimeters, and similar types of construction joints. Primerless adhesion to porous substrates.
3. Available Products and Manufacturers: Subject to compliance with requirements, the above listed urethane joint sealant which may be incorporated in the work include, but are not limited to, the following:
 - a. Vulkem 116, Tremco, Inc.
 - b. Sikaflex 15 LM, by Sika Corporation.

D. Immersible, Single-Component, Pourable, Traffic Grade Polyurethane Joint Sealant:

1. ASTM C 920, Type S, Grade P, Class 50, Use T and I.
 - a. Accelerated Weathering, ASTM C 793: Pass.
 - b. Volatile Organic Compound (VOC) Content: 110 g/L maximum.
 - c. Color: As selected by Architect from manufacturer's standard line of not less than 5 colors.
2. Uses: Traffic rated, pourable, semi-self-leveling sealant, good primerless adhesion and movement capability. Provides exceptional wear and tear resistance required in high traffic areas, suitable for continuous immersion in non-chlorinated water and can be applied to damp and green concrete, and is formulated for use in expansion joints in sidewalks, swimming pool decks, plazas, floors and any horizontal surface with slopes up to 6%.

3. Available Products and Manufacturers: Subject to compliance with requirements, latex joint sealants which may be incorporated in the work include, but are not limited to, the following:

- a. Vulkem 45 SSL, Tremco, Inc.
- b. Or equal.

E. Immersible, Multi-Component, Pourable, Traffic-Grade Polyurethane Joint Sealant:

1. ASTM C920, Type M, Grade P, Class 35, Use T, O, and I.

- a. Accelerated Weathering, ASTM C 793: Pass.
- b. Volatile Organic Compound (VOC) Content: 106 g/L maximum.
- c. Color: As selected by Architect from manufacturer's standard line of 35 colors

2. Uses: Traffic rated, pourable, semi-self-leveling sealant, with primerless adhesion and movement capability, with a tintable base. Provides exceptional wear and tear resistance required in high traffic areas, suitable for continuous immersion in non-chlorinated water and can be applied to damp and green concrete, and is formulated for use in expansion joints in sidewalks, swimming pool decks, plazas, floors and any horizontal surface with slopes up to 6%.

3. Available Products and Manufacturers: Subject to compliance with requirements, latex joint sealants which may be incorporated in the work include, but are not limited to, the following:

- a. Vulkem 445 SSL, Tremco, Inc.
- b. Sikaflex-2C SL, by Sika Corporation.

F. Multi-Component, Non-sag, Polyurethane Joint Sealant:

1. ASTM C 920, Type M, Grade NS, Class 50, Use I.

- a. Color: As selected by Architect from manufacturer's standard line of not less than 35 colors, includes a tintable base, and curative packet.

2. Uses: All around general-purpose sealant that provides flexible, long life and durable waterproofing for both new construction and restoration projects in a fast curing formulation. Uses range from pre-cast tilt-up concrete, masonry, and exterior insulating and finishing systems (EIFS), to metal curtain walls, and perimeter joints around doors and windows. Suitable for immersed use in non-chlorinated fountains and water features.

3. Available Products and Manufacturers: Subject to compliance with requirements, latex joint sealants which may be incorporated in the work include, but are not limited to, the following:

- a. Dymeric 240 FC, Tremco, Inc.
- b. Sikaflex-2C SL, by Sika Corporation.

2.5 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Siliconized acrylic latex, one part, nonsag, mildew-resistant, ASTM C834, Type OP, Grade NF, formulated to provide a fast-setting pliable seal with minimal shrinkage. Must meet the following criteria:
1. Volatile Organic Compound (VOC) Content: 35 g/L maximum.
 2. Color: White, paintable.
 3. Joint Movement: Not more than $\pm 5\%$.
- B. Uses: General purpose interior exposed locations and protected exterior locations. Can be used as an acoustical seal in the construction of interior walls, ceilings and floors.
- C. Available Products and Manufacturers: Subject to compliance with requirements, latex joint sealants which may be incorporated in the work include, but are not limited to, the following:
1. AC-20, by Pecora Corporation.
 2. Tremflex 834, by Tremco Inc.

2.6 SOLVENT-RELEASE-CURING JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealant: ASTM C1311. Manufacturer's standard one-part, nonsag, solvent-release-curing, polymerized butyl sealant and formulated with minimum of 75 percent solids to be nonstaining, paintable, and have a tack-free time of 24 hours or less.
1. Volatile Organic Compound (VOC) Content: 250 g/L maximum.
 2. Color: As selected by Architect from manufacturer's standard colors.
- B. Uses: Exterior and Interior use for sealing joints in concealed joints within metal assemblies, such as curtainwall joints, metal panel joining, bedding thresholds, secondary glazing seals, and areas where a seal is required against neoprene or EPDM gaskets.
- C. Available Products and Manufacturers: Subject to compliance with requirements, solvent-release-curing joint sealants which may be incorporated in the work include, but are not limited to, the following:
1. BC-158, by Pecora Corporation.
 2. Tremco Butyl Sealant, by Tremco Inc.

2.7 ACOUSTICAL SEALANTS

- A. Acoustical/Curtainwall Sealant: Single-component, non-hardening, non-sag, paintable synthetic rubber-tested to reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing of similar assemblies according to ASTM E90. Must meet the following criteria:

1. Volatile Organic Compound (VOC) Content: 160 g/L maximum.
2. Color: White, paintable.

2.8 PRE-FORMED SEALS

- A. Preformed Silicone Joint Seals: Manufacturer's standard seal consisting of precured low-modulus silicone extrusion, in sizes to fit applications indicated on Drawings, combined with a neutral-curing liquid silicone sealant for bonding seals to substrates.
 1. Available Products and Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a. Spectrem SimpleSeal, by Tremco, Inc..
 - b. 123 Silicone Seal, by Dow Corning.
- B. Preformed Foam Joint Seals: Manufacturer's standard preformed, pre-compressed, open-cell foam seal manufactured from urethane foam with minimum density of 10 lb/cu. ft. (160 kg/cu. m), impregnated with water-repellent agent. Provide factory-produced pre-compressed sizes selected to fit joint widths; coated on one side with a pressure-sensitive adhesive.
 1. Available Products and Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - a. illmod 600, by Tremco, Inc.
 - b. Or equal.

2.9 JOINT SEALANT ACCESSORIES

- A. Cylindrical Sealant Backing: ASTM C1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.
- B. Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.
- C. Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.
- D. Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.
- E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement

capability. Verify joint surfaces are clean, dry, and adequately cured. Proceed with joint sealant work once conditions meet sealant manufacturer's written recommendations.

3.2 PREPARATION

- A. Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer. Comply with ASTM C1193.
1. Remove curing compounds, laitance, form-release agents, dust, and other contaminants.
 2. Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
 3. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 SEALANT APPLICATION

- A. Sealant and Primer Installation Standard: Comply with ASTM C1193 and manufacturer's written instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement, per manufacturer's recommendations and requirements.
1. Do not leave gaps between ends of joint fillers.
 2. Do not stretch, twist, puncture, or tear joint fillers.
 3. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.
 4. Install joint backing to maintain the following joint ratios:
 - a. Joints up to 1/2 inch (13 mm) wide: 1:1 width to depth ratio.
 - b. Joints greater than 1/2 inch (13 mm) wide: 2:1 width to depth ratio; maximum 1/2 inch (13 mm) joint depth.
 5. Install bond breaker tape over substrates when sealant backings are not used, between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.
- C. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer. Remove tape immediately after tooling without disturbing joint seal.
- D. Joint Priming: Prime joint substrates when recommended by sealant manufacturer or

when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

- E. Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
 - 1. Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
 - 2. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
 - 3. Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.
- F. Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
 - 1. Remove masking tape immediately after tooling joint without disturbing seal.
 - 2. Remove excess sealant from surfaces while still uncured.
- G. Installation of Preformed Seals: Install seals immediately after removing protective wrapping. Do not stretch or misshape material. Place seals to provide continuity at ends, turns, and intersections. Apply heat to sealant when recommended by sealant manufacturer's written instructions.

3.4 PROTECTION

- A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

3.5 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
 - 1. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate, and one test for each 1000 feet of joint length thereafter or 1 test per each floor per building elevation, minimum.
 - 2. For sealant applied between dissimilar materials, test both sides of joint.
- B. Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-

test. Test adjacent sealants to failed sealants.

- C. Submit report of field adhesion testing to Architect indicating tests, locations, dates, results, and remedial actions taken.

3.6 EXTERIOR JOINT-SEALANT SCHEDULE

- A. Exterior concealed transition joints in air barrier.
 - 1. Joint Sealant: Single-component neutral-curing low-modulus silicone sealant.
 - 2. Joint Sealant: Single-component non-sag urethane sealant.
 - 3. Compatibility: Compatible with air barrier components specified in Division 7.
- B. Exterior construction joints in cast-in-place concrete.
 - 1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant.
 - 2. Joint Sealant: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - 3. Joint Sealant: Single-component non-sag urethane sealant.
 - 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- C. Exterior joints between different materials listed above.
 - 1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant.
 - 2. Joint Sealant: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - 3. Joint Sealant: Single-component non-sag urethane sealant.
 - 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors. Multiple colors may be required to match several conditions.
- D. All other exterior non-traffic joints.
 - 1. Joint Sealant: Single-component neutral-curing non-staining silicone sealant.
 - 2. Joint Sealant: Multi-component neutral-curing non-staining field tintable silicone sealant.
 - 3. Joint Sealant: Single-component non-sag urethane sealant.
 - 4. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.
- E. Exterior horizontal traffic and traffic isolation joints:

1. Joint Sealant: Single-component pourable urethane sealant.
2. Joint-Sealant Color: As selected by Architect from manufacturer's standard colors.

3.7 INTERIOR JOINT-SEALANT SCHEDULE

- A. Interior perimeter joints of interior frames.
 1. Joint Sealant: Single-component non-sag urethane sealant.
 2. Joint Sealant: Siliconized acrylic latex.
 3. Joint-Sealant Color: Multiple colors required or must be paintable.
- B. Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
 1. Joint Sealant: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.
- C. Interior traffic joints in floor and between floor and wall construction.
 1. Joint Sealant: Single-component pourable urethane sealant.
 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- D. Interior non-moving joints between interior painted surfaces and adjacent materials.
 1. Joint Sealant: Siliconized acrylic latex.
 2. Joint-Sealant Color: Paintable.
- E. Interior concealed sealants at thresholds and sills.
 1. Joint Sealant: Butyl-rubber-based joint sealant.

END OF SECTION.

DIVISION 8 – DOORS AND WINDOWS

- 08 11 13 – Hollow Metal Doors and Frames
- 08 31 13 – Access Doors and Frames
- 08 33 26 – Overhead Counter Doors
- 08 56 19 – Pass Thru and Security Windows
- 08 62 23 – Tubular Daylighting Devices
- 08 71 00 – Finish Hardware
- 08 81 00 – Glass and Glazing
- 08 90 00 – Louvers and Vents

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SECTION 08 11 13 – HOLLOW METAL DOORS AND FRAMES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION

- A. Section includes:
 - 1. Doors: Flush, hollow or composite construction standard steel doors for interior and exterior locations.
 - 2. Frames: Welded unit type, pressed steel frames for doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings.
 - 3. Provide factory primed doors and frames with shop applied electrostatic baked on enamel coating.

1.3 RELATED WORK

- A. Section 04 21 13 – Adhered Thin Brick Veneer.
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 08 71 00 – Finish Hardware.
- D. Section 09 24 00 – Lath and Plaster.
- E. Section 09 29 00 – Gypsum Board.
- F. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. 2022 California Building Code (CBC), with Amendments.
- C. American National Standard Institute (ANSI):
 - 1. ANSI/ASA S12.60 – Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools
 - 2. ANSI/BHMA A156.115 – Hardware Preparation in Steel Doors and Frames.

3. ANSI/SDI A250.3 – Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
4. ANSI/SDI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
5. ANSI/SDI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
6. ANSI/SDI A250.8 – Specifications for Standard Steel Doors and Frames.
7. ANSI/SDI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
8. ANSI/SDI A250.11 – Recommended Erection Instructions for Steel Frames.
9. ANSI/SDI A250.13 – Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies.
10. ANSI/SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

D. American Society for Testing and Materials (ASTM):

1. ASTM A167 – Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM A568 – Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
3. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A924 – Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.
5. ASTM A1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability.
6. ASTM E283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
7. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
8. ASTM E413 – Classification for Rating Sound Insulation.

9. ASTM E1332 – Standard Classification for Determination of Outdoor-Indoor Transmission Class.
 - E. The National Association Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual (AMP 500-06)
 - F. National Fire Protection Association (NFPA):
 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives.
 2. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies.
 - G. Steel Door Institute (SDI):
 1. SDI-112 – Zinc-Coated (Galvanized/Galvannealed) Steel Doors and Frames.
 2. SDI-113 – Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies.
 3. SDI-117 – Manufacturing Tolerances Standard Steel Doors and Frames.
 4. SDI-118 – Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements
 5. SDI-124 – Maintenance of Standard Steel Doors and Frames.
 6. SDI-128 – Guidelines for Acoustical Performance of Standard Steel Door and Frames.
 - H. Underwriters Laboratories, Inc. (UL):
 1. UL-10B – Standard for Fire Tests of Door Assemblies.
 2. UL-10C – Standard for Positive Pressure Fire Tests of Door Assemblies.
 3. UL-1784 – Standard for Air Leakage Tests of Door Assemblies.
- 1.5 TESTING
- A. An independent testing laboratory shall perform testing, if / as required.
- 1.6 SUBMITTALS
- A. Product Data: For each type of product indicated. Include installation instructions, construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
 - B. Door hardware supplier shall furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
 - C. Shop Drawings: Shall include:

1. Layout, profiles, product components, 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 anchorages, joints, field splices, and connections.
 6. Details of accessories.
 7. Details of moldings, removable stops, and glazing.
 8. Openings (glazed, paneled, louvered)
 9. Details of conduit and preparations for power, signal, and control systems.
 10. Include schedule identifying each unit, with door marks or numbers referencing drawings, indicating door type, frame, steel, core, material thickness, hardware group, etc.
- D. Color Samples: Selection and verification samples for colors and textures.
- E. Certificates: Product certificates signed by the manufacturer certifying material compliance with ANSI/SDI A250.8 fabrication requirements.
- F. Installation Instructions and Installation Tolerances: Manufacturer's printed installation instructions, if other than as specified in ANSI/SDI A250.11.
- G. Jobsite paint protection requirements: Manufacturer's printed storage instructions, if other than as specified in ANSI/SDI A250.8.
- H. Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance, if other than as specified in SDI-124.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from an SDI Certified manufacturer.
- B. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- C. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with current edition of ANSI/SDI A250.8 – Recommended Specifications for Standard Steel Doors and Frames.
- D. Fire-Rated Door Assemblies: 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 UL10C or NFPA 252 at positive pressure (neutral pressure at 40" above sill).

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction labels certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 2. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450°F (250°C) above ambient after 30 minutes of standard fire-test exposure.
 3. Smoke Control Door Assemblies: Comply with UL 1784 and NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- F. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.395, R-Value 2.53, including insulated door, thermal-break frame and threshold.
 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
- G. Pre-Submittal Conference: Conduct conference in compliance with requirements in Section 01 31 13 – Project Meetings with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Inspect doors and frames upon delivery for damage. Minor damages 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.
- D. Store hollow metal work 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" high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.
- E. If cardboard wrapper on door becomes wet, remove carton immediately.
- F. Protect from rust and damage during storage and erection until completion.

1.9 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.10 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.

1.11 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Products shall be manufactured by a member of the Steel Door Institute. Steel Door Institute Members are as follows:
 - 1. Steelcraft.
 - 2. Ceco Door.
 - 3. Curries.

2.2 MATERIALS

- A. Cold Rolled Steel: Shall conform to ASTM A1008 – Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability; Commercial Steel (CS), Type B; suitable for exposed applications.

- B. Metallic-Coated Sheet Steel: Shall conform to ASTM A653– Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: Shall conform to ASTM A653– Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- D. Stainless Steel: ASTM A167, Type 302 or 304; finish, NAAMM Number 4.
- E. Anchors, Fastenings and Accessories: Fastenings anchors, clips connecting members and sleeves from zinc coated steel.
- F. Insect Screening: ASTM D3656, 18 x 18 regular mesh.
- G. Prime Paint: Paint that meets or exceeds the requirements of ANSI/SDI A250.8.

2.3 HOLLOW METAL DOORS

- A. General: Follow ANSI/SDI A250.8 for fabrication and tolerances of standard steel doors, except as specified otherwise. Provide 1-3/4 inch doors (44 mm), not less than thickness indicated, unless otherwise shown. Doors shall be fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise shown. When vertical steel stiffeners are used for core construction, fill spaces between stiffeners with mineral fiber insulation. Doors shall receive hardware as specified in Section 08 71 00 – Door Hardware.
 - 1. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, and ANSI/SDI A250.4 for physical performance level.
 - a. Design: Flush panel.
 - b. Core Construction: Insulated, foamed in place polyurethane and steel reinforced core with no stiffener face welds.
 - i. Provide 18 gauge steel vertical reinforcements 6 inches apart and welded in place. Foamed in place polyurethane core is chemically bonded to all interior surfaces. No face welding is permitted.
 - ii. Thermal properties to rate at a fully operable minimum U-Factor 0.374 and R-Value 2.53, including insulated door, Mercury thermal-break frame and threshold.
 - c. Level/Model: ANSI A250.8:
 - i. Level 3 – Extra Heavy Duty.
 - ii. Physical Performance – Level A (Extra Heavy Duty)

- iii. Model 2 – Seamless.
 - iv. Minimum 16 gage (1.3 mm / 0.053 inch) thick steel faces.
 - v. Continuous Welded Seam.
- d. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
- e. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
- f. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
- g. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
2. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A1008. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
- a. Design: Flush panel.
 - b. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - c. Level/Model:
 - i. Level 2 – Heavy Duty
 - ii. Physical Performance – Level B (Heavy Duty).
 - iii. Minimum 18 gauge (1.0 mm / 0.042-inch) thick steel faces.
 - iv. Model 1 – Full Flush
 - d. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
 - e. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 - f. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A653, Coating Designation A60 and ANSI A250.8, Level 3 – Extra Heavy Duty
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings. Knocked-down frames are not acceptable.
 2. Basis of Design – Frames for Exterior Doors:
 - a. Steelcraft, F-Series.
 - b. Minimum 14 gauge (1.7 mm / 0.067 inch) thick sheet steel.
- D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A1008, ANSI A250.8, Level 3 – Extra Heavy Duty.
1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings. Knocked-down frames are not acceptable.
 2. Basis of Design – Frames for Interior Doors:
 - a. Steelcraft, F-Series.
 - b. Minimum 16 gauge (1.3 mm / 0.053 inch) thick steel sheet.
- E. Fire Rated Frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- F. Reinforcement and Covers:
1. Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.
 2. ANSI A250.8 for, minimum thickness of steel reinforcement welded to back of frames.
 3. Provide mortar guards securely fastened to back of hardware reinforcements except on lead-lined frames.
 4. Where concealed door closers are installed within the head of the door frames, prepare frames for closers and provide 1 mm (0.042 inch) thick steel

removable stop sections for access to concealed face plates and control valves, except when cover plates are furnished with closer.

2.5 FRAME ANCHORS

- A. Floor Anchors: To be provided at each jamb, formed from A60 metallic coated material.
1. Where floor fills occur, provide extension type floor anchors to compensate for depth of fill.
 2. At bottom of jamb use 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive two 6 mm (1/4 inch) floor bolts. Use 50 mm x 50 mm (2 inch by 2 inch) 9 mm by (3/8 inch) clip angle for lead lined frames, drilled for 9 mm (3/8 inch) floor bolts.
 3. Where mullions occur, provide 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two 6 mm (1/4 inch) floor bolts and frame anchor screws.
 4. Where sill sections occur, provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for 6 mm (1/4 inch) floor bolts and frame anchor screws. Space floor bolts at 50 mm (2 inches) on center.
- B. Jamb Anchors:
1. Locate anchors on jambs near top and bottom of each frame, and at intermediate points not over 600 mm (24 inches) apart, except for fire rated frames space anchors as required by labeling authority.
 2. Form jamb anchors of not less than 1 mm (0.042 inch) thick steel unless otherwise specified.
 3. Anchors Set in Masonry: Use adjustable anchors designed for friction fit against the frame and for extension into the masonry not less than 2" wide by 10" long, formed from A60 metallic coated material, not less than 1 mm (0.042 inches) thick. Use one of following type:
 - a. Wire loop type of 5 mm (3/16 inch) diameter wire.
 - b. T-shape or strap and stirrup type of corrugated or perforated sheet steel.
 4. Anchors for Stud Partitions: Either weld to frame or use lock-in snap-in type. Provide tabs for securing anchor to the sides of the studs.
 5. Anchors for Frames Set in Prepared Openings: Steel pipe spacers with 6 mm (1/4 inch) inside diameter welded to plate reinforcing at jamb stops or hat shaped formed strap spacers, 50 mm (2 inches) wide, welded to jamb near stop.
 6. Drill jamb stop and strap spacers for 6 mm (1/4 inch) flat head bolts to pass thru frame and spacers.

- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. General – Metal Louvers:

1. Sight / vision proof type with stationary blades the full thickness of the door, constructed of inverted V-shaped or Y-shaped blades formed of 24-gage cold-rolled steel set into minimum 20-gage steel frame.
2. Design lightproof louvers to exclude passage of light but permit free ventilation.
3. Provide insect screen and wire guards at exterior doors, except where doors are located below completely enclosed areaways, the wire guard is not required.

- B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

C. Fabrication:

1. Steel louvers 1.0 mm (0.040 inch) thick for interior doors, and 1.3 mm (0.053 inch) inch thick for exterior doors.
2. Factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.
3. Fabricate louvers as complete units. Install in prepared cutouts in doors.
4. Weld stationary blades to frames. Weld louvers into door openings.

D. Screen Frames:

1. Frame of either extruded aluminum or tubular aluminum.
2. Fabricate frame to hold wire fabric in a channel with a retaining bar anchor and to mount on surface of door with screws.
3. Do not lap frame over louver opening.
4. Miter corners of frame members and join by concealed mechanical fastenings extending about 57 mm (2-1/4 inches) into ends of each member.
5. Drill frame and doors for screw attachment. Space screws 50 mm (2 inches) from end of each leg of frame and not over 300 mm (12 inches) on center between end screws.
6. Finish: As chosen by the Owner.

7. Wire Guards: Wire fabric shall be wire guard screen as specified. Fasten wire guard to exterior side of door with retaining bar against door and not exposed to view.

2.7 LIGHT OPENINGS AND GLAZING

- A. Stops and Moldings: Provide stops and moldings around glazed lights where indicated. Provide integral stop on exterior, corridor, or secure side of door. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lights each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.
- B. Moldings for Glazed Lights in Doors and Loose Stops for Glazed Lights in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.
- C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.
- D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.
- E. Glazing: Comply with requirements in Section 08 81 00 – Glass and Glazing and with the hollow metal door manufacturer's written instructions.
 1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 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. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lights: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Louvers: Factory cut openings in door and install louvers into prepared openings where indicated.
4. Astragals: Provide overlapping astragals as noted in door hardware sets in Section 08 71 00 – Door Hardware on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Section 08 71 00 – Door Hardware.

D. Hollow Metal Frames:

1. Shipping Limitations: 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.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Section 08 71 00 – Door Hardware.
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Hospital (Terminated) Stops: Where indicated on the drawings, provide frame stops that terminate six inches above the bottom of each jamb. Close the bottom of the stop at a 45 degree angle.

8. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 10. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Two anchors per jamb up to 60 inches high.
 - ii. Three anchors per jamb from 60 to 90 inches high.
 - iii. Four anchors per jamb from 90 to 120 inches high.
 - iv. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - i. Three anchors per jamb up to 60 inches high.
 - ii. Four anchors per jamb from 60 to 90 inches high.
 - iii. Five anchors per jamb from 90 to 96 inches high.
 - iv. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - v. Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 11. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Section 08 71 00 – Door Hardware.
 12. Frame Undercoating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water-based frame undercoating or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 08 71 00 – Door Hardware.

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250 specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.
- B. Finish Coats: Refer to Section 09 91 00 – Painting, for final finish. NOTE: All HM Doors and Frames to be custom to match all HM doors and frames on existing campus.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Before hardware installation, verify that all doors and frames are properly prepared to receive the specified hardware. Hollow metal frames shall be prepared for ANSI strike plates per A115.1-2 (4-7/8" high), hinge preps will be mortised and reinforced with a minimum of 8 gauge reinforcement material for closer installation. Hollow metal doors shall be properly prepared and reinforced with a minimum or 16 gauge material for either mortised or cylindrical locks as specified. It is preferred that all hollow metal doors receiving door closers have 12 gauge reinforcement. If this is not possible, the use of sex bolts is mandatory. Wood doors shall be factory prepared to receive the scheduled hardware.
- B. Plumb, align and brace frames securely until permanent anchors are set.
 1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
 2. Use wood spreaders at bottom of frame if the shipping spreader is removed.
 3. Protect frame from accidental abuse.
 4. Where construction will permit concealment, leave the shipping spreaders in place after installation, otherwise remove the spreaders after the frames are set and anchored.

5. Remove wood spreaders and braces only after the walls are built and jamb anchors are secured.

C. Floor Anchors:

1. Anchor the bottom of door frames to floor with two 6 mm (1/4 inch) diameter expansion bolts. Use 9 mm (3/8 inch) bolts on lead lined frames.
2. Power actuated drive pins may be used to secure frame anchors to concrete floors.

D. Jamb Anchors:

1. Anchors in Masonry Walls: Embed anchors in mortar. Fill space between frame and masonry wall with grout or mortar as walls are built.
2. Coat frame back with a bituminous coating prior to lining of grout filling in masonry walls.
3. Secure anchors to sides of studs with two fasteners through anchor tabs. Use steel drill screws to steel studs.
4. Frames Set in Prepared Openings of Masonry or Concrete: Expansion bolt to wall with 6 mm (1/4 inch) expansion bolts through spacers. Where subframes or rough bucks are used, 6 mm (1/4 inch) expansion bolts on 600 mm (24 inch) centers or power activated drive pins 600 mm (24 inches) on centers. Secure two piece frames to subframe or rough buck with machine screws on both faces.

- E. Install anchors for labeled fire rated doors to provide rating as required.

- F. Overhead Bracing: Where jamb extensions extend to structure above, anchor clip angles with not less than two, 9 mm (3/8 inch) expansion bolts or power actuated drive pins to concrete slab. Weld to steel overhead members.

END OF SECTION.

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes access doors for installation in gypsum board ceilings.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.
- B. Divisions 22-28 Sections.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data:
 - 1. Include manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
 - 2. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.
- E. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.
- F. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 MANUFACTURERS

- A. Available Products: Access doors that may be incorporated in the work include, but are not limited to, the following:
1. J.L.Industries, Inc.
 2. Karp Associates, Inc.
 3. Milcor Inc.

2.3 ACCESS DOORS

- A. Recessed Access Door for Drywall Surfaces:
1. Basis-of-Design Product: Karp Associates, Inc (min. 30" x 30"):
 - a. Fire Rated: Required if being installed in rated ceiling assembly. Fire rating to match rating of ceiling in which it is installed.
 - b. Frame Material: 16 gauge steel.
 - c. Door: 14 gauge steel.
 - d. Trim: 1" wide, one-piece construction.
 - e. Hinges: Pin type hinge, spring loaded.
 - f. Locks: Flush, screwdriver operated with stainless steel cam and stud or cylinder lock with automatic dust shutter.
 - g. Finish: Prime coat of rust inhibitive electrostatic powder, baked grey enamel.

2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36.
- B. Rolled-Steel Floor Plate: ASTM A786, rolled from plate complying with ASTM A36 or ASTM A283, Grade C or D.
- C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879, with cold-rolled steel sheet substrate complying with ASTM A1008, Commercial Steel (CS), exposed.

- D. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- E. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.
- F. Aluminum-Alloy Rolled Tread Plate: ASTM B632, Alloy 6061-T6.
- G. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2.
- H. Frame Anchors: Same type as door face.
- I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. Provide mounting holes in frames for attachment of units to metal or wood framing.
 - 2. Provide mounting holes in frame for attachment of masonry anchors.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder locks, furnish two keys per lock and key all locks alike.
 - 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.6 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. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.

PART 3 – EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION.

SECTION 08 33 13 – OVERHEAD COUNTER DOORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Overhead Counter Doors, manually operated.

1.3 RELATED SECTIONS

- A. Section 04 21 13 – Adhered Thin Brick Veneer.
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 08 56 19 – Pass Thru and Security Windows.
- D. Section 08 71 00 – Finish Hardware.
- E. Section 08 80 00 – Glass and Glazing.
- F. Section 09 24 00 – Lath and Plaster.
- G. Section 09 29 00 – Gypsum Board Assemblies.

1.4 REFERENCES

- A. 2022 California Building Code with Amendments.
- B. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM A666 – Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- D. ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- E. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittals.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Details of construction and fabrication.
 - 4. Installation methods.

- C. Shop Drawings: Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Install in areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship and installation is approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent finish materials to avoid damage to installed materials.

1.10 WARRANTY

- A. Warranty: Manufacturer's limited door warranty for 2 years for all parts and components.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturer: In order to provide a standard level of quality, the following product and manufacturer have been chosen as a Basis of Design:
1. Basis of Design: Overhead Door Corporation, 651 Series
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 and 01 62 00. NOTE: Slight modifications may be required to be made to the installation if an alternate product is used; GC responsible to coordinate and for any and all additional costs and material if needed for installation of a substituted product.

2.2 OVERHEAD COUNTER DOORS

- A. Stainless Steel Counter Doors: Overhead Door Corporation, 651 Series.
1. Wall Mounting Condition: As shown on plans; between jambs mounting.
 2. Curtain: Interlocking slats, Type F-158 fabricated of 22 gauge stainless steel. Endlocks attached to alternate slats to maintain curtain alignment and prevent lateral slat movement.
 3. Finish:
 - a. Slats and hood stainless steel with a No. 4 stainless steel finish.
 - b. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
 4. Slats: Perforated at the ticket booth; solid at concessions.
 5. Bottom Bar: Single stainless steel angle bottom bar.
 6. Locking: Two point dead locks with mortise cylinders.
 7. Guides: Stainless steel shapes.
 8. Brackets: Steel plate to support counterbalance, curtain and hood.
 9. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel.
 10. Hood: Provided with intermediate support brackets as required and fabricated of stainless steel. Front of hood to be water tight, and rear needs to be removable.
 11. Operation: Manual push up.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.

- B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate installation with pass thru and security windows; refer to Section 08 56 19.
- C. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- D. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- E. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07 92 00.
- G. Install perimeter trim and closures.

3.4 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION.

SECTION 08 56 19 – PASS-THRU AND SECURITY WINDOWS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Flush-mount pass-thru windows with factory installed sneeze guards, for Concessions Building.
 - 1. This project falls under the jurisdiction of the Merced County Environmental Health Department. Owner / Architect are obtaining Health Department review and approval. Contractor is responsible for adhering to all Health Department requirements and coordinating Health Department notification with the Owner when construction is slated to begin, as well as all coordinating all required inspections.
- B. Flush mount security service windows, for Ticket Booth Building.

1.3 RELATED SECTIONS

- A. Section 04 21 13 – Adhered Thin Brick Veneer.
- B. Section 07 62 00 – Sheet Metal Flashing and Trim.
- C. Section 07 92 00 – Joint Sealants.
- D. Section 08 33 13 – Overhead Counter Doors.
- E. Section 08 81 00 – Glass and Glazing
- F. Section 09 24 00 – Lath and Plaster.
- G. Section 09 29 00 – Gypsum Board Assemblies.
- H. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. CFC – California Retail Food Code.
- C. ASTM International:
 - 1. ASTM A240 – Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - 2. ASTM A653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-

Coated (Galvannealed) by the Hot-Dip Process.

3. ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.
4. ASTM B221 – Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
5. ASTM C1036 – Standard Specification for Flat Glass.
6. ASTM C1048 – Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
7. ASTM E773 – Accelerated Weathering of Sealed Insulating Glass Units.
8. ASTM E774 – Classification of the Durability of Sealed Insulating Glass Units.
9. ASTM F1233 – Security Glazing Materials and Systems.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittals.
- B. Product Data: Submit manufacturer's product data, including materials, components, fabrication, finish, and installation instructions.
- C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, glazing, fasteners, hardware, finish, options, and accessories.
- D. Samples: Submit manufacturer's samples of standard finishes.
- E. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- F. Manufacturer's Project References: Submit list of successfully completed pass-thru and security window projects, including project name and location, name of architect, and type and quantity of pass-thru windows installed.
- G. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual, including operation, maintenance, adjustment, and cleaning instructions, trouble-shooting guide, and parts list.
- H. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Minimum of 10 years successful experience continuously manufacturing pass-thru and security windows.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers

and packaging, with labels clearly identifying product name and manufacturer.

- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design Manufacturer:
 - 1. Ready Access, Inc. (www.ready-access.com)
1815 Arthur Drive
West Chicago, Illinois 60185
(800) 621-5045
- B. Substitutions: Refer to Sections 01 25 00 and 01 62 00.

2.2 PASS-THRU WINDOWS – CONCESSIONS BUILDING

- A. Basis of Design Product: Ready-Access 650, with two (2) service openings:
 - 1. Description: Fixed center pane with two independently operating panels that slide towards the center, with a separate transom window above.
 - 2. Size:
 - a. Overall: 84" W x 5'-10" H.
 - b. Sliding Service Openings: 17" W x 27-1/4" H.
 - c. Restriction Panel / Sneeze Guard: In order to meet California Food Code requirements, each service opening shall have a 17" W x 16" H sneeze guard permanently attached at the factory, to the window unit. **Usable opening shall be 17" W x 11-1/4" H (191.25" sq. in.)**. Provide with standard Aluminum Speak Thru.
 - 3. Door Operation: Manual open, self-closing. To be within reach ranges per 11B-308 and operable parts to comply with 11B-309.4.
 - 4. Door Type: Bi-parting sliding, two (2) door per panel.
 - 5. Opening Direction: Right to left and left to right; towards fixed center pane.
 - 6. Frame: Extruded aluminum, ASTM B221, Alloy 6063-T6 and 6063-T52.
 - 7. Aluminum Sheet: ASTM B209, Alloy 5005-AQ-H34.
 - 8. Galvanized Steel Sheet: ASTM A653, G90.
 - 9. Finish: Clear Anodized Aluminum.

10. Transom: Split transom. Reer to plans.
11. Bottom Sill: Angled downward, track-free.
12. Security Lock: Aluminum bar extrusion with sliding spring-loaded locking clip.
13. Fasteners: Stainless steel rivets and hex-head zinc-plated self-threading machine screws.
14. Handle: Black Delrin handle with pressed-in stainless steel spring pins. Stainless steel handle mounting bracket. Stainless steel spring-loaded mounting base.
15. Glazing: Dual pane 3/4" Low-E Solarban 70XL, tempered safety glass, ASTM C1048.
16. Silicone Glazing Sealant: Dow Corning 999A aluminum.
17. Shelf: Exterior, stainless steel, 28 inches wide by 10 inches deep.

2.3 SECURITY SERVICE WINDOWS – TICKET BOOTH BUILDING

- A. Security Service Windows: 600 Series Flush-Mount Window.
 1. Description: Flush mount window, with one sliding panel.
 2. Window Dimensions:
 - a. Overall: 47-1/2" W x 43-1/2" H x 4-1/2" D.
 - b. Sliding Service Opening: 19" W x 35" H.
 3. Operation: Manual open/self closing. To be within reach ranges per 11B-308 and operable parts to comply with 11B-309.4.
 4. Service Panel Type: Sliding, 1 panel.
 5. Opening Direction: As shown on plans.
 6. Frame: Extruded aluminum, ASTM B221, Alloy 6063-T6.
 7. Aluminum Sheet: ASTM B209, Alloy 5005-AQ-H34.
 8. Galvanized Steel Sheet: ASTM A653, G90.
 9. Security: Self-latches each time panel closes. Deadbolt lock. Security bar set.
 10. Fasteners: Stainless steel rivets and hex-head zinc-plated self-threading machine screws.
 11. Handle: Stainless steel.
 12. Lock: Keyed mortise cylinder; to match Primus Keyway on campus.

13. Glazing: 11/16" Secur-Tem 4 ASTM C1036 Smash & Grab.
14. Silicone Glazing Sealant: Dow Corning 999A, aluminum.
15. Bottom Sill / Shelf: Stainless steel shelf base extending from the interior to exterior of the window, providing a continuous pass-thru counter.

2.4 FABRICATION

- A. Assembly: Factory assembled, factory glazed.

2.5 ALUMINUM FINISH

- A. Anodized: Clear, AA-M10-C12-C22-A31, ASTM B680.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive pass-thru and security windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Ensure openings to receive pass-thru and security windows are plumb, level, square, accurately aligned, correctly located, and in tolerance.
- B. Coordinate with Section 08 33 13 – Overhead Coiling Counter Doors for overhead counter doors installed above the pass-thru window and storefront transom, and above the security window.

3.3 INSTALLATION

- A. Install pass-thru and security windows in accordance with manufacturer's instructions.
- B. Install pass-thru and security windows plumb, level, square, true to line, and without warp or rack.
- C. Install pass-thru and security window components weathertight.
- D. Anchor pass-thru windows securely in place to supports. Use attachment methods permitting adjustment for construction tolerances, irregularities, alignment, and expansion and contraction.
- E. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.
- F. Sheet Metal Flashing: Install sheet metal flashing as specified in Section 07 62 00.
- G. Joint Sealants: Install joint sealants as specified in Section 07 92 00.

- H. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- I. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 ADJUSTING

- A. Adjust windows to be weathertight in closed position.
- B. Adjust windows and operating hardware to function properly and for smooth operation without binding.

3.5 CLEANING

- A. Clean pass-thru and security windows promptly after installation in accordance with manufacturer's instructions.
- B. Remove excess joint sealant in accordance with sealant manufacturer's instructions.
- C. Do not use harsh cleaning materials or methods that would damage glazing or finish.

3.6 PROTECTION

- A. Protect installed pass-thru and security windows to ensure that, except for normal weathering, pass-thru and security windows will be without damage or deterioration at time of substantial completion.

END OF SECTION.

SECTION 08 62 23 – TUBULAR DAYLIGHTING DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Tubular daylighting devices and accessories.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 07 41 13 – Metal Roof Panels.
- C. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. ASTM International:
 1. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 3. ASTM A463 – Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.
 4. ASTM A653 – Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.
 5. ASTM A792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 6. ASTM E108 – Standard Test Methods for Fire Tests of Roof Coverings.
 7. ASTM E283 – Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. ASTM E308 – Standard Practice for Computing the Colors of Objects by Using the CIE System.
 9. ASTM E330 – Structural Performance of Exterior Windows, Curtain Walls and Doors.

10. ASTM E547 – Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference.
 11. ASTM E1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 12. ASTM E1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane.
 13. ASTM D635 – Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
 14. ASTM D1929 – Test Method for Ignition Properties of Plastics.
 15. ASTM D 2843 – Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
 16. ASTM F1642 – Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loading.
 17. ASTM F2912 – Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading.
- C. AAMA/WDMA/CSA 101/I.S.2/A440 – Standard/Specification for Windows, Doors, and Unit Skylights; 2011.
- D. FM Standard 4431 – The Approval Standard for Skylights.
- E. ICC-ES AC-16 – Acceptance Criteria for Plastic Skylights; 2008.
- F. California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1).

1.5 PERFORMANCE REQUIREMENTS

- A. Daylight Reflective Tubes: Spectralight Infinity with INFRAREduction Technology combines ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields an average total- and specular-reflectance for the Visible Light spectrum (400 nm to 700 nm) providing maximized visible light transmission and less than 25% reflectance for Infrared (IR) heat wavelengths (750 nm to 2500 nm) for minimized heat transmission, resulting in a spectrally-selective Total Solar Spectrum (250 nm to 2500 nm) reflectance less than 37 percent, as measured using a Perkin Elmer Lambda 1050 spectrophotometer with a Universal Reflectance Accessory. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
- B. Solamaster 750 DS-C (Closed Ceiling):
1. AAMA/WDMA/CSA 101/IS2/A440, Class CW-PG70, size tested 21 inch (530 mm) diameter, Type TDDOC and Type TDDCC.

- a. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E283.
- b. Water Resistance Test: Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in accordance with ASTM E547 and ASTM E331.
- c. Uniform Load Test: All units tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E330.
 - i. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).

2. Fire Testing:

- a. Fire Rated Roof Assemblies (if required): When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code for Class A, B, and C roof assemblies.
 - i. When used with Dome Edge Protection Band and Rooftop Fire Glazing, all domes meet prescriptive method of Option 1 of IBC 708A.2.1 and IWUIC 101.2
- b. Self-Ignition Temperature – Greater than 650°F per ASTM D1929.
- c. Smoke Density: Rating no greater than 450 per ASTM E84 in way intended for use. Classification C.
- d. Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D635.
- e. Rate of Burn and/or Extent: Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D635.

3. FM Certification (if required):

- a. Spread of Flame: Passes: Class A at 5 in 12. No flame spread when tested in accordance with FM modified version of ASTM E108 Fire Test of Roof Coverings.
- b. Simulated Hail Resistance (Pre UV Exposure): Passes: No cracking or breaks when tested with nominal 2.0 in. (51 mm) diameter ice ball having a kinetic energy of 26.8 ft-lbs (36.4J)
- c. Simulated Hail Resistance (Post UV Exposure): Passes: No cracking or breaks when tested with nominal 2.0 in. (51 mm) diameter ice ball

having a kinetic energy of 26.8 ft-lbs (36.4J) after no less than 1000 hours of ultraviolet (UV) light exposure.

- d. Simulated Impact: Passes: No breakage or through openings when a 100 lb (45.5 kg) weight dropped from 4 ft (1.2 m) above highest point of test sample.
 - e. Simulated Wind Uplift: Passes: 195 psf Wind Rating. No separation, breaking or cracking occurred when tested in accordance with FM 4431.
4. Fall Protection Performance: Passes fall protection test: California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1) Skylight Screens.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.
 - 4. Installation requirements.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including rough opening and framing dimensions, anchorage, roof flashings and accessories.
- D. Verification Samples: As requested by Architect.
- E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of twenty years experience in the top lighting industry. Secondary products shall be acceptable to the primary manufacturer.
- B. Installer Qualifications: All products shall be installed by a single installer with a minimum of five years demonstrated experience, with adequate equipment, skilled workers, and practical experience to meet the project schedule.
- C. Skylights shall conform with authorities having jurisdiction and be designed to meet design criteria of the project location and the following:
 - 1. Skylights must be certified by NFRC.

2. Skylights must be Tested and labeled in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
 3. Skylights must have Factory Mutual (FM) Approval Class Number 4431.
 4. Meet or exceed OSHA 200 pound (90 kg) Drop Tests expressed in 29 CFR 1910.23(e)(8)
 5. Skylights shall provide minimum 69 psf (3.30 kPa) design load.
- D. Pre-Installation Meeting: Contractor shall convene a pre-installation meeting on the project site minimum one week before beginning work of this Section. The meeting shall include the Architect or Owner's Representative and representatives of all related trades to:
1. Coordinate between the at least the following trades: Roofing to install the flashing and skylight.
 2. Verify project requirements and site logistics.
 3. Assess integrity of the roofing system and building structure.
 4. Review manufacturer's installation instructions and warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in a cool dry location protected from the weather and in the manufacturer's original unopened containers until ready for installation.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.9 PROJECT CONDITIONS

- A. Coordinate delivery schedule with the Contractor and project schedule to minimize on site storage.
- B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- C. Store materials in a dry area, protected from freezing, staining, contamination or damage.

1.10 WARRANTY

- A. Daylighting Device: Manufacturer's standard warranty for 10 years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Solatube International, Inc (www.solatube.com)
- B. Requests for substitutions will be considered in accordance with provisions of Division 1 sections.

2.2 TUBULAR DAYLIGHTING DEVICES

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.
- B. SolaMaster Series: 21 inch Daylighting System:
1. Model: Solatube Model 750 DS-C Closed Ceiling. AAMA Type TDDCC.
 2. Capture Zone:
 - a. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
 - i. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
 - i. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
 - ii. Acrylic Dome plus Inner Dome Glazing: Type DAI, Inner Dome is 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.
 - b. Tube Ring: 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC. Prevents thermal bridging between base flashing and tubing and channel condensed moisture. Attached to base of dome ring with butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration.
 - c. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.
 3. Dome Options:
 - a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
 - b. Dome Edge Protection Band: Type PB, for fire rated Class A, B or C roof applications. Galvanized steel. Nominal thickness of 0.039 inch (1 mm). For use with all flashing types.
 - c. Rooftop Fire Glazing: Type FG, for use in high fire areas in Wildland Urban Interface zones is 3 mm fully tempered over laminated glass. Laminated glass is two layers of 3 mm glass with minimum 0.76 mm PVB interlayer conforming to ANSI Z97.1. Edge of glass surrounded with steel housing. Housing is GB grade steel with nominal thickness of 0.20 inch (0.5 mm).

4. Flashings:

- a. Roof Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A653 or ASTM A463 or ASTM A792, 0.028 inch plus or minus .006 inch thick.
 - i. Base Style: Type FC, Curb cap, with inside dimensions of 27 inches by 27 inches to cover curb.
- b. Metal Insulated Roof Curb: Corrosion resistant 18 Gauge hot-dipped galvanized steel conforming to ASTM A653 G90 with continuous welded seams, integrated base plate for water tightness and extra strength, lined with 1-1/2 inch fiberglass fireproof sound attenuating thermal insulation, factory installed 2 by 2 treated wood nailer secured to top ledge of curb. Curb designed for single-ply roofing, lightweight fill or tapered insulation low slope roof types.
 - i. Curb Model / Style: As recommended by manufacturer.
- c. Flashing Options:
 - i. Curb Insulator: Curb Insulator, Type CI, Thermal isolation material is for use under flashing Type FC.
 - ii. Curb Cap Insulation: Type CCI, Nominal 1 inch thick thermal insulation pad. Rated R-6 Insulation. Type-1 Class-1 per ASTM C1289; Passes UL 1715. For use with Flashing Type FC.
 - iii. Roof Flashing Turret Extensions: Provide manufacturer's standard extension tubes for applications as required.

5. Transfer Zone:

- a. Extension Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm) conforming to ASTM B209.
 - i. Reflective Tubes: Reflective extension tube, Type EXX and Type EL with total length of run as indicated on the Drawings.
 - ii. Tube Options:
 - i. Extension Tube Angle Adapter: Provide manufacturer's standard adapters for applications requiring:
 - a) Type A1 one 0 to 90 degree extension tube angle adapter.
 - b) Type A2 two 0 to 90 degree extension tube angle adapters.

- ii. Top Tube Angle Adapter, Type TA: Reflective 45 degree adjustable Top Tube Angle Adapter, 16 inches long.
- iii. Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit: Type AK, Reflective 45 degree adjustable top and bottom angle adapters (one each), 16 inches long.
- iv. Bottom Tube Angle Adapter, Type BA: Reflective 45 degree adjustable Bottom Tube Angle Adapter, 16 inches long.
- v. Reflective Extension Tube, Type EL: 48 inches long, replaces two normal 24-inch extension tubes when long tube runs are required.
- vi. Spectralight Infinity SoftLight Extension Tube: Type ES, 24 inch Super-reflective extension tube with structured surface providing precise light spread for enhanced visual comfort. Replaces one standard 24 inch extension tube in the tube assembly.
- vii. Thermal Insulation Panel: Type TIP, high-performance dual-glazed, thermally-broken tube insulation system.
- viii. Open Ceiling Trim Ring: Type R, ABS Plastic, White; nominal thickness of 0.04 inch (1 mm).
- ix. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.

6. Delivery Zone:

- a. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
 - i. Metal Transition Box: Type TM, Metal Round to Square transition box comprised of Spectralight Infinity SoftLight material with structured finish on exposed reflective surface, .015 in (0.4 mm) thick. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
 - ii. Lens: Type L2, Prismatic lens design to maximize light output and diffusion with extruded aluminum frame and EPDM foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E 283. Visible Light Transmission shall be greater

than 90 percent at 0.100 inches (2.5 mm) thick. Classified as CC2.

- iii. Supplemental Natural Effect Lens: Type LN, Lens made of acrylic, classified as CC2, Class C, 0.060 inch (1.5 mm) thick, with open cell foam seal to minimize condensation and bug, dirt and air infiltration per ASTM E283.

2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.
- C. If substrate and rough opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Coordinate requirements for power supply, conduit and wiring.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of the Work performs properly and that finished installation is weather tight.
 - 1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
 - 2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.

- 3. Coordinate attachment and seal of perimeter air and vapor barrier material.
- C. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer
- D. Align device free of warp or twist, maintain dimensional tolerances.
- E. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

3.4 FIELD QUALITY CONTROL

- A. Provide independent testing and inspection as specified in Section 01 45 23. Inspect installation to verify secure and proper mounting.
 - 1. Test for water leaks in accordance with AAMA 502 after installation and curing of sealants but prior to installation if interior finishes.
 - 2. Perform test for total area of each unit skylight.
 - 3. Notify the Architect and the Contractor of any failed tests.

3.5 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 71 00 – FINISH HARDWARE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Definition: "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

- B. This Section includes commercial door hardware for the following:

- 1. Swinging doors.
- 2. Sliding doors.
- 3. Gates.
- 4. Other doors to the extent indicated.

- C. Door hardware includes, but is not necessarily limited to, the following:

- 1. Mechanical door hardware.
- 2. Electromechanical door hardware.
- 3. Cylinders specified for doors in other sections.

1.3 RELATED SECTIONS

- A. Section 08 11 13 – Hollow Metal Doors and Frames.
- B. Section 08 33 13 – Overhead Counter Doors.
- C. Section 28 15 00 – Integrated Access Control Hardware Devices.
- D. Section 32 31 13 – Chain Link Fencing and Gates.
- E. Section 32 31 31 – Ornamental Metal Fencing and Gates.

1.4 CODES AND REFERENCES

- A. Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
 - 2. CBC – California Building Code.

3. NFPA 70 – National Electrical Code.
4. NFPA 80 – Fire Doors and Windows.
5. NFPA 101 – Life Safety Code.
6. NFPA 105 – Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 – Submittals.
- B. Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.

- i. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. 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 Schedule.
- D. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- F. Informational Submittals – Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- G. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.6 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. California Building Code: Provide hardware that complies with CBC Section 11B.
1. All openings as a part of an accessible route shall comply with CBC Section 11B-404.
 2. The clear opening width for a door shall be 32" minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3.
 3. Operable hardware on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.
 4. Hardware (including panic hardware) shall not be provided with "nightlatch" function for any accessible doors or gates unless the following conditions are met:
 - a. Such hardware has a 'dogging' feature and is dogged during the time the facility is open.

- I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.8 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with

required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.9 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
1. Structural failures including excessive deflection, cracking, or breakage.
 2. Faulty operation of the hardware.
 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: 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.

PART 2 – PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing

requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'-0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'-1" to 4'-0": 5" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Hager Companies (HA) – BB Series, 5 knuckle.

- b. McKinney (MK) – TA/T4A Series, 5 knuckle.
- c. dormakaba Best (ST) – F/FBB Series, 5 knuckle.

2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Data Transfer Hinges: Provide combined electrified power and Ethernet data transfer hinges with Molex™ standardized plug connectors to accommodate electrified functions with a 1-year warranty as specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
- 1. Data transfer hinges feature two 6-position and two 4-position Molex connectors, 9 multi-strand wires; 2 twisted pairs (26 AWG), 4 straight conductors (28 gauge) and 1 straight conductor (22 AWG) with concealed plug connectors eliminating the need for separate or exposed wiring. Rated 350 mA continuous @ 48 volts DC nominal, the hinge is capable of two PoE wiring configurations:
 - a. Power over Data (5 wire): Power and Data supplied together over the 2 twisted 26 AWG) pairs. The 22 AWG conductor is used for the earth ground connection.
 - b. Data with Power over Spares (9 wire): Data over 2 twisted (26 AWG) pairs with Power over spare pairs 94 straight 28 AWG conductors). The 22 Awg conductor is used for earth ground connection.
 - 2. Manufacturers:
 - a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR) – PoE Series.
 - b. McKinney (MK) – PoE Series.
 - c. Pemko (PE) – PoE Series.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
- 1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney (MK) – Electrical Connecting Kit: QC-R001.
 - b. McKinney (MK) – Connector Hand Tool: QC-R003.

2. Manufacturers:
 - a. Hager Companies (HA) – Quick Connect.
 - b. McKinney (MK) – QC-C Series.
 - c. Dormakaba Best (ST) – WH Series.

2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 2. Furnish dust proof strikes for bottom bolts.
 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Door Controls International (DC).
 - b. Rockwood (RO).
 - c. Trimco (TC).
- B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
 4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 5. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood (RO).
- c. Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. **Per CBC 1010.1.11, New buildings on a K-12 Public School campus shall be provided with locks which allow doors to classrooms and any room with an occupant load of five or more persons to be locked from the inside. Locks shall conform to the specification and requirements of Section 1010.1.9.3. Exceptions include doors which are normally locked from the outside, relocatables moved within the same campus, and reconstruction projects.**
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Facility Restricted Keyway.
- D. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.

1. Heavy duty cylindrical locks shall have a seven-year warranty.
2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
3. Furnish with solid cast levers, standard 2-3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
4. Locks are to be non-handed and fully field reversible.
5. Manufacturers:
 - a. Corbin Russwin Hardware (RU) – CLX3300 Series.
 - b. Sargent Manufacturing (SA) – 10X Line.
 - c. Schlage (SC) – ND Series.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.

4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.

11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

- a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
- b. Sargent Manufacturing (SA) - 80 Series.
- c. Von Duprin (VD) - 35A/98 XP Series.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
7. Closer Delay Time: Door closing speed shall comply with CBC Section 11B-404.2.8.
8. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically disabled, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing but not more than the following:
 - a. 5.0 lbs. – exterior doors

- b. 5.0 lbs. – interior doors
 - c. 5.0 lbs. – fire doors (The Authority Having Jurisdiction, may increase the maximum effort to operate fire doors to achieve positive latching, but not to exceed 15 lbs max.)
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
- 1. Heavy duty surface mounted door closers shall have a 25-year warranty.
 - 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) - DC6000 Series.
 - b. Norton Rixson (NO) - 7500 Series.
 - c. Sargent Manufacturing (SA) - 351 Series.
 - d. Yale Commercial(YA) - 4400 Series.

2.10 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 - 1. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.11 THRESHOLDS

- A. General: Except as otherwise indicated provide standard metal threshold unit of type, size and profile as shown or scheduled; maximum height to be 1/2" with 1:2 max. bevel.
 - 1. Raised thresholds and changes in level at doorways shall comply with CBC Sections 11B-302 and 11B-303.

2.12 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: 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 UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. Pemko (PE).
 - 2. Reese Enterprises, Inc. (RE).

2.13 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
 - 5. All hand-activated door opening hardware shall be centered between 34 inches and 44 inches above the finish floor, Per CBC Section 11B-404.2.7.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and 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 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.6 ADJUSTING

- A. Initial Adjustment: 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 and to comply with referenced accessibility requirements.

3.7 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.8 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.9 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handling and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

- B. Manufacturer's Abbreviations:

1. D&D – D&D Technologies
2. GMFR – Gate Manufacturer
3. LOC – Locinox
4. MK – McKinney
5. NO – Norton
6. OT – Other
7. PE – Pemko
8. RO – Rockwood
9. SA – SARGENT
10. SC – Schlage

11. ZE – Zero International

3.10 HARDWARE SCHEDULE

A. Group 01.3: Exterior – Double Leaf Doors – Electrical:

Doors: T107

EACH DOOR PANEL TO HAVE:

3	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	TOT	SELF-LATCHING FLUSH BOLT SET	2845 / 2945	US32D	RO
1	TOT	DUST PROOF STRIKE	570	US26D	RO
1	TOT	STOREROOM LOCK	SF 10XG04 LL	US26D	RO
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	KICKPLATE	K1050 10" High x CSK	US32D	RO
1	EA	DOOR STOP / HOLDER	491-RKW	US26D	RO
1	TOT	THRESHOLD	172A 72" x FHSL14	AL	PE
1	TOT	RAIN GUARD	346C x FFW		PE
1	TOT	GASKETING	S773BL		PE
1	EA	SWEEP	315CN		PE
1	TOT	ASTRAGAL	43SP		ZE

B. Group 2.1: Exterior – Single Leaf – Team Rooms with Access Control:

Doors: V105, V105B

EACH DOOR PANEL TO HAVE:

2	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	EA	ELECTRIC HINGE, HEAVY WEIGHT	T4A3386-PoE	US32D	MK ↻
1	EA	ACCESS CONTROL CYL LOCK	SF IN220-10G77 BIKPS MB LL (by Div. 28)	US26D	SA ↻
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	DOOR CLOSER	PR7500	689	NO
1	EA	KICKPLATE	K1050 10" High x CSK	US32D	RO
1	EA	DOOR STOP	463	US32D	RO
1	EA	THRESHOLD	172A 36" MSES10 x FHSL14	AL	PE
1	EA	GASKETING	S773BL		PE
1	EA	SWEEP	315CN		PE
1	EA	ELECTROLYNX FRAME HARNESS	PoE-C1300_RJ		MK ↻
1	EA	ELECTROLYNX DOOR HARNESS	PoE-Cxxx_RJ (length as reqd)		MK ↻
1	EA	LATCH PROTECTOR	320CXL	US32D	RO

C. Group 2.2: Exterior – Single Leaf – Concessions / Snack Bar, and Ticket Booth with Access Control:

Doors: T101, T105, V101

EACH DOOR PANEL TO HAVE:

2	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	EA	ELECTRIC HINGE, HEAVY WEIGHT	T4A3386-PoE	US32D	MK ⚡
1	EA	ACCESS CONTROL CYL LOCK	SF IN220-10G77 BIKPS MB LL (by Div. 28)	US26D	SA ⚡
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	DOOR CLOSER	PR7500	689	NO
1	EA	KICKPLATE	K1050 10" High x CSK	US32D	RO
1	EA	DOOR STOP / HOLDER	491-RKW	US32D	RO
1	EA	THRESHOLD	172A 36" MSES10 x FHSL14	AL	PE
1	EA	GASKETING	S773BL		PE
1	EA	SWEEP	18100CNB		PE
1	EA	ELECTROLYNX FRAME HARNESS	PoE-C1300_RJ		MK ⚡
1	EA	ELECTROLYNX DOOR HARNESS	PoE-Cxxx_RJ (length as reqd)		MK ⚡

D. Group 03.1: Exterior – Student Restrooms – Multi-Stall – Single Leaf – Single Entrance:

Doors: T103, T104, V103, V103B, V104, V104B

EACH DOOR PANEL TO HAVE:

3	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	EA	LOCK	SF 10XG16 LL	US26D	SA
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	DOOR CLOSER	PR7500	689	NO
1	EA	DOOR STOP / HOLDER	491-RKW	US26D	RO
1	EA	KICK PLATE	K1050 10" High x CSK	US32D	RO
1	EA	GASKETING	S773BL		PE
1	EA	DOOR SWEEP	315CN		PE
1	EA	LOCK GUARD	320CXL	US32D	RO
1	EA	THRESHOLD	172A 36" x FHSL14	AL	PE

E. Group 03.2: Exterior – Electrical / IDF:

Doors: V102

EACH DOOR PANEL TO HAVE:

3	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	EA	LOCK	F 10XG04 LL	US26D	SA
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	DOOR CLOSER	PR7500	689	NO
1	EA	DOOR STOP / HOLDER	491-RKW	US26D	RO
1	EA	KICK PLATE	K1050 10" High x CSK	US32D	RO
1	EA	GASKETING	S773BL		PE
1	EA	DOOR SWEEP	315CN		PE
1	EA	LOCK GUARD	320CXL	US32D	RO
1	EA	THRESHOLD	172A 36" x FHSL14	AL	PE

F. Group 03.3: Exterior – Office – Single Leaf:

Door: T102

EACH DOOR PANEL TO HAVE:

3	EA	HEAVY DUTY HINGE	T4A3386 NRP	US32D	MK
1	EA	LOCK	SF 10XG16 LL	US26D	SA
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	DOOR CLOSER	PR7500	689	NO
1	EA	DOOR STOP / HOLDER	491-RKW	US26D	RO
1	EA	KICK PLATE	K1050 10" High x CSK	US32D	RO
1	EA	GASKETING	S773BL		PE
1	EA	DOOR SWEEP	315CN		PE
1	EA	LOCK GUARD	320CXL	US32D	RO
1	EA	THRESHOLD	172A 36" x FHSL14	AL	PE

G. Group 5.3: Interior – Janitor:

Door: T106

EACH DOOR PANEL TO HAVE:

3	EA	HINGE, FULL MORTISE, HEAVY WEIGHT	T4A3786	US32D	MK
1	TOT	STOREROOM LOCK	SF 10XG04 LL	US26D	SA
1	EA	FINAL CORE	PRIMUS EFP CORES / KEYS		SC
1	EA	SURFACE CLOSER	CPS7500	689	NO
1	EA	DOOR STOP / HOLDER	491-RKW	US32D	RO
1	EA	KICKPLATE	K1050 10" High x CSK	US32D	RO
3	EA	SILENCER	608		RO

H. Group 11.1: Specialized Doors (Overhead Coiling Counter Doors):

EACH DOOR PANEL TO HAVE:

2	EA	PRIMUS CORE	PRIMUS EP CORES / KEYS	626	SCH
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I. Group 12.1: Black Vinyl Coated Chain Link Gate – 3'-6"W x 6'-0"H Single Leaf Pedestrian Gate:

Gate: G12

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY, SELF CLOSING HINGES	TCHDRND2S3 TRUCLOSE HEAVY DUTY ADJUSTABLE GATE HINGES	BLACK	D&D
1	EA	LOCK	SF FW-10XG26 LL	BSP	SA
2	EA	PRIMUS CORE	PRIMUS EFP CORES / KEYS	626	SCH
1	EA	WELDED FULL HEIGHT ANGLE / STYLE	RECOMMENDED BY MFR	BLACK	-
1	EA	KICKPLATE	K1050 10" H x CSK	BLACK	RO
1	EA	FLOOR STOP/HOLDER	491-RKW	US32D	RO

J. Group 12.3: Black Vinyl Coated Chain Link Gate – 10'-0" W and 16'-0"W x 6'-0"H Double Leaf Gate:

Gate: G13, G19

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	BLACK	-
1	TOT	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	TOT	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	TOT	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	LOCK – DROP BOLT	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

K. Group 12.4: Black Vinyl Coated Chain Link Gate – 20'-0"W x 8'-0"H – Double Leaf Vehicular Gate with Cane Bolt and Latch:

Gate: G04

EACH GATE PANEL TO HAVE

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	BLACK	-
1	TOT	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	TOT	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	TOT	KNOX PADLOCK	MODEL 3770	-	KNX
1	EA	LOCK – DROP BOLT	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

L. Group 12.5: Black Vinyl Coated Chain Link Gate – 4'-0"W x 6'-0"H Single Leaf Pedestrian Gate:

Gates: G14, G18

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY, SELF CLOSING HINGES	TCHD1AS3WT TRUCLOSE HEAVY DUTY ADJUSTABLE GATE HINGES	BLACK	D&D
1	EA	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	EA	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	EA	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	KICKPLATE	K1050 10" H x CSK	BLACK	RO
1	EA	LOCK – DROP BOLT	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

M. Group 12.6: Black Vinyl Coated Chain Link Gate – 4'-0"W x 4'-0"H Single Leaf Pedestrian Gate:

Gates: G06, G10, G15, G20, G22, G23

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY, SELF CLOSING HINGES	TCHD1AS3WT TRUCLOSE HEAVY DUTY ADJUSTABLE GATE HINGES	BLACK	D&D
1	EA	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	EA	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	EA	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	KICKPLATE	K1050 10" H x CSK	BLACK	RO
1	EA	LOCK – DROP BOLT	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

N. Group 12.8: Black Vinyl Coated Chain Link Gate – 20'-0" W and 14'-0"W x 4'-0"H Double Leaf Pedestrian Gate:

Installed at gates: G11 (20'-0"W), G21 (14'-0"W)

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	BLACK	-
1	TOT	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	TOT	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	TOT	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	LOCK – DROP BOLT	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

O. Group 12.9: Black Vinyl Coated Chain Link Gate – 22'-0"W x 4'-0"H Rolling Gate:

Installed at gates: G05

EACH GATE PANEL / LEAF TO HAVE:

1	EA	DOUBLE WHEEL CARRIER	RECOMMENDED BY MFR	-	-
2	EA	REAR WHEELS WITH BRACKETS	RECOMMENDED BY MFR	-	-
4	EA	PIPE TRACK BRACKETS	RECOMMENDED BY MFR	-	-
1	EA	ROLLING GATE LATCH	RECOMMENDED BY MFR	-	-
1	EA	TUBING FOR TRACK	RECOMMENDED BY MFR	BLACK	-
			SIZE TO FIT GATE SIZE	BLACK	-
1	EA	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-

P. Group 13.2: Galvanized Chain Link Gate – 4'-0"W x 6'-0"H Single Leaf – Storage Gate:

Installed at gates: G07, G09, G16, G17

EACH GATE PANEL TO HAVE

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	-	-
1	EA	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	EA	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	EA	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	DROP BOLT	RECOMMENDED BY MFR	-	-

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

Q. Group 13.4: Galvanized Chain Link Gate 8'-0"W x 6'-0"H Double Leaf – Storage Gate:

Installed at gates: G08

EACH GATE PANEL TO HAVE

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	-	-
1	TOT	HASP / LATCH	RECOMMENDED BY MFR	BLACK	-
1	TOT	KEEPER	RECOMMENDED BY MFR	BLACK	-
1	TOT	PADLOCK	CAPABLE OF USING PRIMUS EFP KEYS	-	-
1	EA	DROP BOLT	RECOMMENDED BY MFR	-	-

INCLUDE IN GROUND CATCH FOR DROP IN BOLT.

R. Group 14.1: Ornamental Metal Gate – 3'-6"W x 8'-0"H Single Leaf Pedestrian Gate:

Gate: G03

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY, SELF CLOSING HINGES	TCHDRND2S3 TRUCLOSE HEAVY DUTY ADJUSTABLE GATE HINGES	BLACK	D&D
1	EA	LOCK	SF FW-10XG26 LL	BSP	SA
2	EA	PRIMUS CORE	PRIMUS EFP CORES / KEYS	626	SCH
1	EA	WELDED FULL HEIGHT ANGLE / STYLE	RECOMMENDED BY MFR	BLACK	-
1	EA	KICKPLATE	K1050 10" H x CSK	BLACK	RO
1	EA	FLOOR STOP/HOLDER	491-RKW	US32D	RO

S. Group 14.2: Ornamental Metal Gate – 22'-0"W x 8'-0"H Vehicular Double Leaf Gate:

Gate: G01

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	-	-
1	EA	PRIMUS CORE	PRIMUS EFP CORES / KEYS	626	SCH
1	EA	LATCH	RECOMMENDED BY MFR	-	-
1	EA	KEEPER	RECOMMENDED BY MFR	-	-
1	EA	KNOX PADLOCK	MODEL 3770	-	KNX
1	EA	LOCK	LAKQU2	-	LOC
1	EA	24" DROP BOLT	LB124BXW-KSA	-	D&D

** INCLUDE IN GROUND CATCH FOR DROP IN BOLT.*

T. Group 14.3: Ornamental Metal Gate – 8'-0"W x 8'-0"H Pedestrian Double Leaf Gate:

Gate: G02

EACH GATE PANEL / LEAF TO HAVE:

3	EA	HEAVY DUTY HINGES	RECOMMENDED BY MFR	-	-
1	EA	PRIMUS CORE	PRIMUS EFP CORES / KEYS	626	SCH
1	EA	LATCH	RECOMMENDED BY MFR	-	-
1	EA	KEEPER	RECOMMENDED BY MFR	-	-
1	EA	KNOX PADLOCK	MODEL 3770	-	KNX
1	EA	LOCK	LAKQU2	-	LOC

** INCLUDE IN GROUND CATCH FOR DROP IN BOLT.*

END OF SECTION.

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SECTION 08 81 00 – GLASS AND GLAZING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Extent of glass and glazing work is indicated on drawings and schedules.

1.3 RELATED SECTIONS

- A. Section 07 92 00 – Joint Sealants.
- B. Section 08 33 23 – Overhead Counter Doors.
- C. Section 08 41 13 – Aluminum Framed Storefronts.

1.4 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.
- B. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.
- C. ANSI Z97.1 – American National Standard for Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
- D. ASCE/SEI 7 – Minimum Design Loads for Buildings and Other Structures.
- E. ASTM International (ASTM):
 - 1. ASTM C162 – Standard Terminology of Glass and Glass Products.
 - 2. ASTM C1036 – Standard Specification for Flat Glass.
 - 3. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. ASTM C1172 – Standard Specification for Laminated Architectural Flat Glass.
 - 5. ASTM C1376 – Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
 - 6. ASTM E119 – Fire Tests of Building Construction and Materials.
 - 7. ASTM E2074 – Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

8. ASTM E2010 – Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.
9. ASTM E2188 – Standard Test Method for Insulating Glass Unit Performance.
10. ASTM E2189 – Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
11. ASTM E2190 – Standard Specification for Insulating Glass Unit Performance and Evaluation.

1.5 PERFORMANCE AND SYSTEM REQUIREMENTS

- A. General: Provide glass capable of withstanding thermal movement and wind and impact loads (where applicable) as specified in paragraph B.
- B. Glass Design: Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 1. Design Wind Loads: Determine design wind loads applicable to the Project according to ASCE 7-16: Minimum Design Loads for Buildings and Other Structures, Chapter 30: Wind Loads – Components and Cladding, based on mean roof heights above grade indicated on Drawings.
 - a. Wind Load Duration: Short duration, as defined in ASTM E1300.
 - b. Maximum Lateral Deflection: For glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure as defined in ASTM E1300
 - c. For monolithic-glass lites heat treated to resist wind loads.
- C. Thermal Movements: Shall allow for thermal movements resulting from ambient and surface temperatures, specifically an ambient temperature range of 120°F and from a consequent temperature range within glass and glass framing members of 180°F.
- D. Glazing identification to comply with CBC 2403.1

1.6 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: For each glass product and glazing material indicated.
- C. Verification Samples (if required): For the following products, in the form of 12 inch (305 mm) square samples for insulating glass units.
- D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

- E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1.7 QUALITY ASSURANCE

- A. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.
- B. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated.
 - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
 - 2. GANA: "Laminated Glazing Reference Manual"; "Glazing Manual."
 - 3. AAMA: "Sloped Glazing Guidelines."
 - 4. IGMA: "Guidelines for Sloped Glazing."
- D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with certification label of either Insulating Glass Certification Council or Associated Laboratories, Inc.
- E. Safety Glazing Products: Comply with testing requirements in CPSC 16 CFR 1201 and, for wired glass, ANSI Z97.1.
 - 1. Obtain safety glazing products permanently marked with certification label, in conformance to CBC Section 2406.3.
 - 2. Lites more than 9 square feet (sf) are required to be Category II materials.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.9 WARRANTY

- A. Warranty: Standard manufacturer's warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
1. AGC Glass Company
 2. FireLite
 3. Guardian Industries Corp.
 4. Pilkington – NSG Group
 5. Technical Glass Products (TGP)
 6. Vetrotech Saint-Gobain
 7. Vitra Architectural Glass (formerly PPG Glass)

2.2 ANNEALED FLOAT GLASS

- A. ASTM C1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
1. Thickness: 1/4 inch.
 2. Color: Clear
 3. Accessories: Provide all necessary gaskets, extrusions, stops, moldings, etc., to provide a complete and workmanlike installation.
 4. Must meet all requirements of ASTM C1048.

2.3 TEMPERED GLASS

- A. General: Kind FT (fully tempered), Type II (patterned flat glass), Class 1 (clear), Form 3 (patterned); and of quality, finish, and pattern specified.
1. Thickness: 1/4 inch.
 2. Color: Clear
 3. Accessories: Provide all necessary gaskets, extrusions, stops, moldings, etc., to provide a complete and workmanlike installation.
 4. Must meet all requirements of ASTM C1048.

2.4 INSULATING-GLASS UNITS, GENERAL

- A. Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E774 for Class CBA units and with requirements specified in this section.
1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 – Performance Requirements of this section.

2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required.
3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
4. Sealing System: Comply with requirements in Section 07 92 00 – Joint Sealants. Dual seal, with polyisobutylene and silicone.
5. Spacer Specifications: Manufacturer's standard spacer material and construction manufactured from aluminum with mill or clear anodic finish.
6. Corner Construction: Manufacturer's standard corner construction.

2.5 LOW-E INSULATING GLASS

- A. Basis-of-Design: Ultra-Clear Low-E Insulating Glass. Ultra-Clear, low-reflective glass outdoor appearance.
 1. Product: "Solarban" 70XL (2) + Clear, by Vitro Architectural Glass.
 2. Insulating Unit Construction: 1 inch total = 1/4 inch (6mm) Clear Glass + "Solarban" 70XL Solar Control Low E-Glass + 1/2 inch (13mm) air space + 1/4 inch (6mm) Clear Glass.

2.6 LAMINATED SAFETY GLASS PRODUCTS

- A. General: Refer to primary and heat-treated glass requirements relating to properties of uncoated glasses making up laminated glass products.
- B. Laminated Safety Glass: Two panes of glass of equal thickness, laminated together with not less than 0.030" thick plastic interlayer and complying with requirements indicated below.
- C. Glass Characteristics: Float glass, complying with requirements for class, kind and thickness of each pane (ply) indicated below:
 1. Class 1: Clear for both panes.
 2. Kind FT: Fully-Tempered.
 3. Thickness: 1/4".
- D. Color of Plastic Interlayer: Clear
- E. Labeling: Permanently marked with certification label, per CBC Section 2406.3.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with

written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.8 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES

- A. General: Provide products of type indicated and complying with the following requirements.
 - 1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact.
 - 2. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C920 requirements, including those for Type, Grade, Class and Uses.
 - 3. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- B. Two-Part Polysulfide Glazing Sealant: Type M; Grade NS; Class 25; Uses NT, M, G, A, and, as applicable to uses indicated, 0.
- C. Preformed Butyl-Polyisobutylene Glazing Tape: Provide manufacturer's standard solvent-free butyl-polyisobutylene formulation with a solids content of 100 percent; complying with AAMA A 804.1.

2.9 GLAZING GASKETS

- A. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C509, Type II; black.

2.10 MISCELLANEOUS GLAZING MATERIALS

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: As recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement of glass.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Clean glazing channels and other framing members to receive glass, immediately

before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

- B. Protect glass from edge damage during handling and installation. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar
- C. Apply primers to joint surfaces where required for adhesion of sealants where recommended by sealant manufacturer.

3.2 INSTALLATION

- A. Comply with GANA Glazing Manual and Sealant Manual and glazing manufacturer recommendations and installation instructions.
- B. Install setting blocks located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- C. Provide spacers inside and out, or correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- D. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints backsurface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- E. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- F. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- G. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
- H. Miter cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.3 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

END OF SECTION.

SECTION 08 90 00 – LOUVERS AND VENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fixed and Drainable Wall Louvers.
 - 2. Linear Soffit Vent.

1.3 RELATED SECTIONS

- A. Section 07 92 00 – Joint Sealers for sealants installed in perimeter joints between louver frames and adjoining construction.

1.4 DEFINITIONS

- A. Louver Terminology: Refer to Air Movement and Control Association (AMCA) 501 for definitions of terms for metal louvers not otherwise defined in this Section or referenced standards.

1.5 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer, fabricate, and install exterior metal wall louvers to withstand the effects of loads and stresses from wind and normal thermal movement, without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
- B. Wind Load: Uniform pressure (velocity pressure) of 20 lbf per sq. ft. (960 Pa), acting inwards or outwards.
- C. Normal thermal movement is defined as that resulting from the following maximum change (range) in ambient temperature. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night time sky heat loss.
 - 1. Temperature Change (Range): 100 deg F (55.5 deg C).

1.6 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM A924 – Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.
3. ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.
4. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
5. ASTM C841 – Standard Specification for Installation of Interior Lathing and Furring.
6. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

1.7 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each product specified.
- C. Shop drawings of louver units and accessories, and soffit vents. Include plans, elevations, sections and details showing profiles, angles, spacing of louver blades, spacing of soffit vents; unit dimensions related to wall openings and construction; free areas for each size indicated; profiles of frames at jambs, heads and sills; and anchorage details and locations.

1.8 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain louvers from one source and vents from one source and by a single manufacturer where alike in one or more respects regarding type and design.
- B. Welding Standards: Comply with applicable provisions of D1.2 "Structural Welding Code – Aluminum," and D1.3 "Structural Welding Code – Sheet Steel."
 1. Certify that each welder employed in unit of Work of this section has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- C. SMACNA Standard: Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.9 PROJECT CONDITIONS

- A. Measurements: Check actual louver openings before fabrication; and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Products / Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following. To establish a standard of quality, design and performance, the following products have been selected. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Architect shall be the sole determinant of equivalency.

1. Fixed Louvers:
 - a. Airolite Co. Model # K6774
2. Linear Soffit Vent:
 - a. Stockton Products, Model # FEV

2.2 FIXED EXTRUDED ALUMINUM WALL LOUVERS

A. Horizontal Drainable Fixed Blade Louvers: Extruded aluminum frames and louver blades; designed to collect and drain water to exterior at sill by means of gutters in front edges of blades and of channels in jambs and mullions; complying with the following requirements:

1. Louver Depth: 4 inches, unless otherwise indicated.
2. Frame Thickness: 0.125 inch, unless otherwise indicated.
3. Blade Thickness: 0.125 inch, unless otherwise indicated.
4. Louver Blade Angle: 45 degrees, unless otherwise indicated.
5. Screen Cloth: Manufacturers standard non-corrosive insect screen.

2.3 LINEAR SOFFIT VENT

A. Linear Soffit Vent: Galvanized steel flush edge vent; designed to offer ventilation while providing a finished flush reveal look; complying with the following requirements:

1. Product / Manufacturer: FEV (Flush Edge Vent), perforated, as manufactured by Stockton Products, or approved equal.
2. Width: 2 inches, or as indicated on drawings.
3. Perforated Vent Holes: To be 1/8".
4. Depth: As indicated on drawings.
5. Material: Galvanized Steel (26 gauge), painted to match soffit.

2.4 FINISH

- A. Finish to be Flourpolymer, Kynar 500 or approved equivalent, gloss finish, shop applied. Coating to be formulated to meet requirements for industrial, seacoast application, and meeting to requirements of AAMA 605. Formulation, preparation, and application shall be in strict accordance with manufacturer's recommendations. Color as selected by Architect from manufacturer's full range of colors.

2.5 MATERIALS

- A. Aluminum Extrusions: ASTM B221, Alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer to produce required finish.
- C. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are corrosive or incompatible with joined materials.
 - 1. Use types and sizes to suit unit installation conditions.
 - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Of type, size, and material required for type of loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.

2.6 FABRICATION, GENERAL

- A. General: Fabricate louvers and vents to comply with requirements indicated for design, dimensions, materials, joinery, and performance.
- B. Assemble louvers and vents in shop to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Maintain equal louver blade spacing to produce uniform appearance.
- D. Maintain equal vent perforations in linear soffit vent to produce uniform appearance.
- E. Fabricate frames, including integral sills, to fit in openings of sizes indicated with allowances made for fabrication and installation tolerances of louvers, adjoining construction, and perimeter sealant joints.
- F. Include supports, anchorages, and accessories required for complete assembly.
- G. Join frame members to one another and to fixed louver blades as follows, unless otherwise indicated, or size of louver assembly makes bolted connections between frame members necessary:

1. With fillet welds, concealed from view; or mechanical fasteners; or a combination of these methods; as standard with louver manufacturer.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

- A. Locate and place louvers and vents plumb, level, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations, and refinish entire unit, or provide new units.
- F. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses where required to make louver joints weathertight.
- H. Comply with Section 07 92 00 – Joint Sealants for sealants applied during installation of louvers and vents.

3.3 ADJUSTING AND PROTECTION

- A. Protect louvers and vents from damage of any kind during construction period including use of temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore louvers and vents damaged during installation and construction period, so that no evidence remains of correction work. If results of restoration are unsuccessful, as judged by Architect, remove damaged units and replace with new units.
 1. Clean and touch-up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish

coating.

- C. Test operation of adjustable wall louvers and adjust as needed to produce fully functioning units that comply with requirements.

3.4 CLEANING

- A. Periodically clean exposed surfaces of louvers and vents, which are not protected by temporary covering, to remove fingerprints and soil during construction period; do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Rinse surfaces thoroughly and dry.

END OF SECTION.

DIVISION 9 – FINISHES

09 24 00 – Lath and Plaster

09 29 00 – Gypsum Board Assemblies

09 30 00 – Tiling and Grout

09 51 13 – Acoustical Ceiling Panels and Grid

09 65 13 – Resilient Wall Base and Accessories

09 67 23 – Resinous Flooring

09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels

09 91 00 – Painting

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SECTION 09 24 00 – LATH AND PLASTER

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Stucco System
 - 2. Metal Lath and Furring
 - 3. Water Resistive Barrier
 - 4. Accessories

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry
- B. Section 07 62 00 – Sheet Metal Flashing and Trim
- C. Section 07 92 00 – Joint Sealants
- D. Section 08 33 13 – Overhead Counter Doors.
- E. Section 08 56 19 – Pass Thru and Security Windows.
- F. Section 09 91 00 – Painting

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. American Concrete Institute (ACI): ACI 524R – Guide to Portland Cement Plastering.
- C. Portland Cement Association (PCA): Portland Cement Plaster (Stucco) Manual, Current Addition.
- D. ASTM International (ASTM):
 - 1. ASTM A489 – Standard Specification for Carbon Steel Eyebolts
 - 2. ASTM A526 – Steel Sheet, Hot-Dip Galvanized, Commercial Quality
 - 3. ASTM A580 – Standard Specification for Stainless Steel Wire
 - 4. ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

5. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
6. ASTM A1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
7. ASTM B69 – Standard Specification for Rolled Zinc
8. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
9. ASTM C11 – Standard Terminology Relating to Gypsum and Related Building Materials and Systems
10. ASTM C150 – Standard Specification for Portland Cement
11. ASTM C636 – Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
12. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
13. ASTM C841 – Installation of Interior Lathing and Furring
14. ASTM C847 – Standard Specification for Metal Lath
15. ASTM C897 – Standard Specification for Aggregate for Job Mixed Portland Cement Based Plasters
16. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
17. ASTM C926 – Standard Specification for Application of Portland Cement-Based Plaster
18. ASTM C933 – Standard Specification for Welded Wire Lath
19. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. to 0.112 in. in Thickness
20. ASTM C1002 – Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
21. ASTM C1007 – Standard Specification for Installation of Load Bearing (Transverse and axial) Steel Studs and Related Accessories.
22. ASTM C1032 – Standard Specification for Woven Wire Plaster Base
23. ASTM C1063 – Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster

24. ASTM C1328 – Standard Specification for Plastic (Stucco) Cement
25. ASTM D226 – Standard Specification for Asphalt Saturated Organic Felt Used in Roofing and Waterproofing
26. ASTM D4258 – Standard Practice for Surface Cleaning Concrete for Coating
27. ASTM D4259 – Standard Practice for Abrading Concrete
28. ASTM D4260 – Standard Practice for Acid Etching Concrete
29. ASTM D4261 – Standard Practice for Surface Cleaning Concrete Masonry Units for Coating
30. ASTM D1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
31. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.

E. Federal Specification:

1. UU-B-790a; Moisture Resistant Building Papers; Type 1, Grade 2, Style 2
2. FF-N-105-B; Nails and Wire Staples
3. FS QQ-W-461H; Carbon Steel Wire

F. ICC-ES (International Code Council – Evaluation Service Reports – Acceptance Criteria):

1. AC11 – Cementitious Exterior Wall Coatings
2. AC38 – Water-resistive Barriers

G. Plaster and Drywall Systems Manual, Current Edition.

H. Underwriters Laboratories (UL): UL Fire Resistance Fire Resistance Directory, Current Version.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at the Project Site, a minimum of two (2) weeks prior to start of plaster work.

1.6 PERFORMANCE REQUIREMENTS

- A. Design and install framing and lath to limit deflection to the following:

1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs

2. Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads.
- B. Installation shall be completed by a manufacturer's certified and approved installer.
- C. Metal lath shall have a minimum zinc coating of G60 in accordance with ASTM A653.

1.7 SUBMITTALS

- A. General: Refer to Section 01 33 00 – Submittals.
- B. Product Data:
 1. All product data sheets, evaluation reports, accessories, material specifications, details, and warranty information that pertain to the project.
 2. Include the metal lath's manufacturer's certification that the lath meets or exceeds the specified weight per ASTM C847 for U.S. nominal weights respectively. Provide manufacturer's product literature and ICC-ESR report for metal lath prior to ordering
- C. Shop Drawings: Indicate locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- D. Samples: The contractor shall submit to the Owner / Architect:
 1. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color, finish, and texture to be used on the project.
 2. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, provide two (2) samples, of sufficient size (approx. 12"x12"), prepared on rigid backing. The same tools and techniques proposed for the actual installation shall be used to prepare the samples.
 3. Retain approved samples at the construction site throughout the application process.
- E. Material Certificates: Submit producer's certificate for each kind of plaster aggregate indicated evidencing that materials comply with requirements.
- F. Construction and Demolition Waste Management: Refer to Section 01 50 13 – Construction Waste Management and Disposal for information on the required waste management plan.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: System component materials shall be manufactured by a firm engaged in lath and plaster manufacturing and shall be distributed by the same or its authorized dealers.
 1. Materials shall be manufactured at a facility covered by a current ISO 9001:2015 and ISO 14001:2015 certification.

- B. All lath pallets and individual bundles of lath shall be identified with the weight of the lath, the name of the manufacturer and country of origin and the manufacturers ICC-ERS Number.
- C. Installation method and materials shall meet the established guidelines set forth by ASTM and as noted above, as well as any prevailing local codes and accepted practices.
- D. Single Source Responsibility: Obtain all required lathing material from a single source, and all plaster material from a single source, for a complete plaster system.
- E. Coordination of Work: Coordinate layout and installation of suspension system components for suspended ceilings with other work supported by or penetrating through ceiling.
- F. Control Joints: Architect is to review the lath locations for each building prior to scratch coat for approval of control joints. All vertical and soffit joints are to align unless otherwise indicated by the Architect during the field review.
- G. The lath and water-resistive barrier installation shall be inspected as required by DSA prior to plaster materials being applied, per CBC 2503.2.

1.9 MOCKUPS

- A. If requested by District, provide a mockup to demonstrate the matching aesthetic effects to the adjacent building, and to set quality standards for materials and execution.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver all materials to the construction site in their original, unopened packaging with labels intact.
- B. Inspection: Inspect the materials upon delivery to assure that specified products have been received. Report defects or discrepancies to the responsible party according to the construction documents; do not use questionable material for application.
- C. Storage: Store materials inside under covering and keep dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes, and per manufacturer's recommendations. Protect metal corners and trim from being bent or damaged.
- D. Paper backed metal lath shall be carefully delivered, stored, handled and erected to prevent puncture and or removal of paper.
- E. Packaging: All lath pallets and individual bundles of lath shall be identified with the weight of the lath, the name of the manufacturer and country of origin and the manufacturers ICC-ESR Number.
- F. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI S202 – Code of Standard Practice for Cold-Formed Steel Structural Framing.

1.11 PROJECT CONDITIONS

- A. Comply with ASTM C926 requirements.
- B. Environmental Requirements: Follow product manufacturer's recommendations for environmental conditions and surface preparation.
- C. Substrates: Prior to installation, inspect the wall for surface contamination or other defects that may adversely affect the performance of the materials, and shall be free of residual moisture.
- D. Exterior Plasterwork:
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40°F (for a minimum period of 24 hours) and rising.
 - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- E. Interior Plasterwork: Maintain room temperatures at greater than 40°F for at least 48 hours before plaster application, and continuously during and after application.
 - 1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
 - 2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.
 - 3. Coordinate the installation of the plaster with all other construction trades. To reduce the likelihood of the stucco cracking, it is recommended the building carry a minimum of 90 percent of the dead building load and the interior gypsum be installed prior to installation of the stucco.
- F. Factory-Prepared Finishes: Comply with manufacturer's written instructions for environmental conditions for applying finishes.

1.12 SEQUENCING

- A. Sequencing: Coordinate the installation of the plaster with all other construction trades. To reduce the likelihood of the stucco cracking, it is recommended the building carry a minimum of 90 percent of the dead building load and the interior gypsum be installed prior to installation of the stucco.

1.13 WARRANTY

- A. System Warranty: Submit documentation on manufacturer's standard warranties for the products installed. At completion of work, provide written system warranty documentation.

1.14 MAINTENANCE

- A. Maintenance and repair shall follow the procedures noted by the manufacturer.
- B. Sealants, flashings and other building envelope components shall be inspected on a regular basis and repairs made as necessary.

1.15 PROJECT CLOSEOUT / EXTRA MATERIALS / ATTIC STOCK

- A. The following materials shall be presented to the owner following the application of the work:
 - 1. One container of finish for each color and texture utilized on the project.
 - 2. A maintenance program for finishes as required.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:
 - 1. Metal Lath:
 - a. AMICO (Alabama Metal Industries Corporation)
 - b. ClarkDietrich
 - c. CEMCO (California Expanded Metal Products Co.)
 - 2. Plaster System: Basis of Design is CCP3 (Commercial Cement Plaster 3) system, manufactured by Dryvit.

2.2 METAL LATH

- A. Expanded-Metal Lath: ASTM C847, cold-rolled carbon steel sheet with ASTM A653, G60 hot-dip galvanized-zinc coating.
 - 1. Diamond-Mesh Lath: Self-furring, 3.4 lb/sq. yd.
 - 2. Woven Wire Lath: Self-furring, minimum 17 gauge, shall be galvanized with openings not exceeding 1-1/2 in x 1-1/2 in meeting ASTM C1032.
- B. Water-Resistive Barrier: Where paper-backed diamond mesh lath is shown, provide two (2) layers of asphalt-impregnated paper factory-bonded to back and complying with FS UU-B-790a, for Type I, Grade D (vapor permeable), Style 2.

1. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper. Provide paper-backed lath unless otherwise indicated.
- C. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper.
- D. Rod Hangers: Mild steel, zinc or cadmium coated.
- E. Flat Hangers: Mild steel, zinc or cadmium coated or protected with rust-inhibitive paint.
- F. Channels: Cold-rolled steel, 0.0598-inch min. thickness of base (uncoated) metal, allowable bending stress of 18,000 psi, protected with rust-inhibitive paint finish or galvanizing, 3/4-inch-deep by 7/16-inch-wide flanges, 300 lbs. per 1000 feet with painted finish, 316 lbs. per 1000 feet with galvanized finish, and as follows:
 1. Carrying Channels: 1-1/2-inch-deep by 7/16-inch-wide flanges, 475 lbs. per 1000 feet painted, 508 lbs. per 1000 feet galvanized.
 2. Hat-Channels: Hat shaped screwable furring channels, 7/8-inch deep formed from zinc-coated (galvanized) steel sheet minimum 0.0179-inch min. base (uncoated) metal thickness, complying with ASTM A653, Coating Designation G 60, designed for mechanical attachment of insulation boards or blankets to monolithic concrete and masonry walls.
 3. Furring Brackets: Serrated arm type, 0.0329-inch min. thickness of base (uncoated) metal, adjustable from 1/4-inch to 2-1/4-inch wall clearance for channel furring.
 4. Provide galvanized channels for exterior installations.
- G. Hanger Anchorage Devices: Screws, cast-in-place concrete inserts, or other devices appropriate for anchorage to the form of structural framing indicated and whose suitability for use intended has been proven through standard construction practices or certified test data.
 1. Size devices to develop full strength of hanger but not less than 3 times calculated hanger loading, except size direct pullout concrete inserts for 5 times calculated hanger loading.

2.3 ACCESSORIES

- A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories: As required:
 1. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A653, G60 zinc coating.
 2. External (Outside) Corner Reinforcement: Fabricated from metal lath with ASTM A653, G60 hot-dip galvanized-zinc coating.

3. Metal Corner Reinforcement: Expanded large-mesh diamond mesh lath fabricated from zinc-alloy or welded wire mesh fabricated from 0.0475-inch-diameter zinc-coated (galvanized) wire and specially formed to reinforce external corners of Portland cement plaster on exterior exposures while allowing full plaster encasement.
4. Strip Mesh: Metal Lath, 3.4 lb/yd² expanded metal; 6 in. wide x 18 in. long.
5. Corner Aid: Minimum 26-gauge thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 in. wide; style as noted on plans; use unless otherwise indicated.
6. Vent Screed: Minimum 26-gauge thick; thickness governed by plaster thickness; minimum 4-inch (102 mm) width, double “V” profile, with perforated expanse between “V’s” of longest possible lengths.
7. Drip Screed: Minimum 26-gauge thick, depth governed by plaster thickness, minimum 3-1/2 in. high flange, maximum possible lengths.
8. Control and Expansion Joints: Depth to conform to plaster thickness; use maximum practical lengths.
 - a. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 - b. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
 - c. Two-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch (6 to 16 mm) wide; with perforated flanges.
9. Column Rings: MM System, style “WCR” with factory punched mounting holes.
10. Cornerbeads: Fabricated from zinc-coated (galvanized) steel.
 - a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
 - b. Smallnose cornerbead with perforated flanges; use on curved corners.
 - c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
 - d. Bullnose cornerbead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.

11. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges. Minimum 26-gauge thick; thickness governed by plaster thickness; maximum possible lengths; expanded metal flanges with removable protective tape, with square edges.

2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Bonding Compound: Comply with ASTM C932. Use where plaster is adhered to structurally sound unit masonry or monolithic concrete.
- C. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.
- D. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.
- E. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

2.5 PLASTER MATERIALS / MIXES

- A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Air/Water-Resistive Barrier Components:
 1. Dryvit Backstop NT: A vapor permeable, flexible, polymer-based noncementitious water-resistive and air barrier coating available in Texture, Smooth, and Spray. See DS180 and DS181.
 2. Dryvit Backstop NT-VB: A Class 1 vapor retarder, available in trowel and spray versions. When specified, consider having a WVT analysis performed. See DS830 and DS831.
 3. Dryvit Grid Tape™: An open weave fiberglass mesh tape with pressure sensitive adhesive available in rolls 4 in (102 mm) wide by 100 yds (91 m) long.
- C. Paper Backed Metal Lath:
 1. Self-Furring Diamond Mesh Metal Lath: Shall be galvanized, 3.4 lbs/yd² (1.9 kg/m²) and comply with ASTM C847.
 2. Self-Furring Woven Wire Lath: Shall be minimum 17 gauge, galvanized with openings not exceeding 1-1/2 in x 1-1/2 in (38 mm x 38 mm) meeting ASTM C1032.
 3. The lath is of the proper type, installed tight, properly fastened, and meets the requirements of ASTM C1063, ASTM C847 (expanded metal), ASTM

C933 (Welded Wire), or ASTM C1032 (Woven Wire), and local building code requirements.

D. Accessories (by others):

1. Type, style and manufacturer shall be indicated on construction documents.
2. Depth of accessories (grounds) shall be sized for the plaster thickness.
3. In corrosive environments, accessories manufactured of PVC or zinc are recommended.
4. Steel accessories shall meet ASTM C841.
5. PVC accessories shall meet ASTM D1784 and ASTM C1063.

E. Plaster Base Coat:

1. Dryvit CCP Base – Sanded: A fiberglass reinforced, cement plaster mix utilizing alkali resistant fibers and proprietary cementitious admixtures which is field mixed with water and Dryvit AC-100 activator (when specified). CCP Base – Sanded is packaged in 80 lb (36.3 kg) bags.
2. Dryvit CCP Base – Concentrate: A fiberglass reinforced, cement plaster mix utilizing alkali resistant fibers and proprietary cementitious admixtures which is field mixed with clean, graded plaster sand meeting ASTM C897, water and Dryvit AC-100 activator (when specified). CCP Base – Concentrate is packaged in 80 lb (36.3 kg) bags.

F. Machine Coated Dryvit EPS Shapes and Starter Boards: Shall be supplied by Acrocore or other manufacturer that subscribes to the Dryvit third party certification and quality assurance program.

G. Primer: Dryvit Color Prime™, Color Prime-W, or Primer with Sand™: A water-based, pigmented acrylic primer applied over the cured CCP base coat to improve adhesion and provide a more uniform appearance of the finish.

H. Dryvit Coating:

1. Demandit® Smooth: Integrally colored smooth exterior wall coating enhanced with proven mildew resistance. A minimum of 2 coats are required.
2. Weatherlastic® Smooth: Integrally colored, elastomeric, smooth exterior wall coating enhanced with proven mildew resistance. A minimum of 2 coats are required.

I. Dryvit Finish(es): 100% acrylic finishes with integral color and texture.

1. Standard DPR (Dirt Pickup Resistance): Water-based, acrylic coating with integral color and texture and formulated with DPR chemistry:
 - a. Quarzputz® DPR: Open-texture
 - b. Sandblast® DPR: Medium texture

- c. Freestyle® DPR: Fine texture
 - d. Sandpebble® DPR: Pebble texture
 - e. Sandpebble® Fine DPR: Fine pebble texture
2. Coatings, Primers and Sealers: As recommended by manufacturer for system installed.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prior to installation of plaster (Dryvit CCP3), it is the contractor's responsibility to ensure that:
 1. The surfaces to receive plaster are free of dust, loose particles, oil and other conditions that would affect the adhesion, installation or performance of CCP3 materials.
 2. The lath is of the proper type, installed tight, properly fastened, and meets the requirements of ASTM C1063, ASTM C847 (expanded metal), ASTM C933 (Welded Wire), or ASTM C1032 (Woven Wire), and local building code requirements.
 3. All accessories including corner aids, control and expansion joints, casing beads, etc. are properly fastened and positioned according to contract drawings and local building code requirements.
 4. Doors, windows, decks, and other openings and penetrations have been properly flashed in accordance with building code and contract documents and CCP3 Installation Details DS826.
 5. Metal roof flashing has been installed in accordance with the manufacturer's requirements, Asphalt Roofing Manufacturers Association (ARMA) Standards and Commercial Cement Plaster 3 Installation Details DS826, or as otherwise necessary to maintain a watertight envelope.
 6. The substrate is flat within 1/4 in (6.4 mm) in 10 ft (3.0 m).
- B. The contractor shall notify the general contractor and/or owner and/or architect of all discrepancies. Do not proceed until unsatisfactory conditions are resolved.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster in accordance with ASTM C926.

3.3 INSTALLATION, GENERAL

- A. Installation, General: Installation of these materials shall be in compliance with ASTM C926 and ASTM C1063.
- B. Portland Cement Plaster Lathing and Furring Installation Standard: Install lathing and furring materials indicated for Portland cement plaster to comply with ASTM C1063.
- C. Install supplementary framing, blocking, and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable published recommendations of gypsum plaster manufacturer or, if not available, of the "Gypsum Construction Handbook" published by United States Gypsum Co.
- D. Isolation: Where lathing and metal support system abuts building structure horizontally and where partition/wall work abuts overhead structure, isolate the work from structural movement sufficiently to prevent transfer of loading into the work from the building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.
- E. Frame both sides of control and expansion joints independently, and do not bridge joints with furring and lathing or accessories.
- F. Sound-Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

3.4 INSTALLATION OF METAL LATH

- A. Metal Lath: Install in accordance with ASTM C1063.
 - 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 - 2. Flat-Ceiling and Horizontal Framing: Where interior or exterior lath is attached to horizontal wood supports, either of the following attachments shall be used in addition to the methods of attachment described in referenced standards listed in CBC Table 2507.2.
 - a. Secure lath to alternate supports with ties consisting of a double strand of No. 18 W & M gage galvanized annealed wire at one edge of each sheet of lath. Wire ties shall be installed not less than 3 inches (76 mm) back from the edge of each sheet and shall be looped around stripping, or attached to an 8d common wire nail driven into each side of the joist 2 inches (51 mm) above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches (51 mm) above the bottom of the joist and the ends of the wire secured together with three twists of the wire.
 - b. Secure lath to each support with 1/2 inch wide (12.7 mm), 1-1/2 inch long (38mm) No. 9 W & M gage, ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not

more than 3 inches (76 mm) from edge of each sheet. Such staples may be placed over ribs of 3/8 inch (9.5 mm) rib lath or over back wire of welded wire fabric or other approved lath, omitting the 10d nails.

3. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh or woven-wire lath, as shown on the plans.

3.5 INSTALLATION OF METAL LATH AND FURRING

- A. Lathing Materials and Accessories: Install in accordance with ASTM C1063 – Installation of Lathing and Furring for Portland Cement Based Plaster, except where indicated or specified otherwise herein.
- B. Metal Furring to Receive Metal Lath: Comply with requirements of ML/SFA "Specification for Metal Lathing and Furring" applicable to each installation condition indicated.
- C. Install expanded metal lath for the following applications where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced lathing installation standards.
- D. Suspended and furred ceilings using 3.4 lbs. per sq. yd. minimum weight diamond mesh lath.
- E. Vertical metal framing and furring.
- F. Exterior sheathed soffits and wall surfaces using 3.4 lbs. per sq. yd. minimum weight self-furring diamond mesh lath.

3.6 INSTALLATION OF ACCESSORIES

- A. Install in accordance with ASTM C1063 and at locations indicated on Drawings.
- B. Reinforcement for External (Outside) Corners:
 1. Install lath-type, external-corner reinforcement and/or cornerbeads at exterior locations.
 2. Install cornerbead at interior locations.
- C. Control Joints: Locate as approved by Architect for visual effect and per ASTM C1063 requirements, as follows:
 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. For Portland Cement-Based Plaster (ceilings and walls), install to create panels no larger than 100 square feet with no dimension exceeding 10 feet.
 2. At distances between control joints of not greater than 18 ft. (5.5 m) o.c.

3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.
5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.7 PLASTER APPLICATION

A. General: Comply with ASTM C926.

1. Do not deviate more than plus or minus 1/8 inch in 10 ft. from a true plane in finished plaster surfaces when measured by a 10 ft. straightedge placed on surface.
2. Grout hollow metal frames, bases, and similar work occurring in plastered areas, with base coat plaster material, and prior to lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor clip
3. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
4. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Mixing and Application Instructions: Refer to the product literature for specific mixing and application instructions of each product.

1. CCP Base shall be moist cured for a minimum of 48 hours following application.
2. CCP Base shall be completely dry and cured for a minimum of 7 days prior to application of primer and finish.
3. The installation of Machine Coated Dryvit EPS Shapes and Starter Boards shall be in accordance with Dryvit Publication DS854.

C. Finish Coats: To match existing campus plaster finish.

D. Elastomeric Paint Finish: Refer to Section 09 91 00 – Painting.

E. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

F. Concealed Interior Plasterwork:

1. Where plaster application is concealed behind built-in cabinets, similar furnishings, and equipment, apply finish coat.
2. Where plaster application is concealed above suspended ceilings and in similar locations, omit finish coat.

3.8 FIELD QUALITY CONTROL

- A. The lath and water-resistive barrier installation shall be inspected as required by DSA prior to plaster materials being applied, per CBC 2503.2.
- B. The contractor shall be responsible for the proper application of the CCP3 materials.
- C. Dryvit assumes no responsibility for on-site inspections or application of its products

3.9 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.10 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION.

SECTION 09 29 00 – GYPSUM BOARD ASSEMBLIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Extent of each type of gypsum board required is indicated on Drawings.
- B. Section Includes: Gypsum Board, Cement Backer Board, and Texture Finishes, Fastener Requirements, Spacing Requirements, and Accessories.

1.3 RELATED REQUIREMENTS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 08 31 13 – Access Doors and Frames.
- C. Section 09 30 00 – Tiling and Grout.
- D. Section 09 91 00 – Painting.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Section 01 33 00 – Submittals.
- B. Product Data: For each type of product.
- C. Samples: If requested.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- B. Gypsum drywall contractor is to review finished work with painter and Project Coordinator, and to provide any additional finishing of gypsum board required until accepted by painting contractor, Architect, and Project Coordinator.
- C. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 REFERENCES

- A. 2022 California Building Code (CBC) with Amendments.

B. ASTM International (ASTM):

1. ASTM C423 – Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM C475/C475M – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
3. ASTM C514 – Standard Specification for Nails for the Application of Gypsum Board.
4. ASTM C665 – Standard Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
5. ASTM C834 – Standard Specification for Latex Sealants.
6. ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.
7. ASTM C1002 – Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
8. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
9. ASTM C1396/C1396M – Standard Specification for Gypsum Board.
10. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
11. ASTM E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

C. Gypsum Association (GA):

1. GA 214 – Recommended Levels of Gypsum Board Finish
2. GA 216 – Application and Finishing of Gypsum Panel Products
3. GA 253 – Application of Gypsum Sheathing
4. GA 600 – Fire Resistance Design Manual

D. South Coast Air Quality Management District (SCAQMD): SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

E. Underwriters Laboratories (UL):

1. UL 2818 – GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes and Furnishings, Current Version.
2. UL Fire Resistance – Fire Resistance Directory, Current Version.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. Minimum Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40°F (4°C). For finishing of gypsum board maintain not less than 50°F (10°C) for 48 hours prior to application and continuously thereafter until drying is complete.
- D. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
 - 1. CertainTeed Corp.
 - 2. Georgia-Pacific Gypsum
 - 3. National Gypsum Co.
 - 4. USG Corporation.

2.2 PERFORMANCE REQUIREMENTS

- A. Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C1658 and ASTM C1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction.

2.3 GYPSUM BOARD, GENERAL

- A. General: Provide gypsum board of types indicated in maximum lengths and widths available to minimize end-to-end joints in each area and that correspond with support system indicated.
1. Thickness: Provide gypsum board in thicknesses indicated, or if not otherwise indicated, in 5/8 inch thickness to comply with ASTM C840 for application system and support spacing indicated.
- B. Fire-Ratings: Provide systems listed in applicable code or by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual or other listing approved by applicable authorities.

2.4 STANDARD GYPSUM BOARD

- A. Gypsum Board: Shall comply with requirements of ASTM C1396.
1. Core: Regular gypsum core
 2. Long Edges: Tapered.
 3. Thickness: 5/8 inch, unless otherwise indicated on drawings.

2.5 FIRE-RESISTANCE RATED GYPSUM BOARD

- A. Gypsum Board, Type X: Shall comply with requirements of ASTM C1396.
1. Core: Fire-resistance rated (Type X) gypsum core
 2. Long Edges: Tapered.
 3. Thickness: 5/8 inch, unless otherwise indicated on drawings.

2.6 GYPSUM BOARD WITH ENHANCED MOLD AND MILDEW RESISTANCE

- A. Gypsum Board, Mold and Moisture Resistant: Shall comply with requirements of ASTM C1396, and Mold and Mildew Resistance requirements of ASTM D3273, as noted below:
1. Core: Mold and moisture resistant gypsum core
 2. Long Edges: Tapered.
 3. Thickness: 5/8 inch, unless otherwise indicated on drawings.

B. Gypsum Board, Type X, with Mold and Mildew Resistance: Shall comply with Type X requirements of ASTM C1396, and Mold and Mildew Resistance requirements of ASTM D3273, as noted below:

1. Core: Mold and moisture resistant, fire-resistance rated (Type X) gypsum core.
2. Long Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated on drawings.

2.7 CEMENTITIOUS BACKER BOARD

A. Cement Backerboard: Shall comply with requirements of ASTM C1325 and ANSI A118.9.

1. Core: Cementitious, water-durable.
2. Long Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated on drawings.
4. Surface: Fiberglass mesh on front and back.
5. Density: 72 lbs. per cu. ft.
6. Water Absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C473.

2.8 EXTERIOR GYPSUM CEILING BOARD

A. Exterior Soffit Board: Shall comply with requirements of ASTM C1396.

1. Core: Regular gypsum core
2. Long Edges: Beveled /Tapered.
3. Thickness: 1/2 inch, unless otherwise indicated on drawings.
4. Surface: 100 percent recycled content paper with extra resistance to moisture and sagging.

B. Exterior Soffit Board – Fire Rated: Shall comply with Type X requirements of ASTM C1396, as noted below:

1. Core: Fire-resistance rated gypsum core
2. Long Edges: Beveled /Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated on drawings.
4. Surface: 100 percent recycled content paper with extra resistance to moisture and sagging.

5. Fire Resistance: Complies with Type X requirements of ASTM C1396.

2.9 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047. Galvanized or aluminum-coated steel sheet or rolled zinc.
 1. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.
- B. Exterior Trim: ASTM C1047. Hot-dip galvanized steel sheet or rolled zinc.
 1. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.10 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper Reinforcing Tape, unless otherwise indicated.
 2. Exterior Gypsum Soffit Board: Paper.
 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 fiberglass mesh.
 4. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats. All Compounds to be factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

1. Prefilling: At open joints and damaged surface areas, use formulation recommended by gypsum board manufacturer for this purpose.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use taping compound formulated for this purpose.
 - a. Where setting-type joint compounds are indicated for use as taping and topping compounds, use formulation for each which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
 3. Fill Coat: For second coat, use drying-type, factory-premixed, all-purpose compound formulated for use as both taping and topping compound, as recommended by gypsum board manufacturer for this purpose.
 4. Finish Coat: For third coat, use drying-type, factory-premixed, all-purpose compound formulated for use as both taping and topping compound, as recommended by gypsum board manufacturer for this purpose.
- D. Joint Compound for Exterior Soffit Applications:
1. Exterior Gypsum Soffit Board: As recommended by sheathing board manufacturer.
 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels: As recommended by backing panel manufacturer.

2.11 FASTENERS AND ADHESIVES

- A. Fasteners for Wood Framing: See GA-216, Table 5, below.
1. Screws: ASTM C1002. Type W, steel self-piercing course-thread screw for fastening gypsum board to wood members, unless otherwise indicated.
 - a. For non-wet areas, chemical composition shall be in accordance with ASTM A1040, Grade 1013 to 1022.
 - b. Screws should penetrate at least 5/8".
 - c. In all wet areas, provide corrosion zinc coated or galvanized thread bugle head.
 2. Nails: ASTM C514 for nails; should penetrate into framing members at least 7/8" on a single layer application and 3/4" on a multi-layer application.

TABLE 5 – FASTENER LENGTHS FOR GYPSUM PANEL PRODUCT APPLICATION TO WOOD FRAMING ^A			
Gypsum Board Thickness ^B	Minimum Nail Length _D	Minimum Screw Length _D	Minimum Staple Length _D
1/4"			
3/8"	1-1/4"	1"	1"
1/2"	1-3/8"	1-1/8"	1-1/8"
5/8"	1-1/2"	1-1/4"	1-1/4"
^A	<i>Where fire resistance is required for gypsum board assemblies, fasteners of the same or larger length, shank diameter, and head bearing area as those described in the fire-rated design shall be used.</i>		
^B	<i>For other thicknesses, for multi-layer applications, or for application over rigid foam insulation fasteners shall be of sufficient length to penetrate framing not less than 3/4" for nails, 5/8" for screws, and 5/8" for staples.</i>		
^C	<i>Staple attachment is restricted to base layers of multi-layer systems only.</i>		
^D	<i>For applications over existing solid surfaces or in multi-layer applications, fastener shall be of sufficient length to penetrate framing not less than 3/4" for nails, and 5/8" for screws.</i>		

B. Fasteners for Steel Framing: See above, GA-216, Table 5.

1. Screws: ASTM C1002. Type S., fine-thread screw for fastening gypsum board to cold formed steel members. unless otherwise indicated.
 - a. In non-wet areas, chemical composition for Type S screws shall be in accordance with ASTM A1040, Grade 1018 to 1022
 - b. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - c. Screws shall be of sufficient length to penetrate framing members not less than 3/8 in. (9 mm).
 - d. In all wet areas, provide corrosion zinc coated or galvanized thread bugle head.

C. Fasteners for Multilayered Gypsum Board: Laminating screws, Type G, course-pitch high-thread self-piercing screws for fastening gypsum board to gypsum board.

1. For non-wet areas, chemical composition shall be in accordance with ASTM A1040, Grade 1013 to 1022.
2. In all wet areas, provide corrosion zinc coated or galvanized thread bugle head.

D. Cementitious Backer Units: For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate; for use where indicated.

2.12 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C919. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90. Refer to Section 07 92 00 – Joint Sealants for specific product information.
- C. Sound Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool, in all stud cavities of framed walls, unless noted otherwise.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- D. Firestopping – Putty Pads: Shall conform to ASTM E90. Refer to Section 07 84 00.
- E. Spot Joint Compound: ASTM C475, setting-type joint compound of type recommended for spot sealing hollow metal door frames.
- F. Insulation: As specified in Section 07 21 00 – Thermal Insulation.

2.13 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.
 - 1. Texture: As selected by District.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates to which gypsum board attaches or abuts including welded hollow-metal frames and framing, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with GA 216 – Application and Finishing of Gypsum Panel Products, and

ASTM C840 – Standard Specification for Application and Finishing of Gypsum Board.

1. Information and instructions below include most GA-216 information needed, but contractor is to defer to the current GA-216 for installation instructions.

B. Framing and Fastener Spacing: Refer to GA-216, and Tables 1, 2, 3, and 4 below.

1. Fasteners at gypsum board edges or ends shall be located not less than 3/8" from the edge or end. Except as specified below, fasteners at edges or ends in a perpendicular application shall be located not more than 1" from the edge or end. Perimeter attachment into partition top and bottom (sole) plates is neither required nor recommended except where fire ratings, structural performance requirements, or other special conditions require such attachment.
 - a. Floating Interior Angles: The floating angle method of application shall be permitted to be used to minimize the effects of truss uplift and the possibility of fastener popping in areas adjacent to wall and ceiling intersections. This method is applicable where either single nailing, double nailing, or screw attachment to wood framing is used. Refer to GA-216, Figures 3, 4, and 5 (included below)
 - b. Ceiling-Wall Intersections: The first fastener into each ceiling framing member, framed either perpendicular or parallel to the wall, shall be located not more than 7" out from the intersection for single nailing and not more than 12" for either double nailing or screw application. Gypsum board products on the wall shall be applied to provide firm support for the floated edges of the gypsum panel product on the ceiling. The uppermost fastener into each stud shall be located not more than 8" down from the ceiling intersection for single nailing and not more than 12" for either double nailing or screw application. Refer to GA-216, Figures 3 and 4 (included below)
 - c. Inside Corners of Walls: The overlapping gypsum board product shall be applied so as to bring the back of the underlying gypsum panel product into firm contact with the face of the framing member behind. Special clips designed to provide support at wall corners and wall-ceiling intersections in lieu of back-up studs or blocking shall be permitted where approved. Floating interior angles shall not be used where fire ratings or shear values are required. Refer to GA-216, Figure 5 (included below).
2. Nails for single nailing shall be spaced not more than 7" o.c. on ceilings and not more than 8" o.c. on walls. Refer to GA-216, Figure 6. Nails for double nailing shall be spaced as shown in GA-216.
3. Where screws are used, they shall be spaced not more than 12" o.c. for ceilings and 16" o.c. for walls where the framing members are 16" o.c. Screws shall be spaced not more than 12" o.c. for both ceilings and walls where framing members are 24" o.c.

TABLE 1 – MAXIMUM FRAMING SPACING FOR SINGLE-LAYER GYPSUM BOARD			
Gypsum Board Thickness ^B		Gypsum Board Orientation to Framing	Max. Framing Spacing
CEILING:			
3/8" ^A		Perpendicular ^B	16"
1/2"		Parallel ^B	16"
1/2"		Perpendicular ^B	24"
5/8"		Parallel	16"
5/8"		Perpendicular	24"
WALLS:			
3/8"		Perpendicular or Parallel	16"
1/2"		Perpendicular or Parallel	24"
5/8"		Perpendicular or Parallel	24"
^A	Shall not support thermal insulation		
^B	On ceilings to receive water-based texture material either i) 1/2" gypsum ceiling board shall be applied perpendicular to framing; or ii) other gypsum panel products shall be applied perpendicular to framing and board thickness shall be increased from 3/8" to 1/2" for 16" o.c. framing and from 1/2" to 5/8" for 24" o.c. framing.		

TABLE 2 – MAXIMUM FRAMING SPACING FOR MULTI-LAYER GYPSUM BOARD, WITHOUT ADHESIVE BETWEEN LAYERS				
Gypsum Board Thickness		Gypsum Board Orientation to Framing		Max. Framing Spacing o.c.
BASE	FACE	BASE	FACE	
CEILING:				
1/4"	3/8"	Perpendicular	Perpendicular ^A	16"
1/4"	1/2"	Perpendicular	Perpendicular ^A	16"
3/8"	3/8"	Perpendicular	Perpendicular ^A	16"
3/8"	1/2"	Perpendicular	Perpendicular ^A	16"
1/2"	3/8"	Parallel	Perpendicular ^A	16"
1/2"	1/2"	Parallel	Perpendicular ^A	16"
1/2"	1/2"	Perpendicular	Perpendicular ^A	24"
1/2"	5/8"	Perpendicular	Perpendicular	24"
5/8"	1/2"	Perpendicular	Perpendicular ^A	24"
5/8"	5/8"	Perpendicular	Perpendicular	24"
WALLS:				
For multi-layer application with no adhesive between layers 1/2" or 5/8" thick gypsum board products shall be permitted to be applied either perpendicular or parallel on framing spaced not more than 24" o.c. Framing spacing shall not be more than 16" o.c. when 3/8" thick gypsum board products are used.				
^A	On ceilings to receive water-based texture material either i) 1/2" gypsum ceiling board shall be applied perpendicular to framing; or ii) other gypsum panel products shall be applied perpendicular to framing and board thickness shall be increased from 3/8" to 1/2" for 16" o.c. framing and from 1/2" to 5/8" for 24" o.c. framing.			

TABLE 3 – MAXIMUM FRAMING SPACING FOR MULTI-LAYER GYPSUM BOARD, WITH ADHESIVE BETWEEN LAYERS^A					
Gypsum Board Thickness		Gypsum Board Orientation to Framing		Max. Framing Spacing o.c.	
BASE	FACE	BASE	FACE		
CEILING:					
3/8"	3/8"	Perpendicular	Perpendicular or Parallel	16"	
1/2"	3/8"	Perpendicular or Parallel	Perpendicular or Parallel	16"	
1/2"	1/2"	Perpendicular or Parallel	Perpendicular or Parallel	16"	
5/8"	1/2"	Parallel	Perpendicular or Parallel	24"	
5/8"	5/8"	Perpendicular or Parallel	Perpendicular or Parallel	24"	
WALLS:					
For multi-layer application with adhesive between layers 3/8", 1/2", or 5/8" thick gypsum board products shall be permitted to be applied either perpendicular or parallel on framing spaced not more than 24" o.c.					
^A Adhesive between layers shall be dry or cured prior to the application of any decorative treatment.					

TABLE 4 – MAXIMUM WEIGHT OF OVERLAID UNSUPPORTED INSULATION^A			
Gypsum Board Type	Thickness	Number of Layers of Gypsum Board	Maximum Insulation Weight in psf
Gypsum Wallboard	1/2"	Single	1.6 ^B
Gypsum Backing Board		Double	3.2 ^C
Exterior Gypsum Soffit Board	5/8"	Single	2.2
Gypsum Base for Veneer Plaster		Double	4.4
Gypsum Ceiling Board	1/2"	Single	2.2
		Double	4.4
^A Based on ceiling framing spaced 24" o.c.			
^B Where ceiling framing is spaced 16" o.c., the maximum weight shall not exceed 2.2 psf.			
^C Where ceiling framing is spaced 16" o.c., the maximum weight shall not exceed 4.4 psf.			

- C. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- D. 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.

- E. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than one framing member in alternate courses of board.
- F. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.
- G. Install panels with face side out. Do not install imperfect, damaged or damp boards. 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.
- H. Locate edge and end joints over supports, except in ceiling/horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. 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.
- I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- J. Control Joints:
 - 1. Form control joints and expansion joints at locations indicated at minimum required spacing or per manufacturer, with space between edges of boards, prepared to receive trim accessories. Coordinate locations and layouts with Architect.
 - 2. Full height door frames shall be considered equivalent to a control joint.
 - 3. Control joints shall be installed where indicated on the plans, and as noted below. Spacings and locations shall be according to ASTM C840 and in specific locations approved by Architect for visual effect.
 - a. A control joint shall be installed where a partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 - b. Control joints shall be installed where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet.
 - c. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 ft.
 - d. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 ft.
 - e. Control joints in exterior ceilings and soffits shall be installed so that linear dimensions between control joints do not exceed 30 ft.
 - f. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

4. Where a control joint occurs in an acoustical or fire-rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8 in. type X gypsum panel products, mineral fiber, or other tested equivalent. See the Gypsum Association's GA-600 or GA-234.
 5. Control joints shall be either manufactured devices designed for this purpose or field fabricated from suitable materials.
 6. Full height door frames shall be considered equivalent to a control joint.
 7. Control joints shall be installed where indicated on the plans, and as noted below. Spacings and locations shall be according to ASTM C840 and in specific locations approved by Architect for visual effect.
 - a. A control joint shall be installed where a partition, wall, or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
 - b. Control joints shall be installed where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet.
 - c. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 ft.
 - d. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 ft.
 - e. Control joints in exterior ceilings and soffits shall be installed so that linear dimensions between control joints do not exceed 30 ft.
 - f. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.
 8. Where a control joint occurs in an acoustical or fire-rated system, blocking shall be provided behind the control joint by using a backing material such as 5/8 in. type X gypsum panel products, mineral fiber, or other tested equivalent. See the Gypsum Association's GA-600 or GA-234.
- K. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area, and may be limited to not less than 75 percent of full coverage.
 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.

- L. 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.
- M. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- N. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- O. Fasteners: Refer to Part 2.11 in this specification section.

3.3 APPLYING INTERIOR GYPSUM BOARD – SINGLE LAYER APPLICATION

- A. Install interior gypsum board in the following locations:
 - 1. Wallboard Type: As 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 8'-0" or Less in Height: Gypsum panels may be applied vertically (parallel to framing) or horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly.
 - 3. On Partitions/Walls 8'-0" up to 12'-0": To eliminate small panels and excessive joints, apply full height gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 4. On Partitions/Walls 12'-0" or Higher: Gypsum panels may be applied vertically (parallel to framing) or horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly.
 - 5. Fastening Methods:
 - a. Apply gypsum panels to supports with steel drill screws.
 - b. Fasten with screws, or as required in specified fire rated assembly.

3.4 APPLYING INTERIOR GYPSUM BOARD – MULTI LAYER APPLICATION

- A. Multilayer Application:

1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
2. Fastening Methods: Fasten base layers and face layers separately to supports with screws, as indicated or specified for fire rated assemblies.

3.5 APPLYING INTERIOR GYPSUM BOARD – LAMINATED TO SUBSTRATE

- A. Laminating to Substrate: Where gypsum panels are indicated (or necessary) as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.6 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at external and outside corners.
 2. LC-Bead: Use where indicated.
 3. L-Bead: Use where edge trim can only be installed after gypsum board in installed.
 4. U-Bead: Use at where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints). Install U-bead where indicated, and where exterior gypsum board edges are not covered by applied moldings or indicated to receive edge trim with face flanges covered with joint compound.
- C. Exterior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. LC-Bead: Use where indicated.
- D. Aluminum Trim: Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated, and in locations indicated on Drawings. Provide type with face flange to receive joint compound except where U-Bead (semi-finishing type) is indicated.

3.7 FINISHING GYPSUM BOARD

- A. General: Apply joint treatment at gypsum board joints (both directions), interior angles, edge trim, flanges of corner bead, control joints, penetrations, fastener

heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

- B. Prefill open joints rounded or beveled edges and damaged surface areas, using setting-type joint compound.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840. Sand between coats and after last coat:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Permanently adhered panels (substrates for tile, and substrates for acoustical tile).
 - 3. Level 3: Concealed spaces behind semi-permanent panels, such as millwork or casework, removable panels, etc.
 - 4. Level 4: Typical, unless otherwise noted (at panel surfaces that will be exposed to view unless otherwise indicated).
 - 5. Texture on surfaces as determined by Architect; smooth texture on surfaces to receive vinyl wall coverings.
- E. Glass-Mat Gypsum Sheathing Panel: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Cementitious Backer Units: Finish in accordance with manufacturer's written instructions.

3.8 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes in strict accordance with texture finish manufacturer's instructions. Apply primer to surfaces that are clean, dry, and smooth, to all surfaces to achieve texture finish.
- B. Texture Finish Application: Mix and apply finish in strict accordance with manufacturer's instructions, using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.9 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION.

SECTION 09 30 00 – TILING AND GROUT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Tile and Accessories:
 - 1. Sanitary Slim-Foot Coved Tile Wall Base.
 - 2. Glazed Wall Tile
 - 3. Grout
 - 4. Trim and Accessories
 - 5. Setting Materials

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete.
- B. Section 07 92 00 – Joint Sealers.
- C. Section 09 29 00 – Gypsum Board Assemblies.
- D. Section 09 67 23 – Resinous Flooring.
- E. Section 10 21 13 – Solid Plastic Toilet Compartments.
- F. Section 10 28 13 – Toilet and Bath Accessories.
- G. Section 10 28 23 – Janitorial Accessories.

1.4 REFERENCES

- A. 2022 California Building Code with Amendments.
- B. Merced County Division of Environmental Health requirements.
- C. American National Standards Institute (ANSI):
 - 1. ANSI A108.1A – Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
 - 2. ANSI A108.1B – Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.

3. ANSI A108.1C – Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 4. ANSI A108.4 – Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
 5. ANSI A108.5 – Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 6. ANSI A108.6 – Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
 7. ANSI A108.9 – Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
 8. ANSI A108.10 – Specifications for Installation of Grout in Tilework.
 9. ANSI A118.1 – Standard Specification for Dry-Set Portland Cement Mortar.
 10. ANSI A118.3 – Chemical-Resistant, Water-Cleanable, Tile-Setting and Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
 11. ANSI A118.4 – Latex-Portland Cement Mortar.
 12. ANSI A118.6 – Standard Ceramic Tile Grouts.
 13. ANSI A118.7 – Polymer Modified Cement Grouts.
 14. ANSI A118.8 – Modified Epoxy Emulsion Mortar/Grout.
 15. ANSI A118.9 – Test Methods and Specifications for Cementitious Backer Units.
 16. ANSI A118.10 – Load bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimensional Stone.
 17. ANSI A137.1 – Specifications for Ceramic Tile.
- D. ASTM International (ASTM):
1. ASTM C50 – Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products.
 2. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar.
 3. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes.
 4. ASTM C241 – Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic.

5. ASTM D4397 – Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.

E. Tile Council of North America (TCNA): TCA Handbook for Ceramic Tile Installation.

1.5 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: Tile on walkway surfaces shall be provided with the following values as determined by testing in conformance with ASTM C1028.

1. Level Surfaces: Minimum of 0.6 (Wet).
2. Step Treads: Minimum of 0.6 (Wet).
3. Ramp Surfaces: Minimum of 0.8 (Wet).

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Selection Samples: Samples of actual tiles for selection.

E. Manufacturer's Certificate:

1. Certify that products meet or exceed specified requirements.
2. For each shipment, type and composition of tile provide a Master Grade Certificate signed by the manufacturer and the installer certifying that products meet or exceed the specified requirements of ANSI A137.1.

F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum two years of experience.

B. Single Source Responsibility: Obtain each type and color of tile from a single source. Obtain each type and color of mortar, adhesive and grout from the same source.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging until ready for installation.
- B. Protect adhesives and liquid additives from freezing or overheating in accordance with manufacturer's instructions.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50°F (10°C) during tiling and for a minimum of 7 days after completion.

1.10 EXTRA MATERIALS

- A. Attic Stock Materials: Deliver materials listed below to Owner. Furnish materials described below that match products installed, packaged with protective covering for storage and identified labels clearly describing contents.
 - 1. Tile and Trim Units: At completion of project, furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. DalTile Corporation – www.daltileproducts.com.
 - 2. American Olean – www.americanolean.com
 - 3. Interceramic – www.interceramicusa.com

2.2 TILE

- A. General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors and pattern indicated on the Drawings and identified in the Schedule and the end of this Section. Tile shall also be provided in accordance with the following:
 - 1. Factory Blending: For tile exhibiting color variations within the ranges selected under Submittal of samples, blend tile in the factory and package so

tile taken from one package shows the same range of colors as those taken from other packages.

2. Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with the manufacturer, unless otherwise specified.
3. Factory Applied Temporary Protective Coatings: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with a continuous film of petroleum paraffin wax applied hot. Do not coat unexposed tile surfaces.

B. Coved Base and Wall Tile:

1. Sanitary Coved Base Tile – Slim Foot Design:
 - a. Basis of Design: Daltile “Color Wheel Collection – Classic”, Models S3619TN and SC3619TN.
 - b. Moisture Absorption: Less than .01 percent to less than 20 percent, per ASTM C373.
 - c. Size and Shape: 6" x 6", slim foot base.
 - d. Thickness: 5/16 inch, nominal.
 - e. Grout: Epoxy Grout.
 - f. Surface Finish: Plain with cushion edges.
 - g. Colors: Price Group 2.
 - h. Locations: Toilet Rooms. To be installed per the Merced County Division of Environmental Health requirements. See drawings for details.
 - i. Trim Units: Cove Base, Cove Base Corners, and other shapes in sizes coordinated with field tile shapes.
2. Field Tile Product: This product to be 80% of the total wall tile used.
 - a. Basis of Design: Daltile “Color Wheel Collection – Classic”.
 - b. Moisture Absorption: Less than .01 percent to less than 20 percent, per ASTM C373.
 - c. Size and Shape: 6" x 6”.
 - d. Thickness: 5/16 inch, nominal.
 - e. Grout: Single Component Grout.
 - f. Surface Finish: Plain with cushion edges.

- g. Colors: Price Group 2. Pattern to be determined by Architect.
 - h. Locations: Toilet Room Walls.
 - i. Trim Units: Bullnose, Cove Base, Cove Base Corner, Groover Bullnose, and other shapes in sizes coordinated with field tile shapes.
3. Accent Field Tile Product: This product to be 20% of the total wall tile used.
- a. Basis of Design: Daltile “Color Wheel Collection – Classic”.
 - b. Moisture Absorption: Less than .01 percent to less than 20 percent, per ASTM C373.
 - c. Size and Shape: 6" x 6".
 - d. Thickness: 5/16 inch, nominal.
 - e. Grout: Single Component Grout.
 - f. Surface Finish: Plain with cushion edges.
 - g. Colors: Price Group 3; up to three (3) colors to be chosen. Pattern to be determined by Architect and Owner.
 - h. Locations: Toilet Room Walls.

2.3 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, stainless steel, brass, etc, style and dimensions to suit application, for setting using tile mortar or adhesive; use in the following locations:
- 1. Open edges of floor tile.
 - 2. Transition between floor finishes of different heights.
 - 3. Expansion and control joints.

2.4 SETTING MATERIALS

- A. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.
- B. Epoxy Adhesive: ANSI A118.3, thinset bond type.
- C. Mortar Bed Materials:
- 1. Portland Cement: ASTM C150, type 1, gray or white.
 - 2. Hydrated Lime: ASTM C207, Type S.
 - 3. Sand: ASTM C144, fine.

4. Latex Additive: As approved.
 5. Water: Clean and potable.
- D. Mortar Bond Coat Materials:
1. Dry-Set Portland Cement type: ANSI A118.1.
 2. Latex-Portland Cement type: ANSI A118.4.
 3. Epoxy: ANSI A118.3, 100 percent solids.
- E. Grout:
1. Single Component Grout: Basis of Design: Fusion Pro, by Custom Building Products:
 - a. Stain proof, single component grout, consisting of an advanced, proprietary acrylic plus silicone resin that cures as hard as cement grout.
 - b. Fusion Pro contains Microban®, an antimicrobial additive from the Microban Products Company. It inhibits the growth of stain-causing mold and mildew on dried grout for superior performance in intermittently wet areas like showers
 - c. Meets the performance characteristics of ANSI A118.7 and A118.3.
 - d. Substitutions per Section 01 25 00 and 01 62 00.
 2. Epoxy Grout: ANSI A118.8, 100 percent solids epoxy grout; color as selected. Epoxy grout to be used in all toilet rooms.
- F. Cleavage Membrane: No. 15 (6.9 kg) asphalt saturated felt, ASTM D226, Type 1, or polyethylene film, ASTM D4397, 4.0 mil thickness.
- G. Membrane at Walls: 4 mil (0.1 mm) thick polyethylene film, ASTM D4397.
- H. Reinforcing Mesh: 2 by 2 inch (50 by 50 mm) size weave of 16/16 wire size; welded fabric, galvanized.
- I. Glass-Mat Backerboard: ANSI A118.9; High density, cementitious, glass fiber reinforced with 2 inch (50 mm) wide coated glass fiber tape for joints and corners:
1. Thickness: 5/8 inch (16 mm).
 2. See Section 09 29 00 – Gypsum Board Assemblies, for detailed information.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that wall surfaces are free of substances which would impair bonding of setting materials, smooth and flat within tolerances specified in ANSI A137.1 and are ready to receive tile.
- B. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Remove any curing compounds or other contaminants.
- C. Vacuum clean surfaces and damp clean.
- D. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION – GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Lay tile to pattern indicated. Arrange pattern so that a full tile or joint is centered on each wall and that no tile less than 1/2 width is used. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Install thresholds where indicated.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Grout tile joints. Use single component grout, unless otherwise indicated.
- L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION – WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCA Handbook Method W244, using membrane at toilet rooms.
- B. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook Method W243, thin-set with dry-set or latex-portland cement bond coat, unless otherwise indicated.
 - 1. Where mortar bed is indicated, install in accordance with TCA Handbook Method W222, one coat method.
 - 2. Where waterproofing membrane is indicated other than at showers and bathtub walls, install in accordance with TCA Handbook Method W222, one coat method.
- C. Over interior concrete and masonry install in accordance with TCA Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.
- D. Over wood studs without backer install in accordance with TCA Handbook Method W231, mortar bed, with membrane where indicated.
- E. Over metal studs without backer install in accordance with TCA Handbook Method W241, mortar bed, with membrane where indicated.

3.5 CLEANING

- A. Clean tile and grout surfaces.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over finished floor surface for 72 hours after installation.

END OF SECTION.

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SECTION 09 51 13 – ACOUSTICAL CEILING PANELS AND GRID

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Acoustical ceiling panels, lay-in
2. Exposed grid suspension system.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.
- B. Division 23 Sections – HVAC.
- C. Division 26 Sections – Electrical Work.

1.4 REFERENCES

A. ASTM International (ASTM):

1. ASTM A568 Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements.
2. ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. ASTM A1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
5. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
6. ASTM C635 Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

7. ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 8. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 9. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 10. ASTM E119 Standard Test Method for Fire Tests of Building Construction and Material.
 11. ASTM E580 Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions
 12. ASTM E1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
 13. ASTM E1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
 14. ASTM E1264 Classification for Acoustical Ceiling Products.
 15. ASTM E1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- B. 2022 California Building Code, with Amendments.
- C. ASCE 7-16 Standard – American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, as modified by CBC Section 1617A.

1.5 SYSTEM DESCRIPTION

- A. Seismic Loads: Design and size components to withstand seismic loads in accordance with ASCE 7-16 Chapter 13, as modified by CBC Section 1617A.1.21, and ASTM C635, C636 and E580, for Seismic Design Category D.

1.6 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- C. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
- D. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

- E. Certifications: Manufacturer's certifications that system complies with specified requirements:
1. For seismic performance: International Code Council Evaluation Report, ESR-1308.
 2. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- F. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.7 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire-performance characteristics, per ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.
1. Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 for Class A products:
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- C. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E119.
1. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.
- D. Seismic Performance: Provide acoustical ceiling system that has been evaluated by an independent party and found to be compliant with the 2022 CBC, Seismic Design Category D.
1. Tested per International Code Council – Evaluation Services – AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components as evidenced by International Code Council Evaluation Report, ESR-1308.

- E. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.9 PROJECT CONDITIONS

- A. Space Enclosure: Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

1.10 WARRANTY

- A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Acoustical Panels: Sagging and warping
 - 2. Grid System: Rusting and manufacturer's defects
- B. Warranty Period:
 - 1. Acoustical Panels: One (1) year from date of substantial completion.
 - 2. Grid: Ten years from date of substantial completion.
- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.11 MAINTENANCE

- A. Attic Stock Materials: Deliver materials listed below to Owner. Furnish materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: At completion of project, furnish quantity of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: At completion of project, furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Basis of Design: Armstrong World Industries, Inc. (ESR-1308)
2. USG Interiors, Inc. (ESR-1222)

2.2 ACOUSTICAL CEILING UNITS – LAY-IN

- A. Standard Acoustical Ceiling Units: Provide manufacturers' standard units of configuration indicated that comply with ASTM E1264 classifications as designated by reference to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.

1. Pattern: Non-directional.
2. Color: White.
3. Size: As shown on drawings.
4. Edge Profile: As specified on plans, for interface with Prelude XL 15/16" Exposed Tee Grid System.
5. Noise Reduction Coefficient (NRC): 0.70.
6. Ceiling Attenuation Class (CAC): 40.
7. Flame Spread: ASTM E 1264; Class A.
8. Light Reflectance (LR) White Panel: 85%.
9. Warranty: 30 year lifetime system warranty against visible sag.
10. Acceptable Products: Fine Fissured, by Armstrong World Industries, Inc.

2.3 SUSPENSION SYSTEMS

- A. Components: Main beams and cross tees that comply with ASTM C635 and Section 5.1 of ASTM E580 requirements.

1. Structural Classification: ASTM C635, Heavy Duty System.

2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Represented Systems:
 - a. Basis of Design: Prelude XL 15/16", as manufactured by Armstrong World Industries. (ESR-1308)
 - i. Main Beams: Part No. 7301 (Heavy-Duty)
 - ii. Cross Tees: Part No.'s XL7342 and XL7328.
 - b. Donn DX/DXL 15/16", by USG Interiors, Inc. (ESR-1222)
 - i. Main Beams: Part No. DXL26 (Heavy-Duty)
 - ii. Cross Tees: Part No. DX422.
- B. Attachment Devices: Size for 5 times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.
 1. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coated (galvanized), carbon steel. Wire shall be #12 gage (0.106" diameter) with soft temper and minimum tensile strength = 70 ksi.
- C. Wall Moldings: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard molding for edges and penetrations that fit type of edge detail and suspension system indicated.
 1. Angles using BERC-2 seismic clips shall be 7/8", formed with 0.034-inch-thick galvanized steel sheet complying with ASTM A568 and ASTM A653, Coating Designation G90, connected to wood studs with #10 wood screws, as shown on Sheet A581.
- D. Accessories:
 1. Seismic Clips: 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 – used to join main beam or cross tee to wall molding.
 2. Hold-Down Clips: For interior ceilings composed of lay-in panels weighing less than 1 lb. per sq. ft., provide hold-down clips spaced 2'-0" o.c. on all cross tees.
 3. Impact Clips: Where indicated, provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels.

2.4 MISCELLANEOUS MATERIALS

- A. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified Section 07 92 00 – Joint Sealants.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.
- B. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer present, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- C. Testing Substrates: Before installing adhesively applied tile on gypsum board substrates, test and verify that moisture level is below tile manufacturer's recommended limits.

3.3 INSTALLATION

- A. Install suspension system and panels in accordance with DSA IR 25-2, and CBC Section 1617A.1.21, except as noted in Section 4.4.2.1 of ESR-1308, and with the authorities having jurisdiction.
- B. ESR-1308, Section 4.4.2.1, Alternate Seismic Design Category D Installation with BERC-2 Clips:
 - 1. Under this installation, the main runners must be rated heavy-duty and have a minimum simple span uniform load of 16.35 pounds per lineal foot (238 N/m); maximum ceiling weight permitted is 4 pounds per square foot (19.5 kg/m²).
 - 2. The BERC-2 clip is used to secure the main runners and cross runners to the wall molding. A nominal 7/8-inch (22 mm) wall molding is used in lieu of the 2-inch (51 mm) perimeter supporting closure angle required by Section 13.5.6.2.2 of ASCE-7-16 for Seismic Design Category D. Except for the use of the BERC-2 clip and the 7/8-inch (22 mm) wall molding and elimination of spreader bars, installation of the ceiling system must be as prescribed by the applicable code.
 - 3. The BERC-2 clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding, and screwed to the wall molding with two (2) screws. Clips installed on the walls where the runners

are fixed are attached to the runner by a No. 7 by 7/16" long (minimum) self-piercing sheet metal screw through the fixed hole in the clip and the top flange bulb of the runner.

4. Clips installed on the walls where the runners are not fixed, the clips must not be mechanically connected to the runners by any fastener and must allow the terminal runner end to move 3/4" towards and away from the wall, and installation of a No. 7 by 7/16" long (minimum) self-piercing sheet metal screw through the horizontal slotted hole is optional.
- C. For Reveal Edge Panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- D. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION.

SECTION 09 65 13 – RESILIENT WALL BASE AND ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of resilient base and accessories is shown on drawings and in schedules.
- B. Work Includes:
 - 1. Rubber Wall Base.
 - 2. Mouldings.

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast in Place Concrete
- B. Section 06 40 23 – Interior Architectural Woodwork.
- C. Section 09 29 00 – Gypsum Board Assemblies.
- D. Section 09 91 00 – Painting.
- E. Section 10 51 13 – Lockers.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E648 – Standard Test Method for Critical Radiant Flux of Flooring systems Using a Radiant Energy Source.
 - 3. ASTM E662 – Test Method for Specific Density of Smoke Generated by Solid Materials.
 - 4. ASTM F137 – Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus
 - 5. ASTM F386 – Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
 - 6. ASTM F925 – Standard Test Method for Resistance to Chemicals of

Resilient Flooring.

7. ASTM F1515 – Standard Test Method for Measuring Light Stability of Resilient Vinyl Flooring by Color Change
8. ASTM F1861 – Standard Specification for Resilient Wall Base

C. National Fire Protection Association (NFPA):

1. NFPA 255 – Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
2. NFPA 258 – Test Method for Specific Density of Smoke Generated by Solid Materials.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Provide each type of base and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
- B. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installing work similar to that required for this project.
- C. Fire Performance Characteristics: Provide accessories which comply with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.
 1. ASTM E648 /NFPA 253, Critical Radiant Flux of Floor Covering Systems: Class 1.
 2. ASTM E662/NFPA 258, Specific Optical Density of Smoke Generated by Solid Materials: 450 or less.
 3. ASTM E84/NFPA 255, Surface Building Characteristics of Building Materials: Class C.

1.6 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of accessory.
- B. Shop Drawings: Submit shop drawings showing layout, finish colors, patterns and textures.
- C. Samples: Submit manufacturer's standard color samples of each type, color, and pattern of accessories required, showing full-range of color and pattern variations.
- D. Certification for Fire Test Performance: Submit certification from an independent testing laboratory acceptable to authorities having jurisdiction those accessories complies with fire test performance requirements.
- E. Proof of Compliance: Submit Proof of Compliance, signed by the manufacturer's representative, that waxing and finishing of accessories complies with all

manufacturers' recommendation.

- F. Maintenance Instructions: Submit 2 copies of manufacturer's recommended maintenance practices for each type of accessory and accessory required.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations, areas to receive resilient wall base and accessories shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of 65°F-85°F for 48 hours prior too during, and thereafter installation of resilient wall base. Resilient wall base and adhesive shall be conditioned in the same manner. Resilient wall base must be unboxed & acclimated in area of use at least 48 hours prior to installation. Minimum temperature shall be a 65°F after installation.

1.8 SEQUENCING AND SCHEDULING

- A. Install resilient wall base and accessories after other finishing operations, including painting, have been completed. Do not install accessories over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by accessory manufacturer's recommended bond and moisture test.

1.9 WARRANTY

- A. Manufacturer's Materials Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 - 1. Warranty Period: 1 year limited warranty commencing on Date of Substantial Completion. Notice of any defect must be made in writing to manufacturer within thirty (30) days after buyer learns of the defect.
 - 2. Limited Wear Warranty: 3 year limited wear warranty.

1.10 MAINTENANCE

- A. Extra Materials (if part of Contract): Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 01 Closeout Submittal Section.
 - 1. Quantity: Furnish quantity of Resilient Wall Base equal to 5% of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.
- B. Maintenance of finished floor covering to be conducted per Manufacturer's Maintenance Guide.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
1. Manufacturers of Resilient Wall Base and Accessories:
 - a. Burke Flooring, a Division of Burke Industries, Inc.
 - b. Flexco Div., Textile Rubber Co.
 - c. Roppe Rubber Corp.

2.2 RUBBER WALL BASE

- A. Provide vulcanized thermoset rubber base complying with ASTM F1861, Type TS, Group I (solid), with matching end stops and preformed or molded corner units, and as follows:
1. Height: 4" or 6", as shown on plans.
 2. Thickness: 1/8"
 3. Length: Product to come in minimum 100' continuous rolls.
 4. Wall Joints: No more than 1 wall base joint per wall on walls greater than 16' long. Walls less than 16' to have no joints.
 5. Style: Standard Top-Set Cove.
 6. Finish: Matte
 7. Colors: As selected by Architect from manufacturer's standard range.
 8. Locations: As shown on plans.
 - a. Install wall base into recesses at knee space of all base cabinets.

2.3 MOULDINGS

- A. 1/8" thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by Architect from standard colors available; not less than 1" wide.
1. This section is responsible for all edge strips, including but not limited to those edges of resilient flooring, sheet vinyl flooring, carpet, etc.
- B. Metal Trim: Manufacturer's standard metal transition trim – provide wall transitions and as elsewhere indicated on drawings.

2.4 ADHESIVES

- A. Adhesives (Cements): Waterproof, stabilized type as recommended by manufacturer to suit material and substrate conditions.

PART 3 – EXECUTION

3.1 INSPECTION/PREPARATION

- A. Require Installer to inspect surfaces to determine that they are satisfactory.
- B. Do not allow accessory work to proceed until surfaces are satisfactory.
- C. Clean surfaces to be covered and inspect flooring/wall conditions prior to installations.
- D. Installation of base should not begin until the work of all other trades has been completed, especially overhead trades. Areas to receive resilient wall base shall be clean, fully enclosed, weather-tight, and maintained at a uniform temperature of at least 65°F for 24 hours before, during, and after the installation is completed. The resilient wall base and adhesives shall be conditioned in the same manner. The wall surface shall be clean, dry and free of all foreign material, such as dust, paint, grease, oils, solvents, sealers, and old adhesive residue which may interfere with proper adhesion. Do not install on interior surfaces which will be exposed to moisture or excessive temperature changes. All coiled wall base shall be unrolled and allowed to lay flat for a period of at least 24 hours at 65°F prior to installation.

3.2 INSTALLATION

- A. Install accessories using method indicated in strict compliance with manufacturer's printed instructions. Extend base into toe spaces, door reveals, and into closets and similar openings. Note requirements for finishing inside accessible work areas.
- B. General:
 1. A 3/32" V-notched trowel is recommended. Adhesive should be spread on the back of the base and to within a 1/4" from the top or spread on the wall. If using a cartridge then bead the adhesive to within about an inch from the top. If using a multiple-hole nozzle on your cartridge, use a 2-hole nozzle for 2.5", a 3-hole for 4" and a 5-hole nozzle for 6".
 2. If the wall or floor is uneven, trim some wall base ends before adjoining pieces. Use a razor-edged utility knife to trim, cutting from the face to the back.
 3. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 4. Scribe, cut, and fit floor base to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions.

5. Apply wall base to the wall within 20 minutes after spreading adhesive. Be sure to "work" the wall base back toward the starting point. This slightly compresses the pieces together and eliminates the possibility of gapping at the seams due to improper installation technique. Always press firmly toward the last piece installed using a hand and a clean rag or a clean hand roller. Base that is installed on a curved or irregular surface may need bracing until adhesive sets.
6. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
7. Resilient wall base shall be rolled, with a J-hand roller, after installation, to ensure proper bonding.

C. Corners:

1. To form outside corners, fold the base at the proper point and scribe the backside with a V-knife or a Cove Base Gouging Tool. Remove no more than 20% of the base thickness. Heat the cut backside area with a hot air gun. Apply heat carefully, too much heat will deform or blister the base. Crease the base at the fold with your hands or a hand roller. Let cool to the touch. Apply adhesive and install. Press firmly to the wall and brace if needed. Use a wet clean cloth to cool the base if hot from heating process.
 2. Always maximize the length of the wall base measured from the edge of an outside corner. Extend the job formed corner wall base length on each side of the corner at minimum of 6 inches. The longer the length of wall base extends back from the corner, the stronger the installation will be in the face of abuse that can occur during subsequent maintenance events.
- D. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on floor base as marked on subfloor. Use chalk or other non-permanent marking device.
- E. Install stair treads and nosing per manufacturer's recommendations for products used.
- F. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.
- G. Apply edge strips where shown on drawings, and after flooring installation. Secure units to substrate with adhesive, complying with edge strip manufacturer's recommendations.

END OF SECTION.

SECTION 09 67 23 – RESINOUS FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes one resinous flooring system, one with epoxy body.
 - 1. Application Method: Flat metal or plastic blade, power or hand troweled.
- B. This project falls under the jurisdiction of the Merced County Environmental Health Department. Owner / Architect are obtaining Health Department review and approval. Contractor is responsible for adhering to all Health Department requirements and coordinating Health Department notification with the Owner when construction is slated to begin, as well as all coordinating all required inspections.

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast-In-Place Concrete
- B. Section 09 30 00 – Tiling and Grout.
- C. Section 09 77 20 – Fiberglass Reinforced Wall Panels
- D. Section 10 21 13 – Solid Plastic Toilet Compartments.
- E. Section 11 40 00 – Food Service Equipment.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required, provide an approximate 5" square, applied to a rigid backing, with different slip resistant additive options.
- C. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- E. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e. Epoxy resin mortar based flooring system with urethane sealers). Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.
- B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 2. Contractor shall have completed at least 10 projects of similar size and complexity.
- C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- D. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
1. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- E. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Apply full-thickness mockups on 48-inch square floor area selected by Architect. Include 48-inch (1200-mm) length of integral cove base.
 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 3. Mockup shall demonstrate desired slip resistance for review and approval by General Contractor prior to installing project areas.
- F. Pre-installation Conference:
1. General contractor shall arrange a meeting not less than thirty days prior to

starting work.

2. Attendance:

- a. General Contractor
- b. Architect/Owner's Representative.
- c. Manufacturer/Installer's Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data.
- C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 1. Maintain material and substrate temperature between 65°F and 85°F during resinous flooring application and for not less than 24 hours after application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- D. Concrete substrate shall be properly cured. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.8 WARRANTY

- A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation or provide a joint warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 – PRODUCTS

2.1 RESINOUS FLOORING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include the following. Broadcast systems will not be accepted. Trowel mortar only.
1. Acceptable Manufacturers:
 - a. Basis of Design: Stonhard, Inc.
 2. Acceptable Product:
 - a. Basis of Design: Stonblend GSI®.
- B. System Characteristics:
1. Color and Pattern: TBD, from both the HDF and G color lines.
 2. Wearing Surface: Smooth Matte finish.
 3. Integral Cove Base: 6 inches.
 4. Overall System Thickness: 3/16 inch (5 mm).
 5. Slip Resistance: Must meet slip resistance requirements of ASTM D2047 for areas of foot traffic. Slip resistance shall not be applied to coved base areas, to allow for ease of cleaning / mopping floor system.
- C. System Components: Manufacturer's standard components that are compatible with each other and as follows:
1. Primer:
 - a. Material Basis: Stonblend Primer
 - b. Resin: Epoxy.
 - c. Formulation Description: 2 component, 100% solids.
 - d. Type: Non-pigmented.
 - e. Finish: Standard.
 - f. Number of Coats: One.
 2. Mortar Base:
 - a. Material Basis: Stonblend Mortar
 - b. Resin: Epoxy.

- c. Formulation Description: 3 component, 100% solids.
 - d. Application Method: Flat Metal or plastic blade trowel.
 - i. Thickness of Coats: 3/16 inch (5 mm).
 - ii. Number of Coats: One.
 - e. Aggregates: Pigmented quartz Blended aggregate.
3. Groutcoat:
- a. Material Basis: Stonblend Groutcoat
 - b. Resin: Epoxy.
 - c. Formulation Description: 2 component, 100% high solids.
 - d. Type: Clear.
 - e. Finish: Standard.
 - f. Number of Coats: One.
4. Sealer:
- a. Material Basis: Stonkote CE4.
 - b. Resin: Epoxy
 - c. Formulation Description: 2 component, 100% solids.
 - d. Type: Clear.
 - e. Finish: Matte.
 - f. Number of Coats: One.
5. Topcoat:
- a. Material Basis: Stonseal CF7.
 - b. Resin: VOC EPA Compliant, Waterborne, Aliphatic Polyurethane.
 - c. Formulation Description: 2 component 100% high solids.
 - d. Type: Clear.
 - e. Finish: Matte.
 - f. Number of Coats: Two.

Note: Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, wearing surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.

- D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
1. Compressive Strength: 6,000 psi after 7 days per ASTM C 579.
 2. Tensile Strength: 1,500 psi per ASTM C 307.
 3. Flexural Strength: 2,200 psi per ASTM C 580.
 4. Flexural Modulus of Elasticity: 5.0×10^5 psi per ASTM C 580.
 5. Hardness: 85 to 90, Shore D per ASTM D 2240.
 6. Impact Resistance: > 160 in. lbs. per ASTM D 2794.
 7. Abrasion Resistance: 0.06 gm max. weight loss per ASEM D 4060, CS-17
 8. Slip Resistance: Coefficient of friction of min. 0.6 (wet) at slopes less than 6% and min. 0.8 (wet) at slopes greater or equal to 6% per ASTM D2047.
 9. Flammability: Class 1 per ASTM E648, E662
 10. Thermal Coefficient of Linear Expansion: 9×10^{-6} in./in. °F
 11. VOC Content per ASTM D2369, Method E:
 - a. Stonblend Primer: 75 g/l
 - b. Stonblend GSI Base: 17 g/l
 - c. Stonblend Groutcoat: 52 g/l
 - d. Stonkote CE4: 34 g/l
 - e. Stonseal CF7: 47 g/l (Method C)
 12. Cure Rate: 12 hours for foot traffic, 24 hours normal operations.

2.2 ACCESSORY MATERIALS

- A. Primer: Type recommended by manufacturer for substrate and body coats indicated. Formulation Description: Stonhard Stonblend Primer, 100% solids.
- B. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated. Formulation Description Only if application above

grade Stonproof ME7.

- C. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- D. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material.

PART 3 – EXECUTION

3.1 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean and dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 - 1. Mechanically prepare substrates as follows: Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup or Diamond Grind with a dust-free system.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
 - 3. Verify that concrete substrates meet the following requirements.
 - a. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - b. Perform anhydrous calcium chloride test, ASTM F1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 6 lb of water/1000 sq. ft. of slab in 24 hours.
- C. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- D. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.
- C. Integral Cove Base: Stonblend GSI mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
1. Integral Cove Base: 6 inches high.
- D. Troweled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Hand trowel apply mixed material over freshly primed substrate using steel finishing trowels or power trowel material using manufacturer's specially designed power trowel blades.
- E. Groutcoat: Remove excess unbonded granules by lightly abrading or scraping and vacuuming the floor surface. Mix and apply grout coat with strict adherence to manufacturer's installation procedures and coverage rates.
- F. Sealer: Lightly sand or scrape surface to remove any floor surface irregularities. Mix and apply sealer with strict adherence to manufacturer's installation procedures.
- G. Matte Finish: Lightly sand or scrape surface to remove any floor surface irregularities. Mix and roller apply mar resistant finish with strict adherence to manufacturer's installation procedures.

3.3 TERMINATIONS

- A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.
- B. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.
- C. Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.
- D. Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.4 JOINTS AND CRACKS

- A. Treat control joints and to maintain monolithic protection.
- B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
- C. Vertical and horizontal contraction and expansion joints are treated by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.6 CLEANING, PROTECTING, AND CURING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General Contractor is responsible for cleaning prior to inspection.

END OF SECTION.

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SECTION 09 77 20 – FIBERGLASS REINFORCED PLASTIC (FRP) WALL PANELS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes: Prefinished polyester glass reinforced plastic sheets adhered to unfinished gypsum wallboard, with PVC trim.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.
- B. Section 09 30 00 – Tiling and Grout.
- C. Section 09 65 13 – Rubber Wall Base and Accessories.
- D. Section 09 91 00 – Painting.
- E. Section 11 40 00 – Food Service Equipment.
- F. Division 22 – Plumbing, for Service Sinks.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM D256 – Izod Impact Strengths
 - 2. ASTM D570 – Water Absorption
 - 3. ASTM D638 – Tensile Strengths & Tensile Modulus
 - 4. ASTM D790 – Flexural Strengths & Flexural Modulus
 - 5. ASTM D2583 – Barcol Hardness
 - 6. ASTM D5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
 - 7. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's data to indicate compliance with these specifications, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
- C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
- D. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants and other pertinent materials prior to their delivery to the site.

1.6 QUALITY ASSURANCE

- A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
 - 1. Wall Required Rating: Class A (ASTM E84).
- B. Sanitary Standards: System components and finishes to comply with:
 - 1. Local Health Department requirements.
 - 2. USDA.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory packaged on strong pallets.
- B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (70°F) for 48 hours prior to installation.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Building are to be fully enclosed prior to installation with adequate heat (70°F) and ventilation consistent with good working conditions for finish work
- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
 - 1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.9 WARRANTY

- A. Furnish a one (1) year guarantee against defects in material and workmanship.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers include, but are not limited to, the following:
1. Marlite, Inc. (www.marlite.com)
 2. Crane Composites, Inc. (www.cranecomposites.com)

2.2 PANELS

- A. General: Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D5319.
- B. Coating: Multi-layer print, primer and finish coats or applied over-layer.
- C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.
- D. Front Finish: As Indicated on the Drawings.
1. Color: Chosen from Manufacturer's Standard Colors.
 2. Surface: Pebbled or Smooth.
 3. Fire Rating: Class A (I) Fire Rating.
 4. Size (nominal): 4'-0" W x 8'-0" L or 10'-0" L x 0.120"D
- E. Tolerance:
1. Length and Width: +/-1/8" (3.175mm)
 2. Square: Not to exceed 1/8".
- F. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
1. Flexural Strength: 1.0×10^4 psi per ASTM D790.
 2. Flexural Modulus: 3.1×10^5 psi per ASTM D790.
 3. Tensile Strength: 7.0×10^3 psi per ASTM D638.
 4. Tensile Modulus: 1.6×10^5 psi per ASTM D638.

5. Water Absorption: 0.72% per ASTM D570.
6. Barcol Hardness (scratch resistance): 40 per ASTM D2583.
7. Impact Strength: ASTM D5420, 12 in-lb (0.64 J), showing no visible damage on finish side.

2.3 MOLDINGS

- A. PVC Trim: Thin-wall semi-rigid extruded PVC, designed to restrict the growth of mold or pathogens.
- B. Corners / Corner Guards: As recommended by manufacturer and/or as shown on the plans.

2.4 ACCESSORIES

- A. Fasteners: Non-staining nylon drive rivets (if required). Match Panel colors. Length to suite project conditions.
- B. Adhesive: Adhesive as recommended by manufacturer. Adhesive to comply with ASTM C557.
- C. Sealant: Clear or White.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
 1. Verify that stud spacing does not exceed 24" on-center.
- B. Repair defects prior to installation. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence.
- B. Cut sheets to meet supports allowing 1/8" clearance for every 8 foot of panel.
 1. Cut and drill with carbide tipped saw blades or drill bits or cut with shears.
 2. Pre-drill fastener holes 1/8" oversize with high speed drill bit.
 - a. Space at 8" max. on center at perimeter, approx. 1" from panel edge.
 - b. Space at in field in rows 16' on center, with fasteners spaced at 12" max. on center.

- C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
 - 1. Install panels with manufacturer's recommended gap for panel field and corner joints.
 - a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
 - b. Drive fasteners for snug fit. Do not over-tighten.
- D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
 - 1. All moldings must provide for a minimum 1/8" (3mm) of panel expansion at joints and edges, to insure proper installation.
 - 2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

- A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.
- B. Refer to manufacturer's specific cleaning recommendations. Do not use abrasive cleaners.

3.4 PROTECTION

- A. Protect installed product and finish surfaces from damage during construction.

END OF SECTION.

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SECTION 09 91 00 – PAINTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes surface preparation, painting, and finishing of ALL paintable exposed interior and exterior items and surfaces. This includes caulking of ALL joints, whether called out in the plans or not.
1. Surface preparation, priming and finish coats specified in this section are in addition to shop priming and surface treatment specified under other sections of work.
- B. Paint exposed surfaces whether or not colors are designated in "schedules," except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.
1. Painting includes field painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, spray on fireproofing where indicated on drawings, and primed metal surfaces of mechanical and electrical equipment.
- C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.
1. Prefinished items not to be painted include the following factory-finished components:
 - a. Metal toilet enclosures
 - b. Acoustic materials
 - c. Architectural woodwork and casework
 - d. Finished mechanical and electrical equipment
 - e. Light fixtures
 - f. Switchgear
 - g. Distribution cabinets
 2. Concealed surfaces not to be painted include wall or ceiling surfaces in the following generally inaccessible areas:
 - a. Foundation spaces
 - b. Furred areas
 - c. Utility tunnels
 - d. Pipe spaces
 - e. Duct shafts

3. Finished metal surfaces not to be painted include:
 - a. Anodized aluminum
 - b. Stainless steel
 - c. Chromium plate
 - d. Copper
 - e. Bronze
 - f. Brass
4. Operating parts not to be painted include moving parts of operating equipment such as the following:
 - a. Valve and damper operators
 - b. Linkages
 - c. Sensing devices
 - d. Motor and fan shafts
5. Labels: Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.3 RELATED SECTIONS

- A. Section 08 11 13 – Hollow Metal Doors and Frames.
- B. Section 09 29 00 – Gypsum Board.
- C. Divisions 22, 23, 26, 27, and 28: Painting mechanical, plumbing, and electrical work is specified in these sections.

1.4 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. ASTM International (ASTM): ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. Steel Structures Painting Council (SSPC):
 1. SP6 – Commercial Blast Cleaning Procedures.
 2. SP10 – Near White Blast Cleaning Procedure.

1.5 DEFINITIONS

- A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, caulking, and other applied materials whether used as prime, intermediate, or finish coats.
- B. General: Standard coating terms defined within Masters Painters Institute (MPI) manual.

1. Gloss level 1 – Flat with a gloss range below 5 when measured at a 60-degree meter and 10 when measured at an 85-degree meter.
2. Gloss level 2 – Low Sheen with a gloss range of 5 to 10 when measured at a 60 degree meter and 10 to 35 when measured at an 85 degree meter.
3. Gloss level 3 – Eggshell with a gloss range between 10 and 15 when measured at a 60-degree meter and 10 to 35 when measured at an 85-degree meter.
4. Gloss level 4 – Satin with a gloss range between 25 to 35 when measured with a 60 degree meter.
5. Gloss level 5 – Semi-Gloss with a gloss range between 50 and 55 when measured at a 60 degree meter.
6. Gloss level 6 – Gloss with a gloss range more than 70 when measured at a 60 degree meter.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittals.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Preparation instructions and recommendations.
 3. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Resubmit until required sheen, color, and texture are achieved.
 1. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats.

- B. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- C. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of total coatings system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
- D. Paints and primers are to comply with California Air Resources Board ruling on architectural Rule 1113 coating and solvent, L.A. County A.P.C.D. Rule 66 not to exceed 260 grams/liter V.O.C./liter of paint, and Federal lead content requirements.
- E. Field Samples: On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface until required sheen, color and texture are obtained; simulate finished lighting conditions for review of in-place work.
 - 1. Final acceptance of colors will be from job-applied samples.
- F. Material Quality: Provide the manufacturer's best quality trade sale paint materials of the various coating types specified. Paint material containers not displaying manufacturer's product identification will be not acceptable.
 - 1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude equal products of other manufacturers.
 - 2. Provide written certification from the manufacturer that materials provided meet or exceed the criteria listed in these specs.
 - 3. Furnish material data and manufacturer's certificate of performance to Architect for proposed substitutions.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Product name or title of material
 - 2. MPI (The Masters Painters Institute) Standards
 - 3. Manufacturer's stock number and date of manufacturer
 - 4. Contents by volume, for major pigment and vehicle constituents
 - 5. Thinning instructions
 - 6. Application instructions
 - 7. Color name and number
 - 8. Manufacturer's name
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags

and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing and application.

1.9 JOB CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 Deg C).
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).
- C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85 percent, at temperatures less than 5 deg F (3 deg C) above the dew point, or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

1.10 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Quantity: Furnish Owner with an additional three percent, but not less than 1 gallon or 1 case, as appropriate, of each material and color applied.

PART 2 – PRODUCTS

2.1 MATERIAL QUALITY

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by paint materials manufacturer. Materials not displaying manufacturers' identification as a standard, best-grade product will not be acceptable.

2.2 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following:
 - 1. To establish a standard of quality, design and performance, Kelly-Moore Paints have been selected. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Owner and Architect shall be the determinant of equivalency.

2.3 PAINT MATERIALS – GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. VOC Classification: Provide materials, including primers, undercoats, and finish-coat materials, that meet local air quality management district regulations.
- C. Color:
 - 1. Pure, non-fading, applicable types to suit substrates and service indicated.
 - 2. Refer to Finish Schedule and Paint Legend for paint colors.
- D. Application Rate: Coating thickness for primer, intermediate, barrier and finish coats shall be measured as Dry Film Thickness (DFT) and comply with manufacturer's published recommendations.
- E. Lead content in pigment, if any, is limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight. This limitation is extended to interior surfaces and those exterior surfaces, such as stairs, decks, porches, railings, windows, and doors which are readily accessible to children under seven years of age.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which painting work will be performed for compliance with requirements for application of paint. Do not begin paint application until unsatisfactory conditions have been corrected.
 - 1. Start of painting work will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

3.2 PREPARATION

- A. General Procedures: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items if necessary for complete painting of the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.
 - 1. Clean surfaces before applying paint or surface treatments. Remove oil and grease prior to cleaning. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
 - 2. Contractor to caulk between ALL joints. Sand if needed or required to meet a uniform smooth painting surface.

- B. Surface Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer's instructions for each particular substrate condition and as specified.
1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing of problems anticipated with using the specified finish-coat material with substrates primed by others.
- C. Cementitious Materials: Prepare concrete, concrete masonry block, and cement plaster surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
1. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.
 2. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
 3. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, and rinse; allow to dry and then vacuum before painting.
- D. Wood: Clean surfaces of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view, and dust off.
1. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sand smooth when dried.
 2. Prime, stain, or seal wood painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.
 3. When transparent finish is required, backprime with spar varnish.
 4. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
 5. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.
- E. Ferrous Metals: Clean nongalvanized ferrous-metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

1. Blast steel surfaces clean as recommended by the paint system manufacturer and in accordance with requirements of SSPC specification SSPC-SP 10.
 - a. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.
 2. Galvanized Surfaces: Clean galvanized surfaces with non-petroleum based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- F. Materials Preparation: Carefully mix and prepare paint materials in accordance with manufacturer's directions.
1. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
 3. Use only thinners approved by the paint manufacturer, and only within recommended limits.

3.3 APPLICATION

- A. Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 1. Paint colors, surface treatments, and finishes are indicated in "schedules".
 2. Provide for multiple paint colors in areas with exposed ceilings. Different colors will be selected for decking, trusses, mechanical etc
 3. Provide finish coats that are compatible with primers used.
 4. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even smooth surface in accordance with the manufacturer's directions.
 5. Caulk between ALL joints.
 6. Apply additional coats when undercoats, stains or other conditions show through final coat of paint until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness

equivalent to that of flat surfaces.

7. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas as required to maintain the system integrity and provide desired protection.
 8. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.
 9. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 10. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
 11. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.
 12. Sand lightly between each succeeding enamel or varnish coat.
 13. Omit (first coat) primer on metal surfaces that have been shop-primed and touch-up painted.
- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure and where application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- D. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate. Provide a total dry film thickness of the entire system as recommended by the manufacturer, and as approved by Architect.
- E. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed in mechanical equipment rooms and in occupied spaces.
- F. Mechanical items to be painted include, but are not limited to:
1. Piping, pipe hangers, and supports
 2. Heat exchangers
 3. Tanks
 4. Ductwork
 5. Insulation
 6. Motors and mechanical equipment
 7. Accessory items

- G. Electrical items to be painted include, but are not limited to:
1. Conduit and fittings
 2. Switchgear
- H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before application of finish coats, apply a prime coat of material as recommended by the manufacturer to material that is required to be painted or finished and has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.
- J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.
- K. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- L. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.
- M. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.4 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following material testing procedure at any time, and as often as the Owner deems necessary during the period when paint is being applied:
1. The Owner will engage the services of an independent testing laboratory to sample paint being used. Samples of materials delivered to the project will be taken, identified, sealed, and certified in the presence of the Contractor.
 2. The testing laboratory will perform appropriate tests for the following characteristics as required by the Owner:
 - a. Quantitative materials analysis
 - b. Abrasion resistance
 - c. Apparent reflectivity
 - d. Flexibility
 - e. Washability
 - f. Absorption
 - g. Accelerated weathering
 - h. Dry opacity

- i. Accelerated yellowness
- j. Recoating
- k. Skinning
- l. Color retention
- m. Alkali and mildew resistance

- 3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove non-complying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

3.5 CLEANING

- A. Clean-Up: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
- B. Upon completion of painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping, using care not to scratch or damage adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
- B. Provide "wet paint" signs to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
 - 1. At completion of construction activities of other trades, touch-up and restore damaged or defaced painted surfaces.

3.7 MAINTENANCE

- A. Coding Maintenance Manual: At the end of the job, provide a Coding Maintenance Manual to the District, designating which paints were used in each location, paint color, sheen, local branch where paint was purchased, and sample of paint color.

3.8 EXTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates indicated. This includes Existing and New surfaces. All paint systems listed below are by Kelly-Moore, included for Basis of Design. Equal products from paint manufacturers listed in this specification shall be accepted, pending Architectural approval.
- B. Colors: Shall be selected by Owner and Architect, to match existing campus paint scheme. **NOTE: Custom color may be required.**
- C. Concrete: Vertical surfaces.
 - 1. Lusterless (Flat) Acrylic Latex Finish: 2 coats with total dry film thickness not

less than 2.5 mils.

- a. Primer: 521 FILL & PRIME Acrylic Block Filler (Concrete block must be filled.)
- b. First Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
- c. Second Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
- d. *Third Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

D. Concrete Epoxy Paint:

1. All concrete areas called out on plans to be epoxy painted shall have two (2) coats applied, as listed below:
 - a. Concrete Floors, Patios, Steps: ALLFLOR Epoxy Fortified 100 % Acrylic Low Luster Enamel.

E. Plaster:

1. Low-Luster Finish:
 - a. Primer: No primer required.
 - b. Caulking: Caulk all joints with high quality, paintable caulk. Sand if needed or required.
 - c. First Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
 - d. Second Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
 - e. * Third Coat: 1128 KEL-SEAL Urethane Modified Acrylic Elastomeric Coating.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

F. Wood Trim:

1. Semi-Gloss Finish:
 - a. Primer: 255 Acryshield.
 - i. This is only required for surfaces that have not been

previously painted. Two coats of primer are required and shall be applied at any unpainted exterior surface called out to be painted on the plans. A visual inspection to be approved and signed off by Architect prior to application of finish coats.

- b. Caulking: Caulk all joints with high quality, paintable caulk. Sand if needed or required.
 - c. First Coat: 1250 Exterior Acry-Shield Semi-Gloss.
 - d. Second Coat: 1250 Exterior Acry-Shield Semi-Gloss.
 - e. * Third Coat: 1250 Exterior Acry-Shield Semi-Gloss.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.
- G. Ferrous Metal (non-galvanized): Primer is not required on shop-primed items.
- 1. Full Gloss Latex Enamel:
 - a. Primer: This is only required for surfaces that have not been previously painted.
 - i. Full Prime: Devprime 1403 or 1405 High Performance Alkyd Primer.
 - ii. Spot Prime (if required): DevPrime 1405 High Performance Alkyd Primer.
 - b. First Coat: Devcryl 1448 Premium Direct to Metal Semi-Gloss Acrylic.
 - c. Second Coat: Devcryl 1448 Premium Direct to Metal Semi-Gloss Acrylic.
 - d. * Third Coat: Latex Gloss Enamel. Devcryl 1448 Premium Direct to Metal Semi-Gloss Acrylic.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.
- H. Galvanized Metal:
- 1. High Gloss Latex Enamel:
 - a. Primer: This is only required for surfaces that have not been previously painted. To be equal to one of the products shown below, as recommended by manufacturer for location of painted galvanized metal:
 - i. Devcryl 1440 Rust Inhibitive Waterborne Primer/Finish.
 - ii. 5725 DTM Acrylic Primer/Finish.

- b. First Coat: Devcryl 1449 Acrylic Gloss Enamel or 5725 DTM Acrylic Primer/Finish.
- c. Second Coat: Devcryl 1449 Acrylic Gloss Enamel or 5725 DTM Acrylic Primer/Finish.
- d. * Third Coat: Devcryl 1449 Acrylic Gloss Enamel or 5725 DTM Acrylic Primer/Finish.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

3.9 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated. This includes Existing and New surfaces.

B. Gypsum Drywall Systems:

- 1. Odorless Semigloss Latex Enamel Finish: Total dry film thickness not less than 2.5 mils.
 - a. Primer: 966 KM PROFESSIONAL Interior PVA Primer/Sealer or 971 ACRY-PLEX Interior PVA Primer/Sealer Low VOC.
 - b. Caulking: Caulk all joints with high quality, paintable caulk. Sand if needed or required.
 - c. First Coat: 1687 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - d. Second Coat: 1687 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - e. * Third Coat: 1687 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

C. Epoxy Painted Gypsum Board Assemblies – All Wet Areas:

- 1. Epoxy Paint System:
 - a. Primer: 4426 Tru-Glaze WB Epoxy.
 - b. Caulking: Caulk all joints with high quality, paintable caulk. Sand if needed or required.
 - c. First Coat: 4426 Tru-Glaze WB Epoxy.
 - d. Second Coat: 4426 Tru-Glaze WB Epoxy.

- e. * Third Coat: 4426 Tru-Glaze WB Epoxy.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

D. Wood Trim:

- 1. Semigloss Enamel Finish:
 - a. Primer: 973 ACRY-PLEX Interior Low VOC Acrylic Undercoat.
 - b. Caulking: Caulk all joints with high quality, paintable caulk. Sand if needed or required.
 - c. First Coat: 1680 or 1685 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - d. Second Coat: 1680 or 1685 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - e. * Third Coat: 1680 or 1685 DURA-POXY Interior 100% Acrylic, High Performance Acrylic.
 - i. * Contractor must meet with Architect before Final (Third) Coat is applied to verify adequate coverage has been met.

E. Ferrous Metal (non-galvanized):

- 1. Semigloss Enamel Finish: Total dry film thickness not less than 2.5 mils.
- 2. Full Gloss Latex Enamel:
 - a. Primer: This is only required for surfaces that have not been previously painted.
 - i. Full Prime: Devprime 1403 or 1405 High Performance Alkyd Primer.
 - ii. Spot Prime (if required): DevPrime 1405 High Performance Alkyd Primer.
 - b. First Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - c. Second Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - d. ** Finish Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - i. ** Contractor must meet with Architect before Second Layer of Finish Coat is applied to verify adequate coverage has been met.

F. Galvanized Metal:

1. Semigloss Finish: Total dry film thickness not less than 2.5 mils.
 - a. Primer: This is only required for surfaces that have not been previously painted. To be equal to one of the products shown below, as recommended by manufacturer for location of painted galvanized metal:
 - i. Devcryl 1440 Rust Inhibitive Waterborne Primer/Finish.
 - ii. 5725 DTM Acrylic Primer/Finish.
 - b. First Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - c. Second Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - d. ** Finish Coat: 5885 DTM High Performance Acrylic Semi-Gloss, or as recommended by manufacturer.
 - i. ** Contractor must meet with Architect before Second Layer of Finish Coat is applied to verify adequate coverage has been met.

G. Concrete and Masonry Sealer:

1. All concrete and / or masonry areas called out on plans to be sealed shall have two (2) to three (3) sealer coats applied.
 - a. See Division 3 Sections for information on stained / colored concrete. Ensure that sealer is compatible with stain.
 - i. Product: ALLFLOR Epoxy Fortified 100 % Acrylic Low Luster Enamel.
 - b. ** Contractor must meet with Architect before Second Layer of Sealer is applied to verify adequate coverage has been met.

END OF SECTION.

DIVISION 10 – SPECIALTIES

10 11 00 – Visual Display Surfaces

10 14 23 – Signage

10 21 13 – Solid Plastic Toilet Compartments

10 28 13 – Toilet and Bath Accessories

10 28 23 – Janitorial Accessories

10 44 00 – Fire Protection Specialties

10 51 13 – Lockers

10 51 50 – Locker Room Benches

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SECTION 10 11 00 – VISUAL DISPLAY SURFACES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes: Porcelain Enamel Markerboards, Field Applied Trim, and Accessories.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.

1.4 REFERENCED STANDARDS

- A. 2022 California Building Code (CBC) with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM E84 – Standard Test Method for Surface Burning Characteristics for Building Materials.
 - 2. ASTM B221 – Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wires, Profiles and Tubes.
- C. Porcelain Enamel Institute: PEI-1002 Manual and Performance Specifications for Porcelain Enamel Writing Surfaces
- D. GREENGUARD Environmental Institute: GREENGUARD Children and Schools Indoor Air Quality Certified.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
- B. Shop Drawings: Provide shop drawings for each type of visual display board required. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout and installation details.
- C. Product Data: Provide technical data for materials specified.
- D. Samples / Color Charts: Provide manufacturer's color charts and composition samples of face, core, backing and trim to illustrate finish, color and texture, where required.
- E. Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be a manufacturer of visual display boards in the United States and have a minimum of five (5) years of experience.
- B. Installer Qualifications: Engage an experienced Installer who is an authorized representative of the markerboard manufacturer for both installation and maintenance of the type of markerboard units required for this Project.
- C. Regulatory Requirements: Conforms to applicable code for flame/smoke rating in markerboard in accordance with ASTM E84.
- D. Product Certifications: Provide GREENGUARD Indoor Air Quality Certified certificates for markerboards, as applicable.
- E. Operations and Maintenance: Include data on regular cleaning, stain removal and precautions.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.
 - 1. Allow for trimming and fitting wherever taking field measurements before fabrication might delay the Work.
- B. Comply with manufacturer's recommendations for acclimating area for interior moisture and temperature to approximate normal occupied conditions.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of visual display boards with spaces sufficiently complete so that visual display boards can be installed upon delivery.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store materials protected from exposure to harmful weather conditions and at temperatures and humidity conditions recommended by manufacturer.

1.9 WARRANTY

- A. Warranty Period: Lifetime of the building for markerboards that do not retain their original writing and erasing qualities, or exhibit crazing, cracking or flaking, provided manufacturer's instructions with regard to handling, installation, protection and maintenance have been followed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to,

the following:

1. Claridge Products and Equipment, Inc.
2. Polyvision

2.2 MATERIALS FOR MARKERBOARD PANELS

- A. Writing Surface Face Sheet: Manufactured in accordance with Porcelain Enamel Institute's specification.
1. Provide facing sheet of 24-gage enameling grade steel sheet especially processed for temperatures used in coating porcelain on steel.
 2. Coat exposed face with a 3-coat process consisting of, ground coat, top cover coat, and conceal face with a 2-coat process consisting of primer and ground coat.
 3. Color: As selected by Architect from manufacturer's standard colors.
- B. Writing Surface Core: 7/16" Medium Density Fiberboard (MDF).
- C. Writing Surface Backing: Aluminum Sheet Back.

2.3 ALUMINUM TRIM AND ACCESSORIES

- A. Metal Trim and Accessories: Fabricate frames and trim of 6063 alloy grade aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible. Miter corners to a neat, hairline closure. Frame cannot extend more than 0.1 inches away from board surface.
- B. Marker Tray: Furnish manufacturer's standard continuous box-type aluminum tray with slanted front and cast aluminum end closures at bottom of each markerboard.
- C. Map Rail: Furnish map rail at the top of each unit, complete with the following accessories:
1. Display Rail: Provide continuous cork display rail approximately 1 or inch wide, as indicated, integral with the map rail.
 2. End Stops: Provide one (1) end stop at each end of the map rail.
 3. Map Hooks: Provide two (2) map hooks for each 4 feet of map rail or fraction thereof.
 4. Flagholder: Provide two (2) flagholders for each markerboard assembly.
 5. Flags: Provide one (1) 16" x 24" stitched nylon USA flag, and one (1) 12" x 18" printed nylon State of California flag for each different room markerboard assembly. Flags to be mounted to 36" long capped aluminum staff (diameter to match flagholder interior diameter).

2.4 FABRICATION

- A. Porcelain Enamel Markerboards: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.
- B. Assembly: Provide factory assembled markerboard units, except where field assembled units are required. Make joints only where the total length exceeds the maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.
 - 1. Provide manufacturer's standard vertical joint system between abutting sections of markerboard and standard mullion trim at joints between markerboards.

2.5 FINISHES

- A. General. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Class II Clear Anodized Finish: AA-M12C22A31 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class II Architectural, clear film thicker than 0.4 mil).
- C. Baked Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment). Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.
 - 1. Color: As selected by Architect from manufacturer's standard colors.

PART 3 – EXECUTION

3.1 PROJECT CONDITIONS

- A. Before installation, verify that interior moisture and temperature approximate normal occupied conditions.
- B. Verify wall surfaces are true and plumb and are prepared and ready to receive boards.

3.2 INSTALLATION

- A. Deliver factory-built markerboard units completely assembled in one piece without joints. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Follow manufacturer's instructions for storage and handling of units before installation.
- C. Do not install boards on damp walls or in damp or humid weather without heat in the

building.

- D. Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories necessary for a complete installation.
- E. Coordinate job-site assembled units with grounds, trim and accessories. Join all parts with a neat, precision fit.

3.3 ADJUST AND CLEAN

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units in accordance with the manufacturer's instructions. Break-in markerboards only as recommended by the manufacturer.

END OF SECTION.

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SECTION 10 14 23 – SIGNAGE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Panel Signs.
 - 2. Room Identification Signs.
 - 3. Maximum Occupancy Signs.
 - 4. Toilet Room Signage.
 - 5. Dimensional Letters and Numbers.
 - 6. Building Identification Signage.
 - 7. Standard Tactile Exit Signs.

1.3 RELATED SECTIONS

- A. Section 01 50 00 – Temporary Facilities, for temporary project identification signs.
- B. Divisions 22, 23 and 26 for Mechanical and Electrical Identification and Signs.
- C. Section 32 31 13 – Chain-Link Fencing and Gates

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
- C. Signage Schedule: Provide an editable version of the signage schedule in Excel (or another editable format) with submittal for Architects review and comment.
- D. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, mounting heights, and large scale sections of typical members and other components. Show anchorages, grounds, reinforcement, accessories, layout, and installation details.
 - 1. Provide message list, timesteps, graphic elements (including raised

- characters and Braille) for each sign required, including large-scale details of wording and layout of lettering. All artwork by Contractor.
2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
- E. Samples: Provide samples of each sign component for initial selection of color, pattern, and surface textures as required and for verification of compliance with requirements indicated.
1. Cast Acrylic Sheet: Provide a sample panel for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the following, except as otherwise indicated:
- B. 2022 California Building Code Section Chapter 11B, Division 7 – Communication Elements and Features:
1. General: Signage required to be accessible according to CBC 11B-703 – Signs and shall comply with applicable provisions of Title 24.
 2. Character Proportion: Characters shall be selected from fonts where the width of the uppercase letter “O” is 60% minimum and 110% maximum of the height of the uppercase letter “I”.
 3. Visual Character Height:
 - a. Characters and numbers on signs shall be sized according to the viewing distance from which they are to be read.
 - b. Minimum Character Heights are to be determined by Table 11B-703.5.5 – Visual Character Height. The minimum height is measured using an upper case “I”.
 - c. Lower case characters are permitted.
 4. Stroke Thickness: Stroke thickness of the uppercase letter “I” shall be 10% minimum and 15% maximum of the height of the character.
 5. Character Spacing: Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch (1.6 mm) minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum at the top of the

cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch (9.5 mm) minimum.

6. Line Spacing: Line spacing between the baselines of separate lines of characters within a message shall be 135% minimum and 170% maximum of character height.
7. Finish and Contrast: The characters and background of signs shall be eggshell, matte, or other non-glare finish. Characters and symbols shall contrast with their background – either light characters on a dark background or dark characters on a light background.
8. Raised and Braille Characters:
 - a. Letters and numerals shall be raised 1/32 inches minimum above their background, sans serif font, complying with CBC Section 11B-703.2, and shall be duplicated in Braille complying with CBC Section 11B-703.3.
 - b. Raised characters shall be at least 5/8 inches (16 mm) high, but no higher than 2 inches (50 mm), based on the height of the uppercase letter “I”.
 - c. Stroke thickness of the uppercase letter “I” shall be 15 percent maximum of the height of the character.
9. Pictorial Symbol Signs (Pictograms):
 - a. Pictograms shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.
 - b. Pictogram shall be accompanied by the equivalent verbal description placed directly below the pictogram. Text descriptors shall comply with Sections 11B-703.2, 11B-703.3, and 11B-703.4.
 - c. Pictograms and their field shall have a non-glare finish. Pictograms shall contract with their field with either a light pictogram on a dark field or a dark pictogram on a light field.
10. Mounting Location and Height:
 - a. Where permanent identification is provided for rooms and spaces, signs shall be installed on the wall adjacent to the latch side of the door. Where provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where provided at double doors with two active leaves, the sign shall be located to the right of the right hand door.
 - b. If there is no wall space at the latch side of a single door or at the right side of a double door, signs shall be placed on the nearest adjacent wall, preferably on the right.
 - c. Signs containing tactile characters shall be located so that a clear

floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

- d. Signs containing tactile characters shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest line of Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

11. Symbols of Accessibility: Facilities and elements required to be identified as accessible shall use the international symbols of accessibility. The symbols shall be displayed as shown in architectural drawings and in Section 11B-703.7 of the 2022 CBC.

C. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

D. Design Criteria: The drawings indicate sizes, profiles, and dimensional requirements of signs. Other signs with deviations from indicated dimensions and profiles may be considered, provided deviations do not change the design concept. The burden of proof of equality is on the proposer.

E. Field Inspection: Tactile signage must be field inspected after installation, per CBC 11B-703.1.1.2.

1.6 WARRANTY

A. Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Deterioration of finishes beyond normal weathering.
- b. Deterioration of embedded graphic image.
- c. Separations or delamination of sheet materials and components.

2. Warranty Period: One (1) year from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Manufacturers of Signs:

- a. Architectural Graphics Inc.
- b. ASI Sign Systems, Inc.
- c. Gemini, Inc.

2.2 MATERIALS

- A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested in accordance with ASTM D 790, a minimum allowable continuous service temperature of 176°F (80°C), and of the following general types:
1. Transparent Sheet: Where sheet material is indicated as "clear" provide colorless sheet in matte finish, with light transmittance of 92 percent, when tested in accordance with the requirements of ASTM D1003.
 2. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes indicated.
- B. Aluminum Extrusions: Provide aluminum extrusions of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B221 for 6063-T5.
- C. Fasteners: Use concealed fasteners fabricated from metals that are non-corrosive to either the sign material or the mounting surface.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, which are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are non-fading for the application intended.

2.3 PANEL SIGNS

- A. Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
- B. Sign Perimeter: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
1. Edge Condition: Square cut, eased edge, per CBC 11B-703.7.2.6.4.
 2. Corner Condition: Square corners, eased edge, per CBC 11B-703.7.2.6.4.
- C. Laminated Sign Panels: Permanently laminate face panels to backing sheets of material and thickness indicated using the manufacturer's standard process.
1. Subsurface Copy: Apply copy to the back face of clear acrylic sheet forming the panel face by process indicated to produce precisely formed opaque

images, free from rough edges.

- a. Use reverse silk-screen process to print copy; overspray the copy with an opaque background color coating.
 - b. Panel Material: Matte-finished clear acrylic with opaque color coating subsurface applied.
- D. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
- E. Any sign required to be mounted on a glass surface is to be provided with opaque backing to match sign color.
- F. Sign Sizes:
1. Standard Room Identification Signs: 5" x 8" or as chosen by Architect and Owner to match existing look of campus signs.
 2. Standard Tactile Exit Signs: 6" x 6" or as chosen by Architect and Owner to match existing look of campus signs.
 3. Standard Toilet Room Identification Signs: 10" x 10" or as chosen by Architect and Owner to match existing look of campus signs.
 4. Standard Toilet Room Door Signs: Refer to Toilet Room Sign section below.
 5. Maximum Occupancy Signs: 14" x 8" or as designated by Architect. Signs to read "Maximum Occupancy Load XXX", where XXX equals number of occupants allowed.
 6. ISA Signage: Provide minimum 6" square decals with international handicapped (ISA) symbol white on blue background with white border, applied at accessible entry doors of existing buildings only required where all entry doors to building are not accessible.

2.4 TOILET ROOM SIGNS

- A. Toilet Room Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
- B. Sign Perimeter: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
1. Edge Condition: Square cut, eased edge, per CBC 11B-703.7.2.6.4.
 2. Corner Condition: Square corners, eased edge, per CBC 11B-703.7.2.6.4.

- C. Laminated Sign Panels: Permanently laminate face panels to backing sheets of material and thickness indicated using the manufacturer's standard process.
1. Subsurface Copy: Apply copy to the back face of clear acrylic sheet forming the panel face by process indicated to produce precisely formed opaque images, free from rough edges.
 - a. Use reverse silk-screen process to print copy; overspray the copy with an opaque background color coating.
 - b. Panel Material: Matte-finished clear acrylic with opaque color coating subsurface applied.
- D. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
- E. Toilet Room Signs – Shapes and Sizes:
1. Toilet Room Wall Identification Signs: See Panel signs section.
 2. Geometric (Door) Symbols: Per DSA BU 17-01: Health and Safety Code Section 118600 requires: (a) All single-user toilet facilities in any business establishment, place of public accommodation, or state or local government agency shall be identified as all-gender toilet facilities by signage that complies with Title 24 of the California Code of Regulations, and designated for use by no more than one occupant at a time or for family or assisted use. For the purposes of this section, "single-user toilet facility" means a toilet facility with no more than one water closet and one urinal with a locking mechanism controlled by the user.
 - a. Men: An equilateral triangle, 1/4 inch (6.4 mm) thick with edges 12 inches (305 mm) long and a vertex pointing upward, shall be located at entrances to men's toilet and bathing facilities. The triangle symbol shall contrast with the door, either light on a dark background or dark on a light background.
 - b. Women: A circle, 1/4 inch (6.4 mm) thick and 12 inches (305 mm) in diameter, shall be located at entrances to women's toilet and bathing facilities. The circle symbol shall contrast with the door, either light on a dark background or dark on a light background.
 - c. Unisex: A circle, 1/4 inch (6.4 mm) thick and 12 inches (305 mm) in diameter with a 1/4 inch (6.4 mm) thick triangle with a vertex pointing upward, superimposed on and geometrically inscribed within the circle and within the 12-inch (305 mm) diameter, shall be provided at entrances to unisex toilet and bathing facilities. The vertices of the triangle shall be located 1/4 inch (6.4 mm) maximum from the edge of the circle. The triangle symbol shall contrast with the circle symbol, either light on a dark background or dark on a light background. The circle symbol shall contrast with the door, either light on a dark background or dark on a light background.

2.5 DIMENSIONAL LETTERS AND NUMBERS

- A. Cast Letters and Numbers: Form individual letters and numbers by casting. Produce characters with smooth, flat faces, sharp corners, and precisely formed lines and profiles, free from pits, scale, sand holes, or other defects. Cast lugs into the back of characters and tap to receive threaded mounting studs. Comply with requirements indicated for finish, style, and size.
1. Aluminum, 1" thick, height and quantity as shown on plans.

2.6 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.
- B. Colors: As selected by the Owner and Architect from the manufacturer's standard colors, to match existing signs on campus.
- C. Aluminum Finishes: Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
1. Class II Clear Anodized Fine Satin Finish: AA-M31C21A31 (Mechanical Finish: Fine satin directional textured; Chemical Finish: Fine matte etched finish; Anodic Coating: Class II Architectural, clear film thicker than 0.4 mil).
 2. Baked Enamel Finish: AA-M4xC12C42R1x (Mechanical Finish: Manufacturer's standard, other nondirectional textured; Chemical Finish: Chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.
 3. Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with a minimum dry film thickness of 1.5 mils, medium gloss.
 4. Color: As selected by the Architect from the manufacturer's standard colors.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Locate sign units and accessories where shown or scheduled, using mounting methods of the type described and in compliance with the manufacturer's instructions. Install sign units level, plumb and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Mounting, Location and Heights:
1. Where permanent identification is provided for room and spaces, signs shall be installed on the wall adjacent to the latch side of the door.

2. Where there is no wall space to the latch side of the door, including at double doors, signs shall be placed on the nearest adjacent wall, preferably on the right. Where provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where provided at double doors with two active leaves, the sign shall be located to the right of the right hand door.
 3. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
 4. Signs containing tactile characters shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest line of Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.
 5. Mounting location for such signage shall be so that a person may approach within 3 inches (76 mm) of signage without encountering protruding objects or standing within the swing of a door.
 6. Geometric Symbol Toilet Room Signage: Geometric symbols at entrances to toilet and bathing rooms shall be mounted at 58 inches (1473 mm) minimum and 60 inches (1524 mm) maximum above the finish floor or ground surface measured from the centerline of the symbol. Where a door is provided the symbol shall be mounted within 1 inch (25 mm) of the vertical centerline of the door.
- C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below. Panel signs shall be secured to the substrate at all four (4) corners, at four (4) locations on square, rectangular, and circular signs (top, bottom, left, right).
1. Screw Mounted Units: Mount panel signs using standard screw/anchors fastening methods recommended by the manufacturer for the sign, type of mounting, wall construction and condition of exposure indicated. Do not use tape or adhesive mounting methods.
 2. Glass Surface Mounted Units: Any sign required to be mounted on a glass surface is to be provided with opaque backing to match sign color. Attach sign to glass surface as recommended by manufacturer, and as approved by Architect.
- B. Dimensional Metal Letters and Numbers: Mount letters and numbers using standard fastening methods recommended by the manufacturer for the letter form, type of mounting, wall construction and condition of exposure indicated. Provide heavy paper template to establish letter spacing and to locate holes for fasteners.
1. Flush Mounting: Mount letters with backs in contact with the wall surface.

3.2 CLEANING AND PROTECTION

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the

Owner.

3.3 SIGNAGE SCHEDULE

- A. Provide Helvetica medium style, upper and lower case, for all copy. Verify copy in writing before beginning fabrication.
- B. See Door Schedule and Architectural Drawings for sign locations and types.
- C. Sign verbiage (text) will be determined by Owner and Architect via the submittal process during construction.

3.4 SIGNAGE

- A. Refer to Architectural Drawings for sign types and locations.

END OF SECTION.

SECTION 10 21 13 – SOLID PLASTIC TOILET COMPARTMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes: Solid plastic toilet compartments, homogenous color.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.
- B. Section 09 30 00 – Tiling and Grout.
- C. Section 09 67 23 – Resinous Flooring.
- D. Section 10 28 13 – Toilet and Bath Accessories.

1.4 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 2. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- B. 2022 California Building Code with Amendments.

1.5 SYSTEM DESCRIPTION

- A. Toilet Partitions: Floor mounted, overhead braced.
- B. All Toilet Compartment doors and door hardware must comply with CBC 11B-604.8.1.2

1.6 SUBMITTALS

- A. Submittals for Review:
 - 1. Shop Drawings: Include dimensioned layout, elevations, trim, closures, and accessories.
 - 2. Product Data: Manufacturer's descriptive data for panels, hardware, and accessories.
 - 3. Samples: 3 x 3 inch samples showing available colors.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 years' experience in manufacture of solid plastic toilet compartments with products in satisfactory use under similar service conditions.
- B. Installer Qualifications: Minimum 5 years' experience in work of this Section.
- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- D. Coordination: Furnish inserts and anchorages which must be built into other work for installation of shower and toilet partitions and related work; coordinate delivery with other work to avoid delay.

1.8 WARRANTIES

- A. Provide manufacturer's 25-year warranty against breakage, corrosion, and delamination under normal conditions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Scranton Products
 - 2. Columbia Partitions

2.2 MATERIALS

- A. Doors, Panels and Pilasters:
 - 1. High density polyethylene (HDPE), fabricated from polymer resins compounded under high pressure, forming single thickness panel, with homogenous color throughout. Class C flame spread rating.
 - 2. Waterproof and nonabsorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
 - 3. 1" thick with edges rounded to 1/4" radius.
 - 4. Color and Texture: To be selected from manufacturer's full color and texture range.
- B. Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.
- C. Stainless Steel: ASTM A167, Type 304.

- D. Openings: Unless otherwise indicated:
1. 24" wide (clear opening) for ordinary toilet stalls
 2. 34" wide (clear opening) for end opening accessible stalls.
 3. 34" wide (clear opening) for side opening accessible stalls.

2.3 HARDWARE

- A. Hinges:
1. 8 inches long, fabricated from heavy-duty extruded aluminum with bright dip anodized finish, wrap-around flanges, adjustable on 30-degree increments, through bolted to doors and pilasters with stainless steel, Torx head sex bolts.
 2. Self-closing at accessible stall.
 3. Hinges operate on field-adjustable nylon cams; field adjustable in 30 degree increments.
- B. Door Strike and Keeper:
1. 6 inches long, fabricate from heavy-duty extruded aluminum with bright dip anodized finish, with wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
 2. Bumper: Extruded black vinyl.
- C. Lock/Latch and Housing:
1. Heavy-duty extruded aluminum.
 2. Lock/Latch housing: Bright dip anodized finish.
 3. Slide bolt and button: Black anodized finish. Slide bolt to not require grasping for use.
- D. Coat Hook/Bumper:
1. Combination type, chrome plated Zamak.
 2. Equip outswing accessible stall doors with second door pull and door stop.
 3. At accessible stalls, install at 48" A.F.F.
- E. Door Pulls: Chrome plated Zamak.
1. At accessible stall, loop or "U" shaped hardware not requiring grasping on each side of door at +34"-44" A.F.F.

2.4 COMPONENTS

- A. Doors and Dividing Panels: 55 inches high, mounted 14 inches above finished floor, with aluminum heat-sinc fastened to bottom edges.
- B. Pilasters: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt.
- C. Pilaster Sleeves: 3 inches high, 20 gage stainless steel, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.
- D. Wall Brackets: 54 inches long, heavy-duty aluminum, bright dip anodized finish, fastened to pilasters and panels with stainless steel tamper resistant Torx head sex bolts.
- E. Headrail: Heavy-duty extruded aluminum, anti-grip design, clear anodized finish, fastened to headrail bracket with stainless steel tamper resistant Torx head sex bolt and at top of pilaster with stainless steel tamper resistant Torx head screws.
- F. Headrail Brackets: 20 gage stainless steel, satin finish, secured to wall with stainless steel tamper resistant Torx head screws.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install compartments in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Install rigid, straight, plumb, and level.
- C. Locate bottom edge of doors and panels 14 inches above finished floor.
- D. Provide uniform, maximum 3/8" vertical clearance at doors.
- E. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints.
- F. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel.
- G. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall.
- H. Overhead-Braced Partitions:
 - 1. Secure pilasters to floor and level, plumb, and tighten installation with devices furnished.
 - 2. Secure overhead-brace to each pilaster with not less than two fasteners.
 - 3. Hang doors and adjust so that tops of doors are parallel with overhead-brace when doors are in closed position.

- I. Not Acceptable: Evidence of cutting, drilling, or patching.

3.2 ADJUSTING

- A. Adjust doors and latches to operate correctly.
- B. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.
- C. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION.

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SECTION 10 28 13 – TOILET AND BATH ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Automatic Hand Dryers
 - 2. Paper Towel Dispensers
 - 3. Soap Dispensers
 - 4. Sanitary napkin disposal units
 - 5. Sanitary napkin vendors
 - 6. Toilet tissue dispensers
 - 7. Toilet seat cover dispensers
 - 8. Mirrors
 - 9. Grab bars

1.3 RELATED REQUIREMENTS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 09 29 00 – Gypsum Board Assemblies.
- C. Section 09 30 00 – Tiling and Grout.
- D. Section 10 21 13 – Solid Plastic Toilet Compartments.
- E. Section 11 40 00 – Food Service Equipment
- F. Division 22 – Plumbing.
- G. Division 26 – Electrical.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets for each product specified, including the following:
 - 1. Installation instructions and recommendations.

2. Storage and handling requirements and recommendations.
 3. Cleaning and maintenance instructions.
 4. Replacement parts information.
- B. Schedule: Submit a toilet accessory schedule, indicating the type and quantity to be installed in each washroom. Use room numbers as indicated on the Drawings.
- C. Setting Drawings: Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide products manufactured by a company with a minimum of 10 years' successful experience manufacturing similar products.
- B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- C. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- D. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to 2022 CBC, ADA, and ICC/ANSI A117.1 requirements, as applicable.

1.6 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.8 WARRANTY

- A. Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard 1-year warranty for materials and workmanship.
- B. Manufacturer's Warranty for Electric Hand Dryers: Manufacturer's standard 10-year warranty on parts, except 3-year warranty on motor brushes from date of purchase.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the work include, but are not limited to, the following:
1. Alpine Industries, Inc.
 2. Bobrick Washroom Equipment, Inc.

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gage (.034") minimum, unless otherwise indicated.
- B. Brass: Leaded and unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16; Castings, ASTM B30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 20-gage (.040-inch) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.
- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- G. Keys: Unless otherwise indicated, provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six (6) keys to Owner's representative and obtain receipt.

2.3 AUTOMATIC HAND DRYERS

- A. Surface Mounted Automatic Hand Dryer:
1. Product: Alpine Industries, Willow Hand Dryer model 405-10-SSB.
 2. Material: Type 304 stainless steel.
 3. Size: 12.63" H x 11.25" W x 3.93" D. Surface Mounted (ADA Compliant). Unit does not project more than 4 inches (100mm) from wall. Mount dryers at heights indicated on drawings.
 4. Electrical Requirements: 110V / 60Hz / 11-12.5 Amps, 300-1400 Watts.
 5. Refer to Electrical drawings and specifications.

2.4 PAPER TOWEL DISPENSERS

A. Surface-Mounted Paper Towel Dispensers:

1. Basis of Design: Bobrick Classic Series Model B-2620.
 - a. Latching: Knob latch.
 - b. Capacity: 400 C-fold or 525 multifold towels 3-1/8 inches to 3-13/16 inches (79mm to 97mm) deep.
2. Door: 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin finish.
3. Cabinet: All-welded, 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin finish on exposed surfaces.
4. Cabinet Back: Formed to recess mounting slots to prevent mounting screw heads from snagging towels.
5. Hinge: Full-length stainless steel piano-hinge.
6. Towel Dispensing: Hemmed towel tray opening dispenses towels without tearing.
7. Filling: Door swings down for loading towels into cabinet.
8. Refill Indication: Two slots on each side of cabinet indicate refill time.

2.5 SOAP DISPENSERS

A. Surface-Mounted Soap Dispensers:

1. Basis of Design: Bobrick Classic Series Model B-40.
 - a. Styling: Black and grey styling.
2. Compliance: Valve is operable with one hand, without tight grasping, pinching or twisting of the wrist and with less than 5 pounds of force (22.2 N) to comply with barrier-free accessibility guidelines, including 2022 CBC, ADA, and ANSI.
3. Wall Bracket: Grey, high-impact-resistant ABS Plastic; equipped with a concealed locking device to secure the lid and a removable plastic key to disengage locking device.
4. Valve: Corrosion-resistance, grey, high-impact-resistant ABS push button and spout; soap head-holding capsule valve, stainless steel spring, U-packing seal, and duckbill. Valve dispenses commercially marketed all-purpose hand soaps.
5. Container: Black, translucent ABS plastic.

6. Lid: Grey, high-impact-resistant ABS plastic.
7. Filling: Plastic key provided or pointed object unlocks concealed locking device.
8. Refill Indication: Translucent container provides visible soap level.
9. Capacity: 40 fl oz (1.2 L).

2.6 SANITARY NAPKIN/TAMPON VENDORS

A. Surface-Mounted Sanitary Napkin/Tampon Vendors:

1. Basis of Design: Bobrick Classic Series Model B-2706.
2. Compliance: Push buttons operable with one hand and less than 5 pounds of force (22.2 N) without tight grasping, pinching, or twisting of the wrist to comply with barrier-free accessibility guidelines including 2022 CBC, ADA, and ANSI. Compliance certificate available upon request.
3. Description: Two dispensing mechanisms in one cabinet to provide either sanitary napkins or tampons.
 - a. No coins required for use.
4. Cabinet: All-welded, 18-8, Type 304, 18 gauge (1.2mm) stainless steel.
5. Door: 18-8, Type 304, 18 gauge (1.2mm) stainless steel with satin finish, with three 90 degree return edges, hemmed bottom edge; equipped with two tumbler locks keyed like other washroom accessories.
6. Hinge: Concealed full-length stainless steel piano-hinge.
7. Coin Mechanisms: Impact-resistant PC-ABS push buttons; coin slots automatically blocked with red indicator when supply is depleted.
8. Coin Box: Equipped with tumbler lock that opens with different key than door locks.
9. Coin Return Push-Buttons: Impact-resistant PC-ABS push-button cancels selection and returns coin into product tray.
10. Product Tray: Impact-resistant PC-ABS. Tray extends width of vendor, has sloped surface which delivers dispensed product to front of extended tray for convenient access.
11. Graphic Symbols: Identify products dispensed and coin denomination, no brand-name advertising for products dispensed.
12. Vendor Capacity: 20 sanitary napkins and 30 tampons.

2.7 SANITARY NAPKIN DISPOSAL UNITS

A. Surface-Mounted Sanitary Napkin Disposal Units:

1. Basis of Design: Bobrick Contura Series Model B-270.
2. Container: All-welded, 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin finish on exposed surfaces. Front of container shall have same degree of arc, radius on corners and edges as other Bobrick Contura Series washroom accessories.
3. Cover: Drawn, one-piece, seamless, 18-8, Type 304, 22 gauge (0.8mm) stainless steel with satin finish construction. Front of cover has same degree of arc, radius on corners and edges as other Bobrick Contura Series washroom accessories.
4. Hinge: Full-length stainless steel piano-hinge.

2.8 TOILET TISSUE DISPENSERS

A. Semi-Recessed Multi-Roll Toilet Tissue Dispensers:

1. Basis of Design: Bobrick Model B-3888.
 - a. Finish: Bright polished finish.
 - b. Spindle: Chrome-plated plastic with heavy-duty internal spring.
2. Flanges and Support Arms: 18-8, Type 304, 22 gauge (0.8mm) stainless steel. Drawn, one-piece seamless construction. Radius on corners and return edges complement corners and edges of door. Secured to cabinet with two rivets.
3. Spindle: Chrome-plated plastic; equipped with heavy-duty internal spring.
4. Capacity: Accommodates two standard toilet tissue roll up to 5-1/8 inch (130mm) diameter (1500 sheets).

B. Surface-Mounted Multi-Roll Toilet Tissue Dispensers:

1. Basis of Design: Bobrick Model B-2888.
 - a. Finish: Bright polished finish.
 - b. Spindle: Chrome-plated plastic with heavy-duty internal spring.
2. Flanges and Support Arms: 18-8, Type 304, 22 gauge (0.8mm) stainless steel. Concealed, 16 gauge (1.6mm) stainless steel mounting bracket welded inside each flange; secured to wall plates with stainless steel setscrews.
3. Concealed Wall Plate: 18-8, Type 304, 16 gauge (1.6mm) stainless steel.
4. Spindle: Chrome-plated plastic; equipped with heavy-duty internal spring.

5. Capacity: Accommodates two standard toilet tissue roll up to 5-1/8 inch (130mm) diameter (1500 sheets).

2.9 TOILET SEAT COVER DISPENSER

A. Surface-Mounted Seat-Cover Dispenser:

1. Product: Bobrick Model B-221
2. Material: 18-8, Type 304, 22 gauge stainless steel. Satin finish.

2.10 MIRRORS

A. Frameless, Stainless Steel Mirrors:

1. Product: Bobrick Model B-290 2436.
2. Materials: 18-8, heavy-gauge stainless steel, 3/4" x 3/4" angle with satin finish, with galvanized steel back.
3. Mounting: Four countersunk sheet metal screws included with unit.

2.11 GRAB BARS

A. Stainless Steel Grab Bars: With snap flange covers.

1. Product: Bobrick Models B-6806 x 36" L x 1-1/2" OD, and B-6806 x 48" x 1-1/2" OD.
2. Compliance: Barrier-free accessibility guidelines, including ADA and ANSI for structural strength. Designed to support 900 lbs in compliant installations.
3. Materials: 18-8, Type 304, 18 gauge stainless steel tubing with satin finish with peened grip.
4. Accessories: Provide concealed mounting flanges, snap flange covers, and any other required mounting accessories.

PART 3 – EXECUTION

3.1 INSTALLATION

- #### A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
1. Verify blocking has been installed properly.
 2. Verify location does not interfere with door swings or use of fixtures.
 3. Comply with manufacturer's recommendations for backing and proper support.
 4. Use fasteners and anchors suitable for substrate and project conditions

5. Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
6. Conceal evidence of drilling, cutting, and fitting to room finish.
7. Test for proper operation.

3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- B. Touch-up, repair or replace damaged products until Substantial Completion.

3.3 SCHEDULES

- A. For schedules, see plans.

END OF SECTION.

SECTION 10 28 23 – JANITORIAL ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Janitorial Accessories:
 - 1. Utility Shelf with Mop and Broom Holders and Rag Hooks
 - 2. Wall Mounted Chemical Dispensing Cabinet.

1.3 RELATED REQUIREMENTS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 09 29 00 – Gypsum Board Assemblies.
- C. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels.
- D. Division 22 – Plumbing, for floor sink and connection to water.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets for each product specified, including the following:
 - 1. Installation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Cleaning and maintenance instructions.
 - 4. Replacement parts information.
- B. Schedule: Submit a schedule, indicating the type and quantity to be installed in each janitor room. Use room numbers as indicated on the Drawings.
- C. Setting Drawings: Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Provide products manufactured by a company with a minimum of 10 years' successful experience manufacturing similar products.
- B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.
- C. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in

concrete or built into masonry; coordinate delivery with other work to avoid delay.

- D. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to 2022 CBC, ADA, and ICC/ANSI A117.1 requirements, as applicable.

1.6 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard 1-year warranty for materials and workmanship.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories which may be incorporated in the work include, but are not limited to, the following:
 1. American Specialties, Inc.
 2. Bobrick Washroom Equipment, Inc.
 3. Bradley Corporation
 4. Pioneer Eclipse

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gage (.034") minimum, unless otherwise indicated.
- B. Brass: Leaded and unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16; Castings, ASTM B30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gage (.040-inch) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.

- F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
- B. Keys: Unless otherwise indicated, provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six (6) keys to Owner's representative and obtain receipt.

2.3 CUSTODIAL/JANITORIAL ACCESSORIES

A. Utility Shelf with Mop and Broom Holders and Rag Hooks:

1. Basis of Design: Bobrick Model B-224x36 with 4 mop/broom holders and 3 rag hooks.
2. Shelf: 18-8, Type 304, 18 gauge (1.2mm) stainless steel with satin finish; 8 inches (203mm) deep, 1-1/2 inch (38mm) return edge.
3. Length: 36 inches (915mm).
4. Mounting Brackets: Welded to shelf, 18-8, Type 304, 18 gauge (1.2mm) stainless steel with satin finish.
5. Mop and Broom Holders: Replaceable, spring-loaded rubber cams with anti-slip coating; accommodates handles from 7/8 inch to 1-1/4 inch (20mm to 30mm) in diameter; with plated steel retainers.
6. Rag Hooks: 18-8, Type 304, 16 gauge (1.6mm) stainless steel with satin finish; secured to shelf with rivets.
7. Drying Rod: 18-8, Type 304, 1/4 inch (6mm) diameter stainless steel with satin finish.

B. Wall Mounted Chemical Dispensing System:

1. Basis of Design: Pioneer Eclipse, AquapHyll Wall Mounted Chemical Dispensing System, or equal. Product to be approved by District and School staff. Each cabinet holds two (2) 2-Liter chemical bottles.
2. Product Information: Modular design, to be arranged as determined by District and School staff.
3. Dispensers: 4 Low Flow & 4 High Flow dispensers.
4. Cabinets: Provide cabinets for 4 chemicals.
5. Mounting: To be mounted on dispenser mounting rail, as provided by manufacturer.
6. Plumbing: Contractor responsible for coordinating water inlet connection to dispensing system.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install products in strict compliance with manufacturer’s written instructions and recommendations, including the following:
 - 1. Verify blocking has been installed properly.
 - 2. Verify location does not interfere with door swings or use of fixtures.
 - 3. Comply with manufacturer’s recommendations for backing and proper support.
 - 4. Use fasteners and anchors suitable for substrate and project conditions
 - 5. Install units rigid, straight, plumb, and level, in accordance with manufacturer’s installation instructions and approved shop drawings.
 - 6. Conceal evidence of drilling, cutting, and fitting to room finish.
 - 7. Test for proper operation.

3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.
- B. Touch-up, repair or replace damaged products until Substantial Completion.

3.3 SCHEDULES

- A. For schedules, see plans.

END OF SECTION.

SECTION 10 44 00 – FIRE PROTECTION SPECIALTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. Section Includes: Fire Extinguishers, Fire Extinguisher Cabinets, and Mounting Brackets.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board.
- B. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels

1.4 REFERENCES

- A. ASTM International (ASTM): ASTM E814 – Standard Test Method for Fire Tests of Penetration Firestop Systems.
- B. 2022 California Building Code with Amendments.
- C. Intertek Testing Services/Warnock-Hersey International (ITS/WHI)
- D. National Fire Protection Association (NFPA): NFPA 10, current edition, Standard for Portable Fire Extinguishers: For criteria covering installations for Class A, B, C, D, and K hazards as well as the selection, inspection, maintenance, recharging, and testing of portable fire extinguishing equipment.
- E. Underwriters Laboratories, Inc. (UL).

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Product Data:
 - 1. Extinguishers: Materials description for fire extinguishers; include ratings and classifications.
 - 2. Installation instructions for each product specified.
- C. Shop Drawings:
 - 1. Small-scale plans showing locations of fire extinguisher cabinets and individual fire extinguishers.
 - 2. Schedules showing each type of cabinet and extinguisher to ensure proper fit

and function.

3. Indicate installation procedures and accessories required for a complete installation.
4. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. Comply with standards referenced in Item 1.4.
- B. Provide fire extinguishers, produced by a single manufacturer.
- C. Provide fire extinguishers of type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle fire protection specialties and related materials using means and methods that will prevent damage, deterioration, or loss.
 1. Deliver components in manufacturer's original packaging, properly labeled for identification.

1.8 SPECIAL WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire protection specialties that fail in materials or workmanship within specified warranty period.
 1. Fire Extinguishers: Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 FIRE PROTECTION SPECIALTIES MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 1. JL Industries, Inc.
 2. Larsen's Manufacturing Company
 3. Potter Roemer
 4. Amerex

2.2 FIRE EXTINGUISHERS

- A. Pressurized Water Type: Extinguisher unit containing water and compressed air; nontoxic.
1. Construction: Butt-welded 304-L stainless steel cylinder with stainless steel discharge lever and fixed carry handle, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin, and UL-labeled chemical engine hose.
 2. Effectiveness (Rating): Class A fires.
 3. Model Identification and UL Rating: Grenadier P; 2A.
- B. Multi-Purpose Chemical Type: Extinguisher unit containing a fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic.
1. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin and upright squeeze grip.
 2. Finish: Factory powder-coated; Red.
 3. Effectiveness (Rating): Class A, B, and C fires.
 4. Model Identification and UL Rating: Cosmic 10E; 4A-80BC.
- C. Class K Wet Chemical Type: Extinguisher unit containing a low "pH" potassium acetate solution.
1. Construction: Stainless steel cylinder with protective nozzle tip orifice seal and nonmetallic nozzle tip finger guard, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin, and upright squeeze grip.
 2. Effectiveness (Rating): Class K fires.
 3. Model Identification and UL Rating: Saturn 15; Class K.
- D. Accessories:
1. Mounting Brackets: Provide manufacturer's steel bracket with powder coat paint finish in manufacturer's standard color, and additional straps designed to secure fire extinguisher to wall or structure and prevent accidental dislodgement, of sizes required for types and capacities of fire extinguishers indicated.
 2. Provide brackets for extinguishers not located in cabinets.
 3. Brackets shall not be mounted in accessible paths of travel, per the drawing locations.
 4. Signage: Identify bracket-mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style, and location as selected by Architect.

2.3 FIRE EXTINGUISHER CABINETS

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter door frames.
 - 1. Cabinet Style – Semi-recessed: Cabinet box (tub) partially recessed in walls of shallow depth. Max. 4" horizontal extension from face of wall.
 - 2. Components:
 - a. Tub: Cold-rolled 16-gage steel.
 - b. Finish: Factory-applied powder coat paint finish.
 - 3. Trim Style and Depth:
 - a. Semi-Recessed and Surface-Mounted Cabinets: Square edge.
 - b. Trim Dimensions: 1-3/4 inch (44.45 mm) face trim on frame and 1-1/4 inch (31.75 mm) face trim on door.
 - 4. Door Style: Style F: Full glazing with ADA flush pull handle.
 - 5. Glazing: Standard Glazing: Tempered glass.
 - 6. Cabinet Lettering:
 - a. Text: FIRE EXTINGUISHER.
 - b. Location: On glass door.

2.4 SOURCE QUALITY CONTROL

- A. Ship extinguishers to the Project site fully charged, EXCEPT those which contain water as an extinguishing agent, if any.
- B. Obtain Fire Extinguishers and Fire Extinguisher Brackets from same manufacturer to ensure compatibility.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed, and blocking where surface mounted cabinets will be installed.
 - 1. Notify the Contractor in writing of conditions detrimental to proper and timely completion of the installation.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cabinets in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
 1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
 2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.
 3. Maintain fire ratings where cabinets are recessed into fire-rated wall systems.
- B. Wall Signs:
 1. Location: Where shown or directed.
 2. Apply on walls after field painting is completed and has been accepted.

3.3 FIELD QUALITY CONTROL

- A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

END OF SECTION.

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SECTION 10 51 13 – LOCKERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SCOPE

- A. Description: Furnish and install factory-assembled Heavy-Duty MIG-Welded Metal Lockers, complete, as shown and specified per contract documents.
- B. Concrete base for lockers is specified in Division 3.

1.3 RELATED WORK

- A. Section 03 30 00 – Cast in Place Concrete
- B. Section 06 10 00 – Rough Carpentry.
- C. Section 09 22 16 – Gypsum Board Assemblies.
- D. Section 09 67 23 – Resinous Flooring.
- E. Section 10 51 50 – Locker Room Benches.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit dimensioned drawings showing locker types, sizes, quantities and proposed numbering, including all necessary details relating to anchoring, trim installation and relationship to adjacent surfaces.
- D. Numbering: The locker numbering sequence shall be provided by the approving authority and noted on approved drawings returned to the locker contractor.
- E. Initial Selection Samples: Provide color charts showing manufacturer's available colors. Owner and Architect will select up to five (5) colors which physical color samples will be requested.
- F. Verification Samples: For each finish product specified, two samples, minimum size 3 inches square, representing actual product, color, and patterns, from which the final

color will be selected.

1.5 QUALITY ASSURANCE

- A. Uniformity: Provide each type of metal locker as produced by a single manufacturer, including necessary accessories, fittings and fasteners.
- B. Job Conditions: Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage and installation.

1.6 PRODUCT HANDLING

- A. General: All work shall be fabricated in ample time as to not delay construction process.
- B. Delivery: All materials shall be delivered to the site at such a time as required for proper coordination of the work. Materials are to be received in the manufacturer's original, unopened packages and shall bear the manufacturer's label.
- C. Storage: Store all materials in a dry and well-ventilated place adequately protected from the elements.

1.7 GUARANTEE

- A. Lifetime Warranty: Submit upon completion of the work, in the form prescribed under Division 0, Guarantees / Warranties, covering all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction and vandalism under this section for the lifetime of the facility.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. List Industries, Inc.
 - 2. Penco Products, Inc.
 - 3. Republic Storage Systems, Inc.
 - 4. Lyon LLC.

2.2 FULLY WELDED METAL LOCKERS

- A. Double Tier Lockers: Equal to Superior Marquis Champion All-Welded Athletic Lockers, manufactured by List Industries, Inc.
1. Size: 15"W x 22"D x 36" lockers.
 2. Style: Double Tier.
 3. Quantity / Layout / Locations: As shown on plans.
 4. Each double tier locker shall include one shelf, one (1) double prong ceiling hook, and two (2) single prong wall hooks.
- B. Double Tier Accessible Lockers: Equal to Superior Marquis Champion All-Welded Athletic Lockers, manufactured by List Industries, Inc.
1. Size: 15"W x 22"D x 36" lockers.
 2. Style: Double Tier.
 3. Quantity / Layout / Locations: As shown on plans.
 4. Each double tier accessible locker shall include one (1) lower shelf no lower than 15" above finished floor, one (1) double prong ceiling hook, two (2) single prong wall hooks, and shall have a decal with the international symbol of accessibility on the exterior of the locker.
- C. Materials:
1. General: All major steel parts shall be made of mild cold rolled steel, free from imperfections and capable of taking a high grade enamel or powder coat finish.
 2. Fasteners: Cadmium, zinc or nickel plated steel; bolt heads, slotless type; self locking nuts or lock washers.
 3. Hardware: Hooks and hang rods of cadmium plated or zinc plated steel or cast aluminum.
 4. Handle: Seamless drawn 304 stainless steel recessed handle.
 5. Number Plates: Each locker shall have a polished aluminum number plate with black numerals not less than 3/8" high. Plates shall be attached with two (2) rivets to the lower surface within the recessed handle pocket or to the top face of the locker door for high visibility, as specified by the Architect.
- D. Construction: All lockers shall be factory-assembled, of all MIG welded construction, in multiple column units to meet job conditions. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable. Grind exposed welds and metal edges flush and make safe to touch.

1. Frame / Vertical Side Panels: Shall be of 13 gauge 1/2" flattened expanded metal framed by 16 gauge Hollow "T" tubular sections and channel frame members designed to enclose all four edges of the side panel with the entire assembly MIG welded to form a rigid frame for each locker. The channel frame members are welded to the front and rear vertical frame members to create an anchor bearing surface of 1-1/4" W x the depth of the locker at each side panel. Note: Diamond perforated sheet steel or 3/4" expanded metal will NOT be accepted.
2. Integral Frame Locker Base: 14 gauge galvanized formed structural channels are MIG welded to the front and rear vertical side panel frame members to allow placement of locker bottom a minimum 2-3/4" above floor level. Locker bottom shelf located less than 2" above floor level will not be acceptable.
3. Tops: Both items below are required:
 - a. Flat Tops: Shall be formed of one piece of 16 gauge cold rolled sheet steel and shall be an integral part MIG welded to each vertical side panel frame member and be continuous to cover the full width of a multiple framed locker unit.
 - b. Continuous Slope Tops: Not less than 18 gauge sheet steel approximately 18 degrees pitch, in lengths as long as practical but not less than four lockers. To be installed in addition to the locker flat top with end closures for support. Finished to match lockers.
4. Shelves: Shall be 16 gauge galvanized sheet steel, have double bends at front and shall engage slots in the Hollow "T" vertical frame members at all four corners and be securely welded to the frame and side. Locker bottom shelf located less than 2" above floor level will not be acceptable.
5. Backs: Shall be 18 gauge cold rolled sheet steel, be continuous to cover a multiple framed unit and be welded to each vertical side panel frame member.
6. Doors: Outer door to be fabricated from single sheet prime 14 gauge with single bends at top and bottom and double bends at the sides with a 3" W 18 gauge full height channel door stiffener MIG welded to the hinge side of the door as well as to the top and bottom door return bends and spot welded to the inside of door face to form a rigid torque-free box reinforcement for the door. Doors to be perforated with 5/8" x 1-1/2" diamonds.
7. Latching: The latching mechanism shall be single-point rigid non-moving positive latch by means of a heavy gauge (minimum 11 gauge) latch securely welded to the framed vertical divider. The latch assembly must be made of a single piece of steel and have a padlock loop that inserts through the recess pan. Locking device shall be designed for use padlocks. Latch hooks shall be 11 gauge (minimum) with riveted bumpers and shall be MIG welded to vertical frame member.
8. Handle: All locker doors shall have a seamless drawn 304 stainless steel recessed handle shaped to receive a padlock or built-in combination lock.

The recess pan shall be deep enough to have the lock be completely flush with the outer door face.

9. Door Hinges: Hinges for wardrobe and side hinged gym doors shall not be less than 3-1/2" long 13 gauge seven knuckle pin type, securely riveted to frame and welded to the door. Doors are to be secured to frame with a minimum of two tamper resistant rivets per hinge. Provide 2 hinges per door. All doors shall be right hand side hinged.
 10. Accessible Lockers: Shall meet all requirements of CBC 11B-222 and 11B-803. Provide a decal with the international symbol of accessibility to the face of each accessible locker. If accessible lockers are larger than 12", one shelf shall be placed near the bottom of each locker so that it is no lower than 15" above the finished floor.
 11. Finished End Panels: Shall be "Boxed" type formed from 16 gauge cold rolled steel with 1" O.D. double bends on sides and a single bend at top and bottom with no exposed holes or bolts. End panels must be formed with slope at top to cover the ends of the slope tops. Finished to match lockers. Provide at all exposed ends.
 12. Fillers: Provide where indicated, of not less than 16 gauge sheet steel, factory fabricated and finished to match lockers.
- E. Finish / Color: All locker parts to be cleaned and coated after fabrication with a seven stage hot-spray washing process and coated with a zirconium-based nanotechnology providing a green alternative to traditional iron phosphate followed by a coat of high grade custom blend powder electrostatically sprayed and baked at 350°F for a minimum of 20 minutes to provide a tough durable finish. Color to be selected from manufacturer's standard list of colors, minimum of twenty (20) colors.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Lockers must be installed in accordance with manufacturer's approved drawings and assembly instructions. Installation shall be level and plumb with flush surfaces and rigid attachment to anchoring surfaces.
- B. Lockers shall be set in place, plumb, level, rigid, flush and securely attached to the wall and anchored to the base according to manufacturer's specifications.
- C. Space fasteners at 36" O.C. or less as recommended by manufacturer. Use fasteners appropriate to load and anchoring substratum. Use reinforcing plates wherever fasteners could distort metal.
- D. Various trim accessories where shown, such as sloping tops, fillers, bases, recess trim, etc., shall be installed using concealed fasteners. Flush, hairline joints shall be provided at all abutting trim parts and at adjoining surfaces.
- E. Lockers will be installed to CMU walls. General Contractor is responsible to ensure proper hardware and installation requirements by the manufacturer are met.

- F. Lockers shall be installed on a 6" high concrete base. Base shall be level for proper installation.

3.2 ADJUSTMENT

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

3.3 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION.

SECTION 10 51 50 – LOCKER ROOM BENCHES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SCOPE

- A. This Section includes fixed and unfixed benches as shown on the drawings and related equipment as indicated throughout drawings.

1.3 RELATED SECTIONS

- A. Section 10 51 13 – Lockers.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit drawings showing sizes and quantities, including all necessary details relating to anchoring, installation and relationship to adjacent surfaces.
- D. Initial Selection Samples: Provide color charts showing manufacturer's available colors. Owner and Architect will select up to five (5) colors which physical color samples will be requested.
- E. Verification Samples: For each finish product specified, two samples, minimum size 3 inches square, representing actual product, color, and patterns, from which the final color will be selected.

1.5 QUALITY ASSURANCE

- A. Uniformity: Provide each type of bench as produced by a single manufacturer, including necessary accessories, fittings and fasteners.
- B. Job Conditions: Do not deliver until building is enclosed and ready for installation. Protect from damage during delivery, handling, storage and installation.

1.6 GUARANTEE

- A. Warranty: Submit upon completion of the work, in the form prescribed under Division 0, Guarantees / Warranties, covering all defects in materials and workmanship

excluding finish, damage resulting from deliberate destruction and vandalism under this section for a minimum of 25 years.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. List Industries, Inc.
2. Penco Products, Inc.
3. Republic Storage Systems, Inc.
4. Lyon LLC.

2.2 BENCHES

A. Quantity and Sizes:

1. Provide fifteen (15) unfixed (movable) 9-1/2" W x 6'-0" L x 17-1/8" H benches; eight (8) in the Home Team Room, and seven (7) in the Visitor Team Room, as shown on plans.
2. Provide two (2) fixed 20" W x 48" L x 18" H ADA benches; one (1) in each Team Room, as shown on plans.

B. Hardwood Bench Top:

C. Hardwood Bench Tops: Benches shall have clear hardwood tops. Sizes as shown above. Tops to be min 1-1/2" thick, with softly rounded edges and center braces for comfortable seating, and finished with two coats of acrylic finish. Bench tops shall have a minimum capacity of 150 lbs. per linear foot.

D. Pedestals – Unfixed Benches: Furnish two (2) 16-1/4" H aluminum trapezoid pedestals per bench. Pedestals shall be constructed out of 1/4-inch by 3-inch bar stock. Use manufacturer recommended lag bolts to secure pedestals to bench top. Provide rubber feet on all unfixed aluminum bench pedestals; two (2) rubber feet per pedestal.

E. Pedestals – ADA Fixed Benches: Furnish two (2) bolt mounted pedestals in an aluminum powder coated finish.

1. Furnish all anchorages.
2. Apply manufacturer's baked enamel finish to pedestals.
3. Each pedestal shall be attached to top by screws and shall be anchored to floor by suitable anchors.

4. Accessible benches as shown on drawings shall comply with CBC 11B-903.1 to 11B-903.7.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Benches must be installed in accordance with manufacturer's approved drawings and assembly instructions. Installation shall be level and plumb with flush surfaces and rigid attachment to anchoring surfaces.

3.2 ADJUSTMENT

- A. Touch-up marred finishes but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by manufacturer.

END OF SECTION.

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DIVISION 11 – EQUIPMENT

11 40 00 – Food Service Equipment
11 65 00 – Athletic Equipment

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SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes food service equipment, as indicated in Schedule of Food Service Equipment (at the end of this specification section) for the Home Building Concessions Building, as well as in the Visitor Building Snack Bar and as indicated on drawings.
 - 1. The contractor is responsible for coordinating installation, and providing all required materials, and labor to properly install, hook, and test all equipment to ensure equipment is in working conditions, in locations as shown on the plans.
 - 2. This project falls under the jurisdiction of the Merced County Environmental Health Department. Owner / Architect are obtaining Health Department review and approval. The contractor is responsible for adhering to all Health Department requirements and coordinating Health Department notification with the Owner when construction is slated to begin, as well as all coordinating all required inspections.
- B. Refer to Mechanical and Plumbing Sections for required drain traps, steam traps, atmospheric vents, valves, pipes and pipe fittings, ductwork, and other materials necessary to complete mechanical hookup of food service equipment.
- C. Refer to Electrical Sections for wiring, disconnects, and other materials necessary to complete electrical hookup of food service equipment.

1.3 RELATED SECTIONS

- A. Section 08 33 13 – Overhead Coiling Counter Doors.
- B. Section 08 56 19 – Pass-Thru and Security Windows.
- C. Section 09 30 00 – Tiling and Grout.
- D. Section 09 67 23 – Resinous Flooring.
- E. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels.
- F. Divisions 22, 23, and 26.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections.

- B. Installation instructions for each item; include roughing-in dimensions, service connection requirements, performances, materials, manufacturer's model numbers, furnished accessories, power/fuel requirements, water/drainage requirements, and other similar information.
- C. Shop drawings including dimensioned roughing-in drawings showing mechanical and electrical requirements. Submit dimensioned fabrication drawings for custom fabricated equipment including plans, elevations, and sections, showing materials and gages used.

1.5 REFERENCES, CODES, AND STANDARDS

- A. 2022 California Building Code, with Amendments.
- B. CRFC – California Retail Food Code.
- C. Merced County Environmental Health Department.
- D. SMACNA: Comply with applicable Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Sheet Metal Manual.
- E. NSF Standards: Comply with applicable National Sanitation Foundation (NSF) standards and recommended criteria. Provide each principal item of food service equipment with an NSF "Seal of Approval".
- F. UL Labels: Where available, provide UL labels on prime electrical components of food service equipment. Provide UL "recognized marking" on other items with electrical components, signifying listing by UL, where available.
- G. ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning appliances, for piping to compressed gas cylinders, and for plumbing fittings including vacuum breakers and air gaps to prevent siphonage in water piping.
- H. NFPA:
 - 1. NFPA 54 – National Fuel Gas Code.
 - 2. NFPA 96 – Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.
- I. ASME Boiler Code: Construct steam-generating and closed steam-heating equipment to comply with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code; Section IV for units not exceeding 15 psi or 250°F (121°C), or Section I for higher pressure/temperature units.

1.6 QUALITY ASSURANCE

- A. Installer's Qualifications: Engage an experienced Installer who has completed food service similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

1.7 DELIVERY, STORAGE AND HANDLING

A. Coordinate with the District:

1. Food service equipment to be in containers designed to protect equipment and finish until final installation. Make arrangements to receive equipment at project site, or to have stored in a warehouse until delivery, with the District.
2. Food service equipment to be stored in original containers, and in location to provide adequate protection to equipment while not interfering with other construction operations.
3. Handle food service equipment carefully to avoid damage to components, enclosures, and finish. Do not install damaged food service equipment; if any damaged equipment is encountered, inform District or immediately.

1.8 PROJECT CONDITIONS

- ### A. General: Take field measurements to assure accurate fit of fabricated equipment.

1.9 WARRANTY

- ### A. Special Project Warranty: Provide written installation warranty in addition to, and not a limitation of, the rights the Owner may have against the Contractor under the Contract Documents.

1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

- #### A. Stainless Steel: AISI Type 304. Provide nonmagnetic sheets, free of buckles, waves, and surface imperfections. Provide No. 4 polished finish for exposed surfaces.
1. Provide protective paper covering on polished surfaces of stainless-steel sheet work, and retain/maintain until time of final testing, cleaning, start-up, and substantial completion.
- #### B. Galvanized Sheet Steel: ASTM A653, G90 zinc coating, chemical treatment.
- #### C. Stainless Steel Tube: ASTM A554, Type 304 with No. 4 polished finish.
- #### D. Aluminum: ASTM B209 sheet and plate, ASTM B221 extrusions, 0.40-mill clear anodized finish where exposed, unless otherwise indicated.
- #### E. White Metal: Corrosion-resistant metal containing not less than 21% nickel. Make castings free from pit marks, runs, checks, burrs, and other imperfections; rough grind, polish, and buff to bright luster.
1. In lieu of white metal castings, 18-8 stainless steel die-cast or stamped may be used.

- F. Sound Deadening: Heavy-bodied resinous coating, filled with granulated cork or other resilient material, compounded for permanent, non-flaking adhesion to metal in 1/8-inch-thick coating.
1. Apply coating of sound deadening material to underside of tops, drainboards, dishtables, and sinks.
- G. Sealants: ASTM C920; Type S Grade NS, Class 25, Use NT. Provide sealant that when fully cured and washed meets requirements of Food and Drug Administration Regulation 21 CFR 177.2600 for use in areas where it comes in contact with food.
1. Color: As selected by Architect from manufacturer's standard colors.
 2. Backer Rod: Closed-cell polyethylene rod stock, larger than joint width.
- H. Gaskets: Solid or hollow (not cellular) neoprene or PVC; light gray, minimum 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

2.2 FABRICATION OF EQUIPMENT

- A. Tops: Fabricate of stainless steel of manufacturers standard gauge, with exposed edges rolled on 1-1/2-inch diameter radius, and with corners bullnosed. Where tops are adjacent to walls or adjoining equipment, turn up 6 inches and back 1 inch on 45 degree angle unless otherwise indicated.
1. Backsplashes: Cove horizontal and vertical corners.
- B. Framing: Mount tops of 1-1/2-inch by 1-1/2-inch by 1/8-inch galvanized angle iron, or 4-inch wide by 12-gage galvanized channels. Mount dishtables and drainboards on 4-inch wide by 14-gage stainless steel channels.
1. Run framework around entire perimeter of unit, and cross brace on 30-inch centers. For dishtables and drainboards, run framing from front to back at each leg location, and run additional channel lengthwise, located at center of table width and welded to leg channels. Fasten framing to underside of top surfaces with 1/4-inch studs welded at approximately 12-inch centers. Provide each stud with suitable chrome-plated lockwashers and capnuts, and make stud lengths such that cap nuts can be made up tight bringing top down snugly to framing.
- C. Legs and Cross Rails: Construct legs of 1-5/8-inch OD by 16-gage stainless steel tubing, with fully enclosed stainless steel bullet shaped adjustable foot with minimum adjustment of 1 up or down without any threads showing. Fasten legs to 4-inch-high stainless steel gusset with top completely sealed by means of stainless steel plate. Weld gusset continuously to bottom of unit framing.
- D. Cabinet Bodies: Construct of 20-gage stainless steel, with end panels formed with round corners for free standing units, and square corners for fixtures which adjoin walls or other fixtures. Provide 90-degree retentions on end panels at front and rear, turned in toward body of cabinet and welded for reinforcement. For cabinets with open shelving, provide double wall inner panels. Weld ends to horizontal angle or

channel members to form integral cabinet base. Provide backs of same material as ends, with vertical edges turned in to match edges of ends. Weld making flush joint.

- E. Inserts: Where cold pans and other inserts are to be installed in cabinet bases, provide apron full depth of insert and of same material as bodies with reinforced openings as required. Form in openings on all sides.
- F. Shelves: Construct of 14-gage stainless steel.
 - 1. Bottom Shelves: Extend forward and turn down at front so as to be flush with front facing of cabinet.
 - 2. Fixed Intermediate Shelves: Weld to front stiles and to 14-gage stainless steel brackets so that shelf is 1 inch away from back and ends of cabinet.
 - 3. Adjustable Shelves: Channel on all 4 sides, weld corners, and mount on removable stainless steel standards.
- G. Open Base Shelving: Construct of 14-gage stainless steel with edges rolled down on open sides, and 2-inch turn up with 3/4-inch radius on rear and ends where adjacent to walls and other equipment. Neatly notch corners and weld to legs. Reinforce shelving longitudinally with 14-gage formed channel welded to underside. Construct removable shelves as above but fit over cross rails. Do not exceed shelving sections of 30 inches long; where one section abuts another, turn down edges 1 inch.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Rough-In Work: Installer must examine roughed-in mechanical and electrical services, and installation of floors, walls, columns, and ceilings, and other conditions under which food service work is to be installed; verify dimensions of services and substrates before fabricating work. Notify Contractor of unsatisfactory locations and dimensions of other work, and of unsatisfactory conditions for proper installation of food service equipment. Do not proceed with fabrication and installation until unsatisfactory dimensions and conditions have been corrected in a manner satisfactory to the installer.

3.2 INSTALLATION

- A. General: Set each item of nonmobile and nonportable equipment securely in place, level and adjust to correct height. Anchor to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation. Conceal anchorages where possible. Adjust counter tops and other work surfaces to level tolerance of 1/16-inch maximum offset, and maximum variation from level or indicated slope of 1/16-inch per ft.
 - 1. Where indicated, or required for safety of equipment operator, anchor equipment to floor or wall. Where equipment is indicated to be anchored to floor, provide legs with adjustable flanged foot. Install 2 anchors on each foot.
- B. Field Joints: Complete field-assembly joints in work (joints which cannot be completed in shop) by welding, bolting-and-gasketing, or similar methods as

indicated. Grind welds smooth and restore finish. Set or trim gaskets flush, except for "T" gaskets as indicated.

- C. Enclosed Spaces: Treat spaces that are inaccessible after equipment installation, by covering horizontal surfaces with powdered borax at rate of 4-oz per sq. ft.
- D. Closure Plates and Strips: Install where required, with joints coordinated with units of equipment.
- E. Cut-Outs: Provide cut-outs in food service equipment where required to run plumbing, electric, gas, or steam lines through equipment items for final connections.
- F. Sealants and Gaskets: Install all around each unit to make joints air-tight, watertight, vermin-proof, and sanitary for cleaning purposes. In general, make sealed joints not less than 1/8-inch wide, and stuff backer rod to shape sealant bead properly, at 1/4-inch depth. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of materials at joint. At internal-corner joints, apply sealant or gaskets to form a sanitary cove, of not less than 3/8-inch radius. Provide sealant-filled or gasketed joints up to 3/4-inch joint width; metal closure strips for wider joints, with sealant application each side of strips. Anchor gaskets mechanically or with adhesives to prevent displacement.

3.3 FIELD QUALITY CONTROL

- A. Testing: Delay start-up of food service equipment until service lines have been tested, balanced, and adjusted for pressure, voltage, and similar considerations; and until water and steam lines have been cleaned and treated for sanitation. Before testing, lubricate each equipment item in accordance with manufacturer's recommendations.
 - 1. Test each item of operational equipment to demonstrate that it is operating properly, and that controls and safety devices are functioning. Repair or replace equipment which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.4 CLEANING

- A. After completion of installation, and completion of other major work in food service areas, remove protective coverings, if any, and clean food service equipment, internally and externally. Restore exposed and semi-exposed finishes to remove abrasions and other damages; polish exposed-metal surfaces and touch-up painted surfaces. Replace work which cannot be successfully restored.
- B. Prior to date of substantial completion on food service equipment work, buff exposed stainless steel finishes lightly, using power buffer and polishing rough or grit of No. 400 or finer.
- C. Final Cleaning: After testing and start-up, and before time of substantial completion, clean and sanitize food service equipment, and leave in condition ready for use in food service.

3.5 HEALTH DEPARTMENT COORDINATION

- A. The contractor is responsible for coordinating notification of start of project, and inspection appointments with the District and Merced County Environmental Health Department.

3.6 CLOSEOUT PROCEDURES

- A. Provide services of Installers technical representative, and manufacturer's technical representative where required, to instruct Owner's personnel in operation and maintenance of food service equipment.
 - 1. Schedule training with Owner, provide at least 7 days of notice to Contractor and Architect/Engineer of training date.

3.7 ITEMS OF FOOD SERVICE EQUIPMENT

- A. See schedule below. Item numbers correspond to equipment labels on plans.
- B. Contractor is responsible for coordinating installation, and providing all required materials, and labor to properly install and hook up all equipment, and test to ensure all equipment is in working conditions. See plans for quantities and locations of all equipment.
 - 1. Item K01 – Stainless Steel Countertop with Undershelves:
 - a. Product Information: Custom stainless-steel countertop with undershelves, as shown in the Concessions Building. Countertop front and sides turned down 90 degrees, 1-1/2" diameter rolled front edge, welded and ground smooth, heavy gauge legs with bracing and adjustable stainless steel bullet feet, 18 gage stainless steel adjustable undershelves, grommets with finished (turned down) edges for wiring at cash register locations, as determined by District and Architect. NSF.
 - b. Coordinate installation and dimensions with Section 08 56 19 – Pass-Thru and Security Windows and Section 08 33 13 – Overhead Coiling Counter Doors.
 - 2. Item K02 – Point of Sale (POS) Cash Register by Owner (OFCl) (located in both Home Side Concessions and Visitor Side Snack Bar):
 - a. Product Information: Provided by Owner, contractor to coordinate moving and installation.
 - b. Coordinate electrical requirements and connections with electrical drawings.

3. Item K03 – Rethermalization Cabinet:

- a. Product Information: Cres Cor Insulated Radiant Cabinet Model 1000-CH-SS-2D, 22-5/8" W x 32-3/4" D x 73-1/4"H, solid state electronic controlled times and temperatures, outer body of 22 ga. stainless steel, inner body, top and frame of 18 ga. stainless steel. Fiberglass insulation 1-1/2" in walls; 1" in door. Stainless steel internal frame; coved corners. Anti-microbial chrome plated latches. Separate thermometer for each compartment. Six (6) heated inner walls. Removable pan supports for sixteen (16) 18" x 26" pans spaced on 3" centers. Casters 5" modulus casters (2) swivel, (2) rigid, Delrin bearings. Load capacity 250 lbs. each. 6000 Watts, 208/240 Volts, 60 Hz., 1 Phase. 2-Year Parts / 1-Year Labor warranty. Lifetime on heating elements (excluding labor). Provide with eight wire grids per cabinet, and eight (8) sheet pans per cabinet. NSF listed
- b. Coordinate electrical requirements and connections with electrical drawings.

4. Item K04 – Three Compartment Sink with Two Drain Boards:

- a. Product Information: Advance Tabco Model FC-3-2424-24RL, three (3) 24" W x 24" L x 14" D sink compartments, fully welded, ~ 8" backsplash, 18/304 stainless steel construction, two (2) 24" drainboards, 21" H galvanized legs, gussets, stainless steel adjustable bullet feet, 3-1/2" basket drain, faucet holes on 8" centers. Working height to be at 36".
- b. Faucet assembly specified in plumbing drawings.
- c. Coordinate plumbing requirements and connections with plumbing drawings.

5. Item K05 – Wall Shelf with Pot Rack and Hooks:

- a. Product Information: Eagle Group, Model WSP10120, 10" D x 120" L x 10" H, with 20 removable hooks, shelf constructed of 16 gauge type 430 stainless steel, with 1-1/2" roll on front and 1-1/2" upturn on rear and ends. 2" x 3/16" type 304 stainless steel flat bar. Furnished with double-prong stainless steel removable hooks, twenty (20) total.

6. Item K06 – Adjustable Wire Shelving on Lockable Casters:

- a. Product Information: Metro, Super Erecta Wire shelving units. Units to be 36" W x 18" D x 74-5/8" H, chrome plated wire shelves, 5 shelves high, fully assembled, and complete with fastener, four (4) polymer locking casters, model # 5PCB, connectors, caps, and accessories. Shelf model # 18436C, post model # 74UP.

7. Item K07 – Two (2) Door Reach-in Refrigerator:

- a. Product Information: True Food Service Equipment, Model No. T-49-HC, two-section, reach-in refrigerator, with two (2) stainless steel doors (left door hinged left, right doors hinged right), stainless steel front / sides / interior, interior lighting, on 4" lockable castors, 1/2 HP, 115v/60/1, 5.4 amps, 9' cord, UL Listed.
- b. Coordinate electrical requirements and connections with electrical drawings.

8. Item K08 – Two (2) Door Reach-in Freezer:

- a. Product Information: True Food Service Equipment, Model No. T-49F-HC, two-section, reach-in freezer, with two (2) stainless steel doors (left door hinged left, right doors hinged right), stainless steel front / sides / interior, interior lighting, on 4" lockable castors, 1 HP, 115v/60/1, 9.6 amps, 9' cord, NEMA 5-15P plug, UL Listed.
- b. Coordinate electrical requirements and connections with electrical drawings.

9. Item K09 – Ice Maker with Storage Bin and Filter:

- a. Product Information: Hoshizaki Model No. F-801MAJ-C, Ice Maker, cubelet, air-cooled, self-contained condenser, filter, maximum 690-lb. production/24 hours, stainless steel finish, Advanced CleanCycle24, R-404A refrigerant, 115v/60/1-ph, 11.8 amps, NSF, UL, Energy Star. To be place on Model B-800SF Ice Bin, with top kits HS-2035 and HS-2032, top-hinged front-opening door, approximately 800-lb. ice storage capacity, for top-mounted ice maker, vinyl clad, painted flange legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL-Sanitation.
 - i. F-801MAJ-C (Ice Maker)
 - ii. B-800SF (Bin)
 - iii. HS-2035 and HS-2032 (Top Kits)
 - iv. H9320 (Filter)
- b. Coordinate plumbing and electrical requirements and connections with plumbing and electrical drawings.

10. Item K10 – Hand Wash Sink with Splash Guards, Soap, and Towel Dispenser:

- a. Product Information: Advance Tabco, Model No. 7-PS-25 ADA sink, wall mount hand sink with two welded 12" splash guards, one on each side (model 7-PS-15D), sink has 14" W x 16" L x 5" D bowl, overall size of 20" W x 24" L x 20" H. 20 gauge 304 series stainless steel, splash mounted faucet, basket drain, wall bracket, NSF, cCSAus.

- b. Soap and towel dispenser to be provided per Section 10 28 13.
- c. Coordinate plumbing requirements and connections with plumbing drawings.

11. Item K11 – Stainless Steel Worktable with Undershef:

- a. Product Information: 30" W x 72" L x 34" H worktable with stainless steel undershef mounted 6" AFF, Eagle Group, Model T3072SB, countertop sides turned down 90 degrees, 1-1/2" diameter rolled front edge, four (4) stainless steel heavy gauge legs with bracing and adjustable stainless steel bullet feet, 18 gage stainless steel adjustable undershef, NSF. K12 mounted to K11.

12. Item K12 – Stainless Steel Double Overshef Mounted to Stainless Steel Worktable (K11):

- a. Product Information: Eagle Group, Model DOS1260. 12" W x 60" L x 30" H stainless steel overshef mounted to stainless steel work table KS11. Two shelves, top of first shelf at 18" above tabletop, second shelf 12" above first shelf, total of 30" above tabletop. All type 304 stainless steel construction, 1" diameter stainless steel tubular base legs, 1-1/2" diameter 180° rolled edge on front and rear of overshefs, Ends are turned down 90° providing for flush installation when required. NSF.

13. Item K13 – NOT USED

14. Item K14 – Table Top Hot Dog Roller Grill with Bun Warmer:

- a. Product Information: Avantco Slanted 50 Hot Dog Non-Stick Roller Grill with 48 Bun Warmer and Pass-Through Canopy, Model RG1850SLT, with slanted top and bun warmer drawer; 34-11/16" L x 18-5-16" W x 11" H; analog control, independent front and rear controls for both cooking and holding, clear pass through canopy to keep food clean and sanitary; 1 Phase, 120 V, 1460 Watts, NEMA 5-15P plug, ETL and CE listed.
- b. Coordinate electrical requirements and connections with electrical drawings.

15. Item K15 – Ice Maker with Storage Bin and Filter:

- a. Product Information: Hoshizaki Model No. F-450MAJ-C, Ice Maker, cubelet, air-cooled, self-contained condenser, filter, maximum 492-lb. production/24 hours, stainless steel finish, Advanced CleanCycle24, R-404A refrigerant, 115v/60/1-ph, 11.8 amps, NSF, UL, Energy Star. To be place on Model B-300SF Ice Bin, top-hinged front-opening door, approximately 300-lb. ice storage capacity, for top-mounted ice maker, vinyl clad, painted flange legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL-Sanitation.
 - i. F-450MAJ-C (Ice Maker)
 - ii. B-300SF (Bin)

- iii. H9320 (Filter)
 - b. Coordinate plumbing and electrical requirements and connections with plumbing and electrical drawings.
16. Item K16 – Adjustable Wire Shelving on Lockable Casters:
- a. Product Information: Metro, Super Erecta Wire shelving units. Units to be 36" W x 14" D x 74-5/8" H, chrome plated wire shelves, 5 shelves high, fully assembled, and complete with fastener, four (4) polymer locking casters, model # 5PCB, connectors, caps, and accessories. Shelf model # 1436NC, post model # 74UP.

END OF SECTION.

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SECTION 11 65 00 – ATHLETIC EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SECTION INCLUDES

- A. Play Field Equipment:
 - 1. Football goal posts.
 - 2. Football goal post pads with graphics.
 - 3. Football end zone pylons
 - 4. Weighted Track Crossing Mat
 - 5. Long jump and triple jump plates
 - 6. Pole vault box
 - 7. Other miscellaneous physical education equipment as indicated and/or as shown on plans.

1.3 RELATED SECTIONS

- A. Section 32 12 16 – Asphalt Paving
- B. Section 32 18 23 – Track Asphalt Paving
- C. Section 32 31 13 – Chain Link Fencing and Gates

1.4 REFERENCES

- A. 2022 California Building Code (CBC), with Amendments.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM F 2440 – Standard Specification for Indoor Wall/Feature Padding.
- D. Federal Standard 191 – Textile Test Methods.
- E. NFPA 101 – Life Safety Code.
- F. NFPA 255 – Surface Burning Characteristics of Building Materials.
- G. NFPA 286 – Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

- H. NFPA 701 – Methods of Fire Tests for Flame-Resistant Textiles and Films.
- I. UL 214 – Test for Flame-Propagation of Fabrics and Films.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittals.
- B. Product Data: Submit manufacturer's product data, including materials, components, fabrication, finish, and installation instructions.
- C. Shop Drawings:
 - 1. Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating locations, quantities, dimensions, tolerances, materials, fabrication, connections, hardware, fasteners, finish, options, and accessories.
 - 2. Show location and detail of footings and ground sleeves.
- D. Samples: Submit manufacturer's color samples for all items which a color must be chosen, as well as football goal post padding with detailed information on graphic layout, lettering, and logo placement.
- E. Test Reports: Submit manufacturer's certified test reports from testing performed by accredited independent testing laboratory, indicating compliance of materials with requirements as specified.
- F. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- G. Manufacturer's Project References: Submit manufacturer's list of recently completed projects, including project name and location, name of architect, and type and quantity of athletic equipment installed.
- H. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; and parts list.
- I. Warranty: Submit manufacturer's standard, lifetime, and additional warranties.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide play field equipment from single manufacturer, as much as possible.
- B. Manufacturer's Qualifications: Minimum of 5 consecutive years of experience manufacturing play field equipment similar to specified.
- C. Installer's Qualifications: Trained and approved by manufacturer.
- D. Regulatory Requirements: Play field equipment shall conform to latest rules and

regulations.

1. Federation Internationale de Football Association (FIFA).
2. National Association for Girls and Women in Sport (NAGWS).
3. National Federation of State High School Associations (NFHS).

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions. Keep temporary protective coverings in place.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.8 WARRANTY

- A. Provide a one year warranty against defects in materials and workmanship, unless otherwise specified.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
 1. Porter Athletic® (www.gillporter.com)
 2. Sportsfield Specialties, Inc. (www.sportsfield.com)
- B. Substitutions: Requests for substitutions will be considered in accordance with Sections 01 25 00 and 01 62 00.

2.2 FOOTBALL EQUIPMENT

- A. Basis of Design: Model GP620HSPL Base Plate Mount High School Football Goal Posts and Accessories as manufactured by Sportsfield Specialties, Inc.
- B. Components:
 1. Single Base Plate Mount Gooseneck Support: Fabricated of 6" schedule 40 aluminum pipe (6.625" o.d.), 5' radius, 6' offset, custom offsets available
 2. Base Plate Mounting Kit.
 3. Crossbar: Fabricated of 6" schedule 40 aluminum pipe (6.625" O.D.)
 - a. Length: 23'-4" – High School

- b. Includes Patented AdjustRight® feature allowing for easy installation through the adjustment of an internal locking rotating sleeve at both the gooseneck/crossbar and upright/crossbar connections. This adjustment can easily be repeated throughout the life of the football goal post ensuring proper alignment of all components for years of competition and all with the added benefit of no exposed hardware on the face of the goal. Thermal arc sprayed internal textured mating surfaces and anti-vibration enhancements such as serrated washers and nyloc coated bolt ends ensure the AdjustRight® Football Goal Posts remain in position.
 - c. Uprights: Fabricated of extruded 6061-t6 aluminum tube (4" o.d.) with rigid wire loop welded to upper end.
 - i. Length: 20'
 - d. Support Footings: Bottom of main upright shall extend 3'-6" below playing surface and be permanently set in concrete support footing as indicated on the Drawings.
4. Powder Coated Finish: Yellow or White
5. Installation Package Consisting of the Following Components:
- a. Base Plate Mounting Kit
 - b. Frame Kit: 1/8" (0.125") aluminum construction with 1" PVC drain stub, includes two (2) half-moon filler plugs, optional full-size filler plug and SG2S® patented soccer goal rear bottom ground bar retractable safety clamp system available, use GFAFIT for synthetic turf installation applications and GPAFNG for natural grass installation applications.
6. Accessories:
- a. Directional wind flags
 - b. Touch-up paint (powder coat finish specific)
 - c. Model specific hardware kit and installation instructions
7. Football Goal Post Pads: Model GPPRDG. 18 oz. vinyl with polyester scrim and vertically sewn in hook and loop securement, standard 6' in height, color selected from manufacturer's standard vinyl colors, with custom digitally printed lettering and/or graphics. Round, fully encased vinyl, 18" O.D. and 7" I.D. polyurethane foam core.
- a. Provide two (2) total; one (1) for each goal post.
8. Football End Zone Pylons: Set of four (4) orange vinyl covered foam football end zone pylons with self-standing weighted bases, 18" H x 4" L x 4" W.
- a. Provide two (2) sets total; one (1) for end zone.

2.3 WEIGHTED TRACK CROSSING MAT

- A. Basis of Design: TM1540 – Weighted Track Crossing Mat, manufactured by Sportsfield Specialties, Inc.
1. Dimensions: 15' W x 40' L
 2. Material: 16 oz. Black Non-Woven Polypropylene Geotextile Material
 3. Perimeter Ballast:
 - a. Heat Welded 18.5 oz. Heavy Coated Outdoor Vinyl Chain Pocket, Various Standard Colors Available
 - b. 1/4" (0.25") Galvanized Steel Chain
 4. Locations: Where shown on plans.

2.4 MISCELLANEOUS PHYSICAL EDUCATION EQUIPMENT

- A. Long Jump and Triple Jump – Take-Off Board: Basis of Design – Model LTJTOB8BL, manufactured by Sportsfield Specialties.
1. Product Information: 8" Long and Triple Jump Take-Off Board System with Blanking Lid:
 - a. White Synthetic Polyboard with Textured Surface:
 - i. Dimensions: 8" x 48" x 3/4" (0.75")
 - ii. Grooved edges for slide-on assembly, no exposed fastening hardware
 - b. Extruded Aluminum Insert/Spacer:
 - i. 0.120" wall thickness
 - ii. Designed to accommodate slide-on board assembly
 - c. Formed Aluminum Blanking Lid:
 - i. 1/8" (0.125") aluminum sheet
 - ii. 1/2" (0.5") recess to accept synthetic track surfacing by others
 - iii. Includes leveling bolts
 - d. 16 Gauge (0.60") 304 Stainless Steel Tray:
 - i. Includes 1" PVC drain stub (oriented at either end) to ensure positive connection to subsurface drainage system by others.

2. Installation: Shall be installed by manufacturer in synthetic track surfacing, as recommended by manufacturer.
- B. Pole Vault Box: Basis of Design – Model PVBSS, with Pole Vault Box Cover Plug (Basis of Design – Model PVBCVRSS) manufactured by Sportsfield Specialties.
1. Product Information: Stainless Steel Pole Vault Box:
 - a. 13 gauge stainless steel construction
 - b. Mill finish
 - c. 30° reverse bend at pole vault box entryway
 - i. 7.874" (0.2m) Long
 - d. Concrete set wings to reduce floating during installation.
 - e. Meets or exceeds NFHS, NCAA, and IAAF rules and regulations for size and shape
 2. Installation: Shall be installed by manufacturer in synthetic track surfacing, so when lid is placed on box, it is flush with the runway surface, as recommended by manufacturer.
- C. ComBox for Track Surfacing: Basis of Design – Model CBTS1830 – ComBox® for Track Surfacing, manufactured by Sportsfield Specialties.
1. Dimensions: 18" W x 30" L x 14" H
 2. Box: 3/16" (0.1875") aluminum construction, welded frame with open bottom having the following attributes:
 - a. 1/8" (0.125") aluminum adjustable main lid support ledge
 - b. 3/16" (0.187") aluminum removable divider panel
 - c. 1" PVC drain stub for positive drainage connection
 - d. Leveling Bolts
 3. Main Lid: 1/8" (0.125") aluminum construction with the following attributes:
 - a. 1/2" (0.50") recess designed to accept synthetic track surfacing by others
 - b. Secured with cam locks and is pad lockable
 - c. Includes wire feed cutouts
 4. Hand Hole Covers: 1/8" (0.125") aluminum construction with the following attributes:

- a. Designed to accept synthetic track surfacing structural spray or urethane top coat by others
 - b. Secured with hex key
 - c. Includes wire feed cutouts
5. Assembly hardware

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and supporting structure to receive play field equipment. Notify Architect in writing of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Install athletic equipment in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install equipment plumb, level, straight, square, accurately aligned, correctly located, to proper elevation, and secure.
- C. Install equipment using manufacturer's supplied hardware and fasteners.
- D. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- E. Remove and replace damaged components that cannot be successfully repaired, as determined by Architect.

3.3 ADJUSTING

- A. Adjust all athletic equipment and goals for plumb and level.
- B. Adjust operating equipment to function properly and for smooth operation without binding.
- C. Set and adjust electric winch upper and lower limit controls.

3.4 CLEANING

- A. Clean athletic equipment promptly after installation in accordance with manufacturer's instructions.
- B. Remove labels and temporary protective coverings.
- C. Do not use harsh cleaning materials or methods that would damage finish.

3.5 DEMONSTRATION

- A. Demonstrate operation and maintenance of gymnasium and play field equipment to Owner's personnel, as applicable.
- B. Furnish Owner with keys to equipment after demonstration.

3.6 PROTECTION

- A. Protect installed athletic equipment to ensure equipment will be without damage or deterioration at time of substantial completion.

END OF SECTION.

DIVISION 13 – SPECIAL CONSTRUCTION

13 34 16 – Permanent Grandstands and Press Box

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SECTION 13 34 16 – PERMANENT GRANDSTANDS AND PRESS BOX

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Provide labor, materials, equipment, and supervision necessary to complete installation of permanent steel grandstands and press box, including the following:
 - 1. Bleacher Assemblies; Steel Substructure, Decking System, Press Box Base, and Prefabricated Press Box are **OFCI**; District will procure and provide from Southern Bleachers.
 - 2. General Contractor to provide and install concrete foundation and footings; including excavation, rebar reinforcing, and installation of rebar and concrete and anchor bolts for all footings as shown in the bleacher drawings.

1.2 RELATED REQUIREMENTS

- A. Manufacturer's Qualifications: Manufacturers must have ten years of experience in the manufacture of bleachers and grandstands; manufacturer must exhibit proof of business existence for the past 5 years with documentation. Welders must be AWS certified.
- B. Installer Qualifications: Factory-certified by Southern Bleacher, with ten years of experience (minimum) in the proper installation of grandstands for DSA approved projects.
- C. Source Quality Control: Mill Test Certification

1.3 REFERENCE STANDARDS

- A. 2022 CA Building Code (CBC), Part 2, Title 24, C.C.R
- B. 2022 CA Fire Code, Part 9, Title 24 C.C.R
- C. 29 CFR 1926 – U.S. Occupational Safety and Health Standards Current Edition.
- D. Must meet or exceed all State and local applicable codes, in compliance with CBC, Title 24, and ICC 300.

1.4 SUBMITTALS

- A. Manufacturer's Product Data: Submit manufacturer's descriptive product data for project.
- B. Shop Drawings: Manufacturer to submit shop drawings sealed by a registered engineer and shall be of sufficient clarity to indicate the location, nature, and extent of the work proposed and show in detail that it will conform to the applicable code and relevant laws.

- C. Certificates:
 - 1. Insurance Certificate
 - 2. Bid Bond
- D. Product Sample: Submit one (1) 18" seat sample. This is the responsibility of Southern Bleachers.
- E. Color Sample: Submit 4 separate color option samples, as selected by District. This is the responsibility of Southern Bleachers.

1.5 SITE CONDITIONS

- A. Field Site:
 - 1. Owner to make site accessible.
 - 2. Owner to verify site locations/benchmarks.
- B. Underground Utility Line: General Contractor to clearly mark all underground utilities and obstructions and relocate all that conflict with grandstand.
- C. Soils Test: Furnished by Owner.

1.6 WARRANTY

- A. Permanent grandstand shall be under warranty for a period of one (1) year beginning at date of substantial completion. The warranty will provide for repair or replacement of failed components due to defects in materials and workmanship of installation for the specified period. This warranty excludes any other defects resulting from abnormal use in service, vandalism, weathering, oxidation, accidental/intentional damage, or any occurrences beyond manufacturer's control.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: Southern Bleacher Co. (800)433-0912 Horizontal Beam Design.

2.2 PERMANENT STEEL GRANDSTAND (OFCI)

- A. Product Description:
 - 1. Home Grandstand (Horizontal Beam Design): Gross seating capacity of 2160, net seating capacity of 2126 plus 22 wheelchair spaces, 15 rows, and 216' long.
 - 2. Visitors Grandstand (Horizontal Beam Design): Gross seating capacity of 1161, net seating capacity of 962 plus 12 wheelchair spaces, 9 rows and 193'-6" long.

3. Vertical columns are placed 16'-20' on center laterally and as required on center front to back on both home and visitors stands.
4. Horizontal Beams are wide-flange beams.
5. Traverse bays are free of cross bracing the total length of the grandstand.
6. Stringers are wide flange with steel angle rise and depth fabrication and are placed 6' on center.
7. Front Walkway:
 - a. Home Width: 9'-4"
 - b. Visitors Width: 9'-6"
 - c. Home: Elevated 3'-6" at front of stand, above grade at the benchmark on upper field level.
 - d. Visitors: Elevated 4' at front of stand, above grade at the benchmark on upper field level.
8. Entry stairs to be firmly anchored to uniformly poured concrete bases.
 - a. Stair rise: 6" minimum with aluminum closure and contrasting aluminum stair nose.
 - b. Stair tread depths: 11"
 - c. Guardrails: As required by code
 - d. Stairs to have handrail extension. The handgrip portion of handrails shall not be less than 1-1/2" or more than 2" in cross sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corners. The top of handrails and handrail extensions shall be placed not less than 34" or more than 38" above the nosing of treads and landings. Where handrails are not continuous between flights, the handrails shall extend horizontally at least 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. Ends shall be returned or shall terminate in newel posts or safety terminals.
9. Aisles:
 - a. Aisles with seating on both sides to have discontinuous mid-aisle handrails. The handrails shall be discontinuous with breaks at intervals not to exceed five rows. These breaks shall have a clear width of at least 22" and not greater than 36" horizontally.
 - b. Anodized aluminum handrails with rounded ends to be provided with an intermediate handrail below the main handrail.

- c. Aluminum tread nosing of contrasting color on aisle steps.
- d. Half-steps shall be provided for riser heights above 8".
- e. Half-steps shall provide equal rise and run throughout aisle. Each shall have aisle nosing with non-skid black powder coated finish or other paint system meeting AAMA 603.8-92 specifications with a hardness rating of 2H and riser closure with clear anodized finish.
- f. Aisles with a riser height of non-uniformity shall be indicated with distinctive markings as required by code.

10. Decking:

- a. Rise per row 12" with tread depth of 26" on both home and visitors grandstands.
- b. Each seat 17" above its respective tread.
- c. Tongue and groove closed decking arrangement. Open/full deck is unacceptable.
- d. Seating Selection: Anodized Aluminum Bench Seat. 2 x 10 (standard), Die #7758 with height of 1-1/2".

11. Guard railing: To be at all sides of bleacher, entry stairs and ramps, portals, and landings. Railing to be anodized aluminum with end plugs at ends of straight runs and/or elbows at corner. All guardrails shall be secured to angle rail risers by galvanized fasteners. Railing shall be at heights as required by code for its location on the grandstand. Guard railing shall include intermediate railing, or galvanized chain link fencing fastened in place with galvanized fasteners and aluminum ties.

- a. Durkyn finish riser board façade and closure of ramps/stairs on home and visitors grandstands. In architect selected standard colors.

12. Ramps:

- a. Slope: 1 in 12.5 wide-flange ramps, except for starter section which is of angle fab construction
- b. Guardrails: As required by code plus toe board.
- c. Handrail: Ramps to have handrail extension. The handgrip portion of handrails shall not be less than 1-1/2" or more than 2" in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corners. The top of handrails and handrail extensions shall be placed not less than 34" or more than 38" above the ramp surface. Where handrails are not continuous between runs, the handrail shall extend horizontally above the landing 12" minimum beyond the top and bottom ramps. Ends shall be returned or shall terminate in newel posts or safety terminals.

13. Handicap provision:

- a. Quantity of wheelchair spaces: 22 on home grandstand and 12 on the visitor's grandstand.
- b. Riser area adjacent to wheelchair spaces to have closed intermediate construction.

B. Materials/Finishes:

1. Substructures: Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.

- a. Shop connections are seal welds.
- b. After fabrication, all steel is hot-dipped galvanized to ASTM A123 specifications.
- c. Painted steel finish is unacceptable.

2. Extruded Aluminum:

- a. Seat Planks, Backrests, Stanchions, Riser Planks, and Railing are extruded aluminum alloy, 6063-T6.
- b. Clear anodized 204R1, AA-M10C22A31, Class II finish
- c. Tread planks are extruded aluminum alloy 6063-T6 mill finish.
- d. Railing: Extruded aluminum alloy, 6063-T6 clear anodized 204R1, AA-M10C22A31, Class II.

3. Accessories:

- a. Channel End Caps: Aluminum alloy 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II.
- b. Hardware:
 - i. Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.
 - ii. Hold-down Clip Assembly: Aluminum alloy 6005A-T6, mill finish.
 - iii. Structural Hardware: Equal to or greater than hot-dipped galvanized ASTM-A307. No connections utilizing high strength bolts are classed as slip critical.

- c. Aisle Nose and Stair Nose: Aluminum alloy, 6063-T6, non-skid black powder coated finish or other paint system meeting AAMA 603.8-92 specifications with a hardness rating of 2H.

C. Fabrication:

1. Design Load:

- a. Tread and Seat Area: 100 p.s.f. uniform live load.
- b. Seat (Vertical): 120 lbs./lf.
- c. Seat (Horizontal Sway): 24 lbs./lf parallel and 10 lbs./lf perpendicular to seat.
- d. Handrail and Guardrail: 50 lbs./lf, in any direction.
- e. Handrail and Guardrail: 200 lbs. concentrated in any direction.
- f. Snow Loads: As per State adopted code.
- g. Wind Loads: As per State adopted code.
- h. Seismic Loads: As per State adopted code.

2. All manufactured connections to be shop welded.

- a. Manufactured by certified welders conforming to AWS Standards.

2.3 PRESS BOX WITH METAL STRUCTURE (OFCI)

A. Product Description: Type II Construction

- 1. Press Box Support Structure: Independently supported but connected to rear of grandstand. Support Structure to be 48' wide x 8' deep with 6' landing on 2 ends.
- 2. Press Box Dimensions: 36' wide x 8' deep.
- 3. Press Box to be of open construction, allowing inspection of electrical wiring, switches and other components without destructive disassembly.

B. Materials/Finishes:

1. Press Box Support Structure:

- a. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
- b. Shop connections are seal welds.
- c. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.

2. Press Box: All materials shall be new and shall comply with ASTM specifications.
- a. Floor:
- i. Main support to be a galvanized steel floor frame sized to support structure and 29 ga metal belly pan for support of insulation.
 - ii. Floor to be INTERLOCK Aluminum Decking System, extruded aluminum alloy 6063-T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports. (Tongue & Groove or Standard extrusion is not acceptable.)
 - iii. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation R-13, 3-1/2 inches thick. Batt or roll as manufactured by Johns Manville, or equal.
- b. Wall Structure:
- i. 4 inch x 4 inch x 11 gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4 inch x 2-1/2 inch x 14 gauge steel "cees" with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design.
 - 1) Steel framing shapes to meet one of the following ASTM's, A500 Grade A or B 45 ksi, A36 50ksi, A1011 CS Type B.
 - ii. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation R-13, 3-1/2 inches thick. Batt or roll as manufactured by Johns Manville or equal.
 - iii. Interior Finish:
 - 1) 1/2 or 5/8 inch vinyl coated gypsum panels (as required), Gold Bond vinyl-surfaced Durasan. Color - Harvest Cotton.
 - 2) Cove Base: Vinyl 4 inches x .080. color – Nubian or Black Brown
 - iv. Exterior Finish:
 - 1) 26 gauge prefinished R-Panel paneling as manufactured by MBCI, Signature 200 color series, or equal.
 - 2) Wall panels are attached with #12 TEK screws – 6" O.C. at the top, midpoint and bottom of the panels.

- 3) Lap screws are placed at each end of the panels, at the intermediate supports, and at the mid point between supports (TEK #14).
- 4) All fasteners to be painted same color as exterior paneling.

c. Roof Structure:

- i. 4 inch x 4 inch x 11 gauge square tubing with maximum spacing of 6 feet on center and 4 inches x 2 1/2 inches x 14 gauge steel "cees" with maximum spacing of 2 feet on center.
- ii. Roof: 1/8 inch fourway steel plate roof, continuous welded seams coated with acrylic metal primer as manufactured by Coronado and 36 mils of acrylink roof coating as manufactured by Isothermal Protective Coatings, or equal. Plate is welded on one side of rafters not located at seams and both sides of rafters located at seams with 2 inch long 1/2 inch fillet weld on 12 inch centers.
- iii. Insulation: Poly-encapsulated Formaldehyde-free fiberglass building insulation, R-19 (minimum) 6 inches thick. Batt or roll as manufactured by Johns Manville or equal.
- iv. Cornice: 26 gauge steel prefinished to match metal siding.
- v. Ceiling: 24 inch x 24 inch x 5/8 inch acoustical lay in ceiling tile with removable tiles, per 2022 CBC, applicable category for seismic zone. ref. DSA IR 25-2.

d. Exterior Door(s):

- i. Full flush steel construction with hollow or polystyrene core. 18 gauge skin sheets. Dimensions: 3 feet 0 inches x 6 feet 8 inches. Color: Coordinated with press box siding color.
- ii. Steel door frame (16 gauge) complete with 1/2 inch threshold and weather-stripping.
- iii. Exterior Hardware: Yale 546F Exterior Trim, or equal. Handles shall be lever type that allow operation without tight grasping or twisting of the wrist. Keyed alike locks.
- iv. Interior Hardware: Yale 2100 Exit Device, or equal. Handle shall be panic bar that allows for opening without any grasping, twisting or turning.

e. Interior Door (if applicable):

- i. Interior Hollow Core Birch Unit. Dimensions: 3 feet 0 inches x 6 feet 8 inches.

- ii. Hardware: Handles shall be lever type that allow operation without tight grasping or twisting of the wrist.
- f. Interior Walls:
 - i. Framing to be steel galvanized studs (25 gauge) 1-1/4 inch x 3-5/8 inch, maximum 2 feet on center.
 - ii. Finishes to be consistent with all other interior finishes.
- g. Windows:
 - i. Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
 - ii. Sash: Tilt toward inside for easy cleaning.
 - iii. Glazing: Clear tempered panes.
 - iv. Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
 - v. Finish: Electrostatically applied acrylic enamel.
- h. Work Bench: 1 inch thick x 21 inch wide clear anodized aluminum work bench supported by 4 inch x 2-1/2 inch x 14 gauge steel. Countertops heights shall be constructed to allow wheelchair usage at all locations.
- i. Painting: Materials equal to Coronado, or equal.
 - i. Surfaces: Exterior Door(s), Door Frame(s)
 - 1) Primer: Applied by Door Manufacturer.
 - 2) Finish: 2 coats acrylic latex semi-gloss enamel applied by press box manufacturer.
 - ii. Surfaces: Interior Doors (if applicable)
 - 1) Primer: Jones Blair Interior Exterior Latex, or equal.
 - 2) Finish: 2 coats acrylic latex semi-gloss enamel.
 - iii. Surfaces: Exterior Siding
 - 1) Primer: Applied by Siding Manufacturer.
 - 2) Finish: Applied by Siding Manufacturer.
 - 3) Touchup: If applicable

- iv. Surfaces: Wall and Roof Structure
 - 1) Primer: Coronado DTM Industrial 180-11 acrylic metal primer applied after welding, or equal.

- j. Caulking: Sonneborn NP1 – Polyurethane sealant, All temperature, UV resistant, or equal. Silicone products are not acceptable.

- k. Electrical:
 - i. Submittal drawing shall indicate devices and circuitry.

 - ii. Fixtures: LED 1' x 4' lay-in design as manufactured by Lithonia Lighting, or equal. Fixtures shall be located above countertop and be maximized to full length of compartment space.

 - iii. Wiring to be in EMT, flexible metal conduit or surface raceway. N.E.C. breaker panel to be 100 amp flush or surface mounted on wall with 1 1/4 inch conduit stubbed out bottom of press box or 2 inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected. (Service line to Press Box is responsibility of Owner).

 - iv. Electrical outlet(s) installed per NEC shall be standard duty. All outlets shall be surface or flush mounted.

 - v. Sound, Telephone, Clock, Field Communication: Empty single or double outlet boxes (as required) per N.E.C. with 3/4 inch conduit stubbed out bottom of Press Box for use of Owner. Outlet boxes to be flush mounted into wall. Any wiring completed on-site will be responsibility of such contractor for inspections. Quantity. Two will be provided. Owner shall indicate additional boxes needed.

 - vi. (Optional) Filming Area/Observation Deck: Weathertight outlet box for cameras. Quantity: One. Owner shall indicate additional outlets needed.

2.4 WARRANTY

- A. The Press Box shall be under warranty for a period of one (1) year beginning at Date of Substantial Completion. The Press Box is warranted to be free from defect in materials and workmanship in the course of manufacture. This warranty excludes any other defects resulting from abnormal use in service, accidental or intentional damage or any occurrences beyond manufacturer's control.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All work performed by technicians experienced in bleacher seating installation.
- B. Project as per approved shop drawings.
- C. All required testing is noted in the plans and on the DSA approved 103 associated with the bleacher installation.

3.2 FIELD QUALITY CONTROL

- A. Foundation:
 - 1. Footings are as designed and engineered in the DSA approved plans.
 - 2. General Contractor and/or Bleacher Installer to provide grubbing, excavation, formwork, required rebar reinforcing, concrete and concrete placement, and installation of all C.I.P base plates and anchor bolts provided by owner.
 - 3. Hot-dipped galvanized anchor bolts shall be secured in the concrete footings as noted in the bleacher drawings. Concrete shall attain a minimum working strength of 3,000 psi. at 28-days.

3.3 CLEAN-UP

- A. Clean up all debris caused by work of this section.
- B. Owner, Architect and Contractor acknowledge and accept that mill finish aluminum as specified may have water stains present from transportation and storage during installation. Removal of these stains is not part of this contract. Stand to be broom cleaned at completion.

END OF SECTION.

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DIVISION 22 – PLUMBING

- 22 00 00 – Plumbing General Conditions
- 22 05 00 – Common Work for Plumbing
- 22 05 23 – Valves and Accessories for Plumbing
- 22 07 00 – Plumbing Insulation
- 22 11 00 – Facility Water Distribution
- 22 11 23 – Domestic Water Pumps
- 22 13 00 – Facility Sanitary Sewage
- 22 33 00 – Electric Domestic Water Heaters
- 22 42 00 – Plumbing Fixtures

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SECTION 22 00 00 – PLUMBING GENERAL CONDITIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies the Division 22 Work coordination requirements with general work provisions.
- B. For convenience and reference the Division 22 Specifications are separated into Divisions and Sections. Such separations shall not operate to make the Engineer an arbitrator to establish subcontract limits between the Prime Contractor and his Subcontractors. In any case, the Prime Contractor is responsible to the owner for a complete job.
- C. This section consists of General Requirements and Standard Specifications covering certain parts of work under Division 22 and is supplemented by other Division 22 sections covering additional work, requirements, and materials specifically applicable to the work of each section.
 - 1. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.
- D. No material installed as part of this WORK shall contain asbestos in any form.

1.2 CONDITIONS OF THE CONTRACT

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.
- B. This section is a Division-22 Basic Materials and Methods section and is a part of each Division -22 section.

1.3 DESCRIPTION OF REQUIREMENTS

- A. Provide finished work, tested and ready for operation including apparatus, appliances, materials, and work. Provide incidental accessories necessary to make the work complete and ready for operation without additional expense to the Owner.
- B. Before beginning work or ordering materials, consult Architect for clarification of discrepancies between, or questionable intent, of the Contract Documents.
- C. Contractor shall visit the site and field survey the existing site conditions prior to bid. Any site conditions which may cause significant deviation from the design drawings shall be brought to the attention of the Owner's representative for clarification prior to bid.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- A. Provide work and materials in full accordance with the latest rules and regulations of the following:

1. California Code of Regulations - Title 24 - Parts 2, 3, 4,5, and 9
 2. California Code of Regulations - Title 22 - Chapter 7
 3. California Building Code, 2022
 4. California Mechanical Code, 2022
 5. California Plumbing Code, 2022
 6. California Electric Code, 2022
 7. California Fire Code, 2022
 8. California Building Energy Efficiency Standards 2022
 9. California Green Building Standards 2022
 10. California Energy Code 2022
 11. National Fire Protection Association
 12. CAL-OSHA
 13. Occupational Safety and Health Administration
 14. State Fire Marshal, Title 19 CCR
 15. Other applicable state laws
- B. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.
- C. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.
- D. The above Codes and Standards define minimum requirements required for the project. Where Contract Documents differ from governing codes, furnish and install higher standard.
- 1.5 FEES, PERMITS, AND UTILITY SERVICES
- A. Arrange for required inspections and permits required in installation of the work.
 - B. The Owner will pay charges for permits required.
 - C. Arrange for utility connections and pay charges incurred, including excess service charges, if any.

1.6 UTILITY CONNECTIONS

- A. Prior to start of Construction and within 30 days of award of Contract, contact local gas company representative and coordinate location of gas meter and piping. In addition, coordinate time required for installation in order to avoid delay to the project.
- B. Arrange for utility connection and coordinate work with utility company.
- C. Contractor to bear the cost of all construction related to utility services from the point of connection shown on the Contract Documents. This includes any piping, excavation, backfill, boring, etc.

1.7 SITE EXAMINATION

- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.
- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.
- C. Exercise care in excavating near existing utilities to avoid any damage thereto. This Contractor is responsible for any damage caused by his operations.

1.8 ACTION SUBMITTALS / MATERIAL LIST AND SUBSTITUTIONS

- A. Prior to commencement of work, and within 35 days after award of Contract, submit to Architect for review electronic copies of a complete list of equipment and materials to be furnished, including all substitutions. All submittals to be in electronic format as follows:
 - 1. Submittals to be in PDF Format.
 - 2. Individual PDF cut sheets shall be inserted into a single file for review.
 - 3. All sheets to be “unprotected” and “writable”.
- B. Provide submittal information for all materials proposed for use as part of this project. Provide standard items on specified equipment at no extra cost to the contract regardless of disposition of submittal data. Other material or methods shall not be used unless approved in writing by the Architect. The Architect’s review will be required even though “or equal” or synonymous terms are used.
- C. It is the responsibility of the Contractor to assume all costs incurred because of additional work and/or changes required to incorporate the proposed substitute into the project including possible extra compensation due to the Architect. Refer to Division 1 for complete instructions.
- D. Contractor to provide complete Submittal packages for all plumbing items clearly separated by system. At a maximum, submittals to be broken into the following packages:

1. Plumbing – Fixtures and accessories, Trim, Piping, Equipment, Accessories, etc.
 2. Plumbing – Piping, Valves, Equipment, Accessories, etc.
 - a. When required by schedule, a separate Plumbing Underground submittal package will be reviewed upon request.
 3. Incomplete submittals or submittals broken down by spec section shall be returned un-reviewed.
- E. Identify each item by manufacturer, brand, trade name, model number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment.
1. Where submittal sheets indicate more than one product, Contractor to clearly identify product being submitted. Contractor to cross-out information not being submitted for review.
 2. Submittals that do not clearly identify submitted item will be returned to the Contractor un-reviewed.
- F. Identify each submitted item by reference to specification section number and paragraph in which item is specified. Cross reference submittals by equipment ID where applicable.
- G. Quantities are the Contractor's responsibility and will not be reviewed.
- H. If Contractor desires to make a substitution, he shall submit complete information or catalog data to show equality of equipment or material offered to that specified.
1. Only one request for substitution will be considered on each item of material or equipment. No substitutions will be considered thereafter.
 2. Scheduled Products and first named manufacturer/product forms basis of design. All other manufacturers' products are substitutions.
 3. No substitutions will be allowed unless requested and reviewed in writing.
 4. The Architect shall review and take appropriate action on shop Drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor.
 5. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated

items have not been received. Architect reserves right to require originally specified item.

6. Named non-basis-of-design manufacturer does not guarantee approval of equipment submittals. Manufacturers must comply with all the performance and features as specified within the specifications and as indicated on the design documents.

I. Installation of reviewed substitution is Contractor's responsibility. Any changes required for installation of reviewed substituted equipment must be made without additional cost to the owner. Review by the Architect of the substituted equipment and/or dimensional Drawings do not waive these requirements.

1.9 CLOSEOUT SUBMITTALS / MAINTENANCE AND OPERATING INSTRUCTIONS

A. Instruct the Owners' authorized representatives in the operation, adjustment, and maintenance of all mechanical equipment and systems. Provide 3 copies of certificate signed by Owner's representatives attesting to their having been instructed.

B. Furnish Architect with three complete sets of operating and maintenance (O&M) instructions.

1. O&M manuals to be bound in hardboard binder and indexed.

2. O&M manuals to include: descriptive literature, catalog cuts, and diagrams covering all items of operation and maintenance for each and every mechanical system and piece of equipment furnished under these specifications.

3. Include in each set a copy of the air balance test report specified hereinafter.

C. Contractor must start compiling the above data (including obtaining operating and maintenance instruction data and catalog cuts and diagrams from the manufacturer of the reviewed equipment) immediately upon review of his list of materials, so as not to delay the final installation of the work.

D. Bind and index each set in a durable, hardboard binder. Final observation will not be made until booklets are submitted and have been reviewed by the Architect.

E. O&M manuals to incorporate the following:

1. Complete operating instructions for each item of plumbing equipment.

2. Test data and system balancing reports as specified.

3. Manufacturer's bulletins with parts numbers, instructions, etc. for each item of equipment. Remove information not applicable to project.

4. Typewritten maintenance instructions for each item of equipment listing in detail the lubricants to be used, frequency of lubrications, inspections required, adjustment, etc.

5. A complete list and/or schedule of all major valves giving the valve ID, location of valve, and the rooms or area controlled by the valve.
6. Provide copies of start-up reports for each piece of equipment provided as part of this work.
7. Name, address, and phone number of contractors involved in work under this Division.
8. Detailed step-by-step instructions for starting, summer operation, winter operation, and shutdown of each system.
9. Detailed maintenance instructions for starting, summer operation, winter operation, and shutdown of each system.
10. Spare parts list.
11. Full size Record as built shop drawings in hard copies and PDF files.
 - a. Contractor to incorporate field mark-ups into record drawings. Mark-up shop drawings not acceptable.

1.10 COORDINATION SHOP DRAWINGS

A. General:

1. Prepare and submit for review coordination drawings where work by separate entities requires fabrication of products and materials which must accurately interface or for which space provided is limited.
2. Coordination drawings shall indicate how the work will interface and installation will be sequenced. It is the intent of this provision to find, bring forth, and resolve potential constructability problems prior to actual construction, thereby allowing for the resolution of issues before construction cost and schedule are impacted.

B. The General Contractor shall oversee preparation of coordination drawings, assign priority space, and bring to the attention of the Architect any conflicts or interferences of an unresolved nature found during preparation of coordination drawings. Expedite conflict or interferences and submit solutions/ recommendations for approval review.

C. Drawings: Shop drawings shall include but are not necessarily limited to the following:

1. Submit 1/4" = 1'-0" minimum scale, a combined, comprehensive plumbing coordination drawing. Coordination drawing shall include all plumbing piping, HVAC ductwork, mechanical piping, sprinkler systems, and ceiling systems overlaid on structural frame and architectural plan. Shop drawings are to be coordinated with all electrical and Telecom systems.
2. Criteria: Plumbing Piping, Ductwork, mechanical piping, and sprinkler system components shall be sized as shown on Drawings. Seismic restraints shall be shown where required.

- a. Nonconforming Mechanical work installed within designated coordination areas is subject to removal and replacement by the installing contractor at no additional cost to Owner.
 3. Provide sections for congested areas.
 4. Identify typical areas, start preparation of coordination drawings for such areas first.
- D. Coordination drawings shall be signed and dated by individual trade contractors. By act of signature and submittal of singular combined coordination drawing, each trade contractor acknowledges their coordinated portion of the work with all other mechanical, electrical, telecom, architectural, and structural work contractors.
- E. After completion of coordination shop drawings signed by individual trade contractors. Submit copies to the architect for review. Once approved, provide copy at the job site for reference. No work shall be performed without the complete coordination shop drawings.
- F. No request for information regarding the routing of pipes and placement of equipment will be reviewed and responded to without a completed shop drawings.

1.11 SITE CONDITIONS

- A. Information of the drawings relative to existing conditions is approximate only. Deviations found necessary during progress of construction to conform to actual conditions as approved by the Architect shall be made without additional cost to the Owner. The Contractor shall be held responsible for any damage caused to existing services. Promptly notify the Architect if services are found which are not shown on the Drawings.

1.12 WARRANTY

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show damage to itself or other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.
- C. Provide manufacturer's written warranties covering defects in material and workmanship of products and equipment utilized for the project.
- D. Warranties shall be for a period of 2 years from the date of substantial completion unless more stringently specified within individual Sections of this Division.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted or equal. Refer to subsequence division 22 specification sections for specific equipment and system materials and accessories.
- B. All material shall be new, full weight, standard in all respects, and in first- class condition.
- C. Provide materials of the same brand or manufacture throughout for each class of material or equipment wherever possible.
- D. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- E. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.
- F. Conform to the State Energy Conservation Standards for all material and equipment.

2.2 MATERIALS FURNISHED

- A. Identify all materials and equipment by manufacturer's name and model number. Remove unidentified materials and equipment from site.
- B. Equipment specified by manufacturer's number shall include all accessories, controls, etc. listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance from this permitted only with written consent of the Architect.
- D. Deliver, Protection, and Care:
 - 1. Deliver materials or equipment to the Project in the manufacturer's original, unopened, labeled containers.
 - 2. Added costs associated with reordering, expediting orders, or project delays due to rejected materials shall be borne by the Contractor.
 - 3. Protect from damage which may be caused by theft, weather, and building operations. Failure to protect materials and apparatus adequately shall be sufficient cause for rejection of any damaged material or equipment.
 - 4. Close pipe and equipment openings to prevent intrusion of obstructions and damage.
 - 5. Owner or Architect will require removal and replacement of such material or work from the premises which is not in accordance with Contract Documents.

Replace unsatisfactory work without delay, at no additional cost to the Owner.

6. All material and equipment shall be protected against moisture, dirt and damage. Protective coverings shall be provided for bearings, open connections to pumps and tanks, coils, ducts, pipes and similar equipment that is vulnerable to grit and dirt.
7. The interior of the pipes shall be kept clean at all times.

PART 3 – EXECUTION

3.1 GENERAL

- A. General arrangement and location of piping, equipment, etc. are shown on Drawings or herein specified. Carefully examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work. Provide all offsets as required to avoid other trades at no additional cost to the owner.
- B. In advance of construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.
- C. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both. Omission from Drawings or specifications of any minor details of construction, installation, materials, or essential specialties does not relieve this Contractor from furnishing same in place complete.
- D. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
 1. Minor piping associated with instrumentation and control is generally not shown. Interconnection of sensors, transducers, control devices, instrumentation panels, is the responsibility of the contractor. Small piping associated with water cooling, drips, drains and other minor piping may not be shown to avoid confusion in the plan presentation but shall be provided as part of contract work. Drains shall be piped to the nearest floor drains.
- E. Furnish materials and work at proper time to avoid delay of the work.
- F. Coordinate with testing and balancing contractor to review drawings for proposed additional balancing components required for proper system testing and balancing.

3.2 ACCESS

- A. Continuously check Architectural Drawings for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind will be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.3 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.4 PROJECT MODIFICATIONS

- A. During the progress of construction, if such conditions arise that require revisions, modifications, or relocations to any mechanical equipment or materials incorporated in this project, such alterations shall be immediately called to the attention of the Architect. Contractor shall then prepare necessary Drawings showing proposed changes. Submit proposed changes for review by the Architect prior to actual revision work in the field.
- B. Two sets of Drawings showing all revisions shall be immediately presented to Architect for his records. Maintain additional copies on the project as necessary to comply with "RECORD DRAWINGS" requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings.

3.5 FORMING, CUTTING AND PATCHING

- A. Coordinate with other contractors as necessary to provide any special forming, recesses, chases, etc., and provide wood blocking, backing, and grounds as necessary for proper installation of mechanical work.
- B. If this Contractor fails to coordinate with other contractors at proper time or fails to locate items properly, resulting in extra work, then this Contractor is responsible.
- C. This Contractor is responsible for proper placement of pipe sleeves, hangers, inserts, and supports for work.
- D. Cutting, patching, and repairing of existing (old) construction to permit installation of piping, etc. is responsibility of this Contractor. Repair or replace damage to existing work with skilled mechanics for each trade involved in first-class manner.
- E. Cut existing construction in a neat and workmanlike manner by the use of a concrete saw. Use of pneumatic devices will not be allowed.
- F. Core openings through existing construction as required for the passage of new piping and conduits. Cut holes of the minimum diameter to suit size of pipe installed and associated insulation.

3.6 DEMOLITION AND SALVAGE

- A. Provide demolition of mechanical work under this SECTION as indicated on Drawings.
- B. Removed materials which will not be re-used and which are not claimed by the owner shall become the property of the Contractor and shall be removed from the

premises. Consult Owner before removing any material from the premises. Carefully remove materials claimed by the owner to prevent damage. Coordinated delivery of such items to owner.

- C. Removed materials which are to be reused are to be removed, cleaned, and stored in a safe location. If such items are lost or damaged by the Contractor, item shall be replaced with new item at no added cost to owner. If item is found to be damaged prior to removal, inform Architect prior to removal so that item may be examined by Architect and owner for further instructions.

3.7 WELDING FOR MECHANICAL WORK

- A. All mechanical welding and inspection requirement shall be in accordance with the California Mechanical Code.
- B. Qualify welding procedures, welders and operators shall be in accordance with ASME Boiler and Pressure Vessel Code, Section IX, welding and brazing qualifications. Welding procedures and testing shall comply with ANSI standard B31.9 - Standard Code for Pressure Piping, and the American Welding Society (AWS) welding handbook.
- C. Soldering and brazing procedures shall conform to ANSI B9.1 standard safety code and NFPA 99.
- D. All welders shall be certified by a state approved welding bureau. Fabricator shall have current and valid certificated registration by the building official for the types of welds required by the project. Prior to start of the project, the fabricator shall submit a copy of certificate of registration for approval. Prior to project close out, the fabricator shall submit a certificate of compliance that the work was performed in accordance with the approved plans and specifications to the building official and to the Engineer or Architect of record.

3.8 ASBESTOS ABATEMENT

- A. Existing systems within the area of this scope of work may have asbestos-bearing materials. Testing, encapsulation, removal, treatment, or correction of existing asbestos-bearing materials is not a part of this scope of work and is not the responsibility of the mechanical contractors.

3.9 STRUCTURAL DESIGN OF EQUIPMENT AND SEISMIC RESTRAINTS

- A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2022 California Building Code, Section 1617A.1.18 through 1617A.1.26 and ASCE 7-10. Chapters 13, 26, and 30.
- B. Provide seismic sway bracing for all suspended piping and ductwork in accordance with the OSHPD anchorage pre-approval OPM-0043-13 the "Mason West Inc. Seismic Restraint Guidelines for Suspended Piping, Ductwork, and Electrical Systems".

3.10 START-UP PROVISIONS FOR MECHANICAL WORK

- A. General: Major equipment start-up shall be performed by the equipment manufacturer or authorized representative.
- B. Adjusting and Aligning Equipment: Adjust all equipment. Check all motors for proper rotation.
- C. Lubrication:
 - 1. Extend grease fittings on bearings to points of ready and easy accessibility.
 - 2. Lubricate fan bearings, etc., before operation of any equipment.
 - 3. Provide a final lubrication to equipment immediately before turning over to Owner.
- D. Provide training and orientation of Owners operating staff in proper care and operation of equipment, systems and controls.
- E. During test period, make final adjustments and balancing of equipment, systems, controls, and circuits so that all are placed in first-class operating condition.
- F. Mark final positions of balancing valves after balancing is complete.
- G. Final observation will not be made until all of the above have been completed and a preliminary copy of the balance report has been submitted and reviewed.

3.11 PLUMBING RECORD AS-BUILT DRAWINGS

- A. During the course of Project Construction, Mechanical Contractor shall maintain recorded “As-built” information by distinctively marking up approved shop drawings prints to depict all actual work installed on a daily basis form but not limited to field conditions, addendums, architectural supplemental instructions (ASIs), instruction bulletins (IBs), change orders (COs), responses to Request For Information (RFIs), and approved product substitutions.
- B. The marked-up shop drawings will be made available at the Construction Site to the Architect upon request, at any time.
- C. The marked-up shop drawings with the recorded information shall then be used to create Record As-built drawings at the completion of the project. Contractor shall submit the Record As-built drawings in full-size hard copies and also in PDF format.
 - 1. Provide 2 complete sets of full-size drawings on 20 pound white bond paper.
 - 2. Provide 1 CD (compact disc) or Thumb Drive with Record drawings in PDF format. Files to be names the same as sheets.
 - 3. Record as-built drawings are to be full size drawings (same size as Contract Documents) and all plans are to be to standard engineering scale. The minimum drawing scale to match those provided within the Contract Documents.

- D. Record As-built drawings shall include the followings:
1. Work on Record As-built drawings shall be provided with horizontal and vertical dimensions. Underground work shall be provided with invert elevations. All dimensions shall be references to permanent building fixed points and/or column lines.
 2. Provide sufficient details and sections to depict actual installations.
 3. Equipment identifications and system labeling nomenclatures shall match the Project Design Documents.
 4. Identification of main shut-off valves shall be based on the approved valve tag list and as actually installed in field.
 5. Piping mains and branches, size and location with pipe elevation information and invert elevations for underground piping. All risers shall be clearly identified.
 6. Location of plumbing fixtures, including but not limited to clean outs, floor drains, floor sinks, storm drains, catch basins, valve boxes and equipment connections.
 7. Locations of all manual and automatic valves, pipe strainers, backflow preventers, water hammer arrestors, expansion joints and compensators, pipe guides and anchor points.
 8. Equipment locations with dimensions from prominent building lines and requires service access.
 9. Seismic bracing information for plumbing system, piping, and equipment

3.12 CLEANING UP

- A. Remove tools, scaffolding, surplus materials, barricades, temporary walks, debris, and rubbish from the Project promptly upon completion of the work of each Section. Leave the area of operations completely clean and free of these items.

END OF SECTION.

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SECTION 22 05 00 – COMMON WORK FOR PLUMBING

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes general mechanical materials and methods required within the project. Items included within this specification section include:

1. Piping Supports
2. Access Doors
3. Valve Boxes
4. Roof Flashing
5. Dielectric Unions
6. Thermometers
7. Gauges
8. Pipe and Equipment Identification
9. Fireproofing
10. Painting
11. Concrete
12. Excavating And Backfill
13. Electrical Work
14. Commissioning and preliminary operational tests

1.2 ACTION SUBMITTALS

A. Product data: submit complete data of materials proposed including:

1. Manufacturer and model number
2. Clearly indicate all options, trim, and accessories.
3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.

1.3 CLOEOU SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

- C. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each component.
 - 2. Provide "trouble- shooting" maintenance guide.
 - 3. Include this data within maintenance manual.

- D. Operation and Maintenance Data: where applicable, submit complete O&M data including:
 - 1. Maintenance data and parts lists for each component.
 - 2. Provide "trouble- shooting" maintenance guide.
 - 3. Include this data within maintenance manual.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

1.5 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all plumbing valves and accessories against defects in materials and workmanship. Warranty shall cover replacement of product plus labor to install.

PART 2 – PRODUCTS

2.1 PIPING SUPPORTS

- A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2022 California Building Code, Section 1617A.1.18 through 1617A.1.26 and ASCE 7-10, chapters 13, 16, and 30.
- B. Mechanical equipment supports shall be designed by a licensed Structural Engineer.
- C. Provide seismic sway bracing for all suspended piping and ductwork in accordance with the Seismic Restraint System Guidelines, OPM-0043-13 by Mason Industries, Inc.
- D. Provide all piping and ductwork with seismic restraints using seismic hazard level (SHL) "A" as called for in SMACNA's Seismic Restraint Manual Second Edition 1998.
- E. Acceptable Manufacturer:
 - 1. Mason

F. Vertical Piping:

1. Support vertical piping risers securely with riser clamps, B-Line B3373, or equal. Attach clamps to the pipe above each concrete floor slab, with the arms of the clamp resting on the slab or the structural supports. Provide Superstrut B3373C, or equal clamp when used on copper piping.
2. Support pipe lines passing up through the building at each floor of the building.

G. Horizontal Piping:

1. Use B-Line B3100, or equal, steel strap hanger for uninsulated steel or cast-iron pipe through 8-inch size, and for insulated steel or cast-iron pipe through 4-inch size.
2. Use Superstrut C-710 or equal, steel hanger in pipe sizes where suitable. Use saddle shield as specified for insulated pipes.
3. For uninsulated copper tubing, use B-Line B3100F, or equal, felt lined hanger.

H. Pipe Saddles:

1. Use B-Line B3153, or equal, protective insulation shield with “loc” tabs.

I. Concrete Inserts: Provide B-Line B2500, or equal, concrete inserts.

2.2 VALVE BOXES

- A. Provide at each valve or cock in ground a Christy, Brooks, or equal valve box with cover marked for service.
- B. Valve boxes in traffic areas: Provide Christy No. G5 traffic valve box, 10-3/8” inside diameter with extensions to suit conditions, with cast iron locking cover.
- C. Valve Boxes in non-traffic areas: Provide Christy No F22, 8” inside diameter by 30” long with cast iron locking cover. Cut bottom of plastic body for operation of valve as required.
- D. Extension Handles
 1. Handle to be Alhambra Foundry Co., or equal, model A-3008 extension handle.
 2. Furnish 2 extension handles per project for underground valves.

2.3 ACCESS DOORS

- A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14-inch by 14-inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 18-inch by 24-inch minimum usable opening.

1. All access doors less than 7'-0" above finished floors and exposed to public access shall have keyed locks.
- B. Access doors shall match those supplied in Division 8 in all respects, except as noted herein.
- C. Where panels are located on ducts or plenums, provide neoprene gaskets to prevent air leakage, and use frames to set door out to flush with insulation.
- D. Provide insulated doors where located in internally insulated ducts or casings.
- E. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.
- F. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the architect when access is required within these areas.
- G. Available Manufacturers:
 1. Milcor
 2. Karp
 3. Nystrom
 4. Cesco
- H. Access doors to be equivalent to the following Milcor access doors:
 1. Style M (plaster)
 2. Style A (A/C tile, gypsum board)
 3. Style M (Masonry)
 4. Style "Fire Rated" where required.

2.4 ROOF FLASHING

- A. Flashings in metal deck or membrane type roofing:
 1. Flashing for penetrations of the roof for mechanical items such as flues, ducts, and pipes will be furnished and installed under other sections of these specifications. The work of this section shall include layout, sizing, and coordination of penetrations required for the mechanical work.
 2. Furnish and install counterflashings above each flashing required in the mechanical work. Flues and ducts shall have 24-gauge galvanized sheet metal storm collar securely clamped to the flue or duct above the flashing.

3. Sewer vents and other piping extending through roof structure shall have flashing provided and installed as part of the roofing work. This contractor shall coordinate his Work accordingly.
- B. Flashing in built-up roofing assemblies:
1. Where flashing is not provided and installed as part of other Work, furnish and install a waterproof flashing and counterflashing for pipe, duct, and flue passing through roof. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe, flue, or duct.
 2. Sewer vents and other piping extending through roof structure shall have four-pound sheet lead flashings and Semco, Smith, or equal to Semco #1100-4, counterflashing sleeves installed as detailed.
 - a. Provide Hydroseal at underside of counterflashings as recommended in Semco installation instructions.
 3. Seal all pipes passing through exterior walls in an approved, watertight manner.

2.5 DIELECTRIC UNIONS

- A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal-to-metal contact. Heavily line the couplings with a hard, insulating, phenolic plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.
- B. Acceptable Manufacturers:
1. Watts Regulator Co.
 2. Eclipse, Inc.
 3. Perfection Corp.

2.6 THERMOMETERS

- A. General:
1. Thermometers shall be furnished at all locations shown on the Drawings and in accordance with these specifications, whether shown on the Drawings or not
 2. All thermometers, unless shown otherwise, shall be of the bimetal helix or liquid-filled type.
 3. All thermometers shall be round, stainless steel case construction with glass front.

4. Accuracy to be within plus or minus one of the smallest scale divisions throughout the entire range.
 5. The thermometer scales shall have a minimum of 2 degrees between graduations and a maximum of 20 degrees between figures.
 6. The thermometers shall be located so as to be easily read and shall be furnished with adjustable angle pattern so as to be rotated to any position.
 7. Liquid thermometers for tanks and similar equipment shall have a minimum 5-inch diameter face.
 8. Thermometers for piping shall have a minimum face diameter of 3 inches.
 9. Thermometers installed on insulated tanks or piping shall be provided with an extension neck well to compensate for the thickness of the insulation.
 10. Thermometers shall be provided with stainless steel stems and steel wells.
 11. Thermometers used for air temperature in ductwork, plenum boxes, etc., unless specified or shown otherwise, shall have a minimum scale face of 5 inches and shall have an adjustable mounting flange so that scale may be set at any angle up to 45 degrees to facilitate reading.
 - a. The thermometers shall have a perforated guard over stem suitable for sensing air temperature.
 - b. Length of stem shall be a minimum of 8 inches.
 12. Thermometer wells with chain and cap shall be provided where wells are indicated on the Drawings.
- B. Provide Pete's Plug II, Sisco P/T, or equal test plug with Nordel core where indicated on drawings.
- C. Acceptable Manufacturers:
1. Weston
 2. Marsh
 3. Taylor
 4. Or Equal

2.7 GAUGES

- A. General:
1. Gauges and gauge connections shall be furnished at all locations shown on the Drawings and in accordance with these specifications, whether shown on the Drawings or not.

2. Accuracy to be within 1 percent in the middle third of the dial range and equipped with front calibration.
 3. Dials to be white with black numerals.
 4. Normal reading to be mid-scale.
 5. Provide a needle valve on each gauge connection.
 6. Gauge to have bronze bushed movement and front recalibration.
 7. Gauges shall have a minimum dial size of 3-1/2 inches.
- B. Provide Pete's Plug II, Sisco P/T, or equal test plug with Nordel core where indicated on drawings.
- C. Acceptable Manufacturers:
1. Marsh, Series J
 2. U.S. Gage
 3. Danton 800

2.8 PIPING AND EQUIPMENT IDENTIFICATION

- A. Pipe Identification:
1. Each piping system furnished and installed under this work shall be identified and the direction of flow indicated by a prefabricated coiled plastic colored label.
 2. Labels shall comply with ASME A13.1 with regard to color, letter height, and marker size. The labels shall have black or white lettering and flow arrows on colored backgrounds and shall not require adhesive. The background colors shall conform to the color schedule shown in this Article.
 3. For use indoors use 20 mil vinyl labels, MSI model MS-970, or equal. For piping with an outside diameter greater than 6 inches provide the label manufacturers nylon straps to secure label to piping.
 4. For use outdoors use Polyester/Tedlar laminated material, MSI model MS-977, or equal. For piping with OD greater than 6" provide the label manufacturers stainless steel straps to secure label to piping.
 5. The size of the lettering and label shall be such that the lettering can be easily read from the floor and the colors easily discernible.
 6. Acceptable Manufacturers:
 - a. Marking Services Incorporated (MSI)
 - b. Idento Metal Products Co., Idento Bands

c. Setmark

B. Equipment Identification:

1. Provide white lamacoid plate for each and every piece of equipment installed in this work.
 - a. Lettering on plate shall be black, with size of lettering to suit equipment.
 - b. Lettering shall be minimum of 3/8-inch in height.
 - c. Plates shall be riveted or bolted to equipment.

2. Equipment to include, but not limited to:
 - a. Pumps
 - b. Water Heaters
 - c. Air Compressors
 - d. Vacuum Pumps
 - e. Etc.

C. Acceptable Manufacturers:

1. Marking Services Incorporated, (MSI)
2. LEM Products
3. Seton
4. Craftmark

2.9 FIREPROOFING

- A. Fireproofing to be installed at all pipe and duct penetrations of rated assemblies.
- B. Fireproofing to be UL Rated fire stop material.
- C. Acceptable Manufacturers:
 1. Hilti
 2. 3M Pro-Set
 3. Or Equal

PART 3 – EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS

- A. Fasten all piping securely to structure with hangers, supports, guides, anchors, or sway braces to maintain pipe alignment, to prevent any sagging, and to prevent noise or excessive strain on the piping due to uncontrolled movement under operating conditions. Relocate hangers as necessary to correct unsatisfactory conditions that may become evident when system is put into operation.
- B. Follow drawing requirements and details where special pipe support requirements are detailed on the Drawings.
- C. Do not support piping by perforated tape, wire, rope, wood, nails, or other makeshift devices.
- D. Design hangers and supports to support the weight of the pipe, weight of fluid, and weight of the pipe insulation with a minimum factor of safety of five based on the ultimate tensile strength of the material used.
- E. Burning or welding on any structural member under load shall not be attempted. Field welding not called for on the Drawings or reviewed shop Drawings may only be done with consent and advice of the Architect and after proper provisions have been made to relieve the stress on the member. The boring of holes in beam flanges or narrow members will not be allowed.
- F. Install hanger on insulated piping in a manner which will not produce damage to insulation. Provide steel pipe saddles as required to protect pipe covering. Install pipe hangers on piping covered with insulation on the outside of the insulation and not in contact with the pipe.
- G. Fasten hanger rods to concrete structural members with concrete inserts set flush with surface. Install a reinforcing rod through the opening provided in the concrete inserts. Fasten hanger rods to structural members with suitable beam clamps, and provide beam clips to lock clamp securely to beam.
- H. Use of powder-actuated fasteners will not be permitted for the support of any overhead piping.
- I. Turnbuckles, if used, shall have a load-carrying capacity at least equal to that of the pipe hanger with which they are being used.
- J. All threaded parts of pipe hanger assemblies shall have full length of thread in service while in use.
- K. Hanger material shall be reviewed by the Architect before installation.
- L. Pipe Hanger or Support Spacing:
 - 1. Provide pipe hangers or supports at 6-foot maximum spacing on steel pipe 3/4-inch diameter and smaller and for copper pipe 1-1/2 inches and smaller.

2. Support steel piping 1" and larger and copper larger than 1-1/2 inches at 10-foot maximum spacing.
- M. Provide hangers or supports for horizontal and vertical cast-iron drainage pipe at every other joint, except that when the developed length between hangers or supports exceeds 4 feet, provide hangers or supports at each joint. Provide adequate sway bracing to prevent shear.

3.2 ACCESS DOORS

- A. Access doors shall be furnished and installed wherever valves, balance valves, damper operating mechanisms, air terminal boxes, fans, and similar items normally requiring adjustment or servicing are installed in concealed or inaccessible spaces. Coordinate with access doors shown on architectural Drawings.
- B. Comply with manufacturer's instructions for installation of access doors.
- C. Where access panels are detailed on architectural or mechanical Drawings, sizes indicated thereon shall be used.
- D. Keyed access doors shall be keyed alike.
 1. Provide owner with 4 copies of keys for access doors.

3.3 VALVE BOXES

- A. Provide valve box for all buried valves. Install per manufacturer's written instructions with top of box flush with finished grade.
- B. Clean all valve boxes of debris.

3.4 ROOF FLASHING

- A. Provide pipe flashings as noted on the Drawings.
- B. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.5 DIELECTRIC UNIONS

- A. Install dielectric unions in the following locations:
 1. In all metallic water and gas service connections into the building within 5 feet of the building wall. Install adjacent to the shut-off valve or cock and above ground where possible.
 2. At points of connections where copper water lines connect to steel domestic water heater tanks and other equipment.
 3. At points in piping where dissimilar metal pipes are connected together.
 4. Any special applications shown on the Drawings.

5. Where steel or cast-iron pipe in the ground connects to copper or brass piping above the ground, the transition from steel or cast-iron pipe to the copper or brass pipe shall be made above ground in all cases and in an accessible location where practicable.
6. Where copper or brass piping is connected to steel or cast-iron piping and the connection is buried in the ground, the connection shall be covered with coal tar protective tape extending outward a minimum of 5 feet on all pipes, from the point of connection. The tape shall have a minimum thickness of 10 mils and a maximum thickness of 12 mils and shall be applied so as to provide at least two full thicknesses of the tape over the piping. A primer, specifically designed for use with the tape, shall be used. The piping shall be thoroughly cleaned before any tape or primer is applied.

3.6 THERMOMETERS

- A. Liquid thermometers for piping systems shall be installed so that the liquid flows completely around the bulb.
- B. Enlarge pipes smaller than 2 ½" for installation of thermometer wells.
- C. Apply thermal grease in thermowells prior to installation of thermometers.
- D. Where shown on the temperature control diagram, the temperature control subcontractor shall furnish and install remote, bulb, panel-mounted, pneumatic-type thermometers. Duct-mounted thermometers may be omitted at these locations.
- E. Locations: Thermometers shall be placed at all locations shown on the Drawings and at locations specified below. Ranges shall be as specified below.
 1. In supply from tank, thermostat range to be 30 to 180 degree F.
 2. In domestic hot water return systems near circulating pump, thermostat range to be 30 to 180 degree F.
- F. In such cases where the above described thermometers cannot be located so as to be easily read, a remote reading type of thermometer shall be installed, as approved by the Architect.
- G. Thermometers provided as part of the temperature control work and located on a control panel, etc. need not be duplicated by above requirements.

3.7 GAUGES

- A. Gauges shall have indication of 0 to 160 psi where indicated pressure will be greater than 40 PSI and 0 to 60 psi for lesser pressures.
- B. Provide gauge connections at the following locations:
 1. Inlet and outlet of butterfly-type balancing valves.
 2. Suction and discharge of circulating pump.

3. Elsewhere as may be shown on the Drawings.
- C. Gauges shall be provided in a convenient location within approximately 5 feet of the flanges or connections and elsewhere as may be shown on the Drawings.
- D. A needle-point globe valve, similar to Crane No. 88, shall be supplied at each gauge and gauge connection.
- E. A gauge siphon located adjacent to the gauge shall be applied with each hot water gauge.

3.8 PIPE AND EQUIPMENT IDENTIFICATION

- A. Identification shall be applied to all piping, except piping located in furred spaces without access to permit entrance of personnel, and piping buried in the ground or concrete.
- B. Underground pipe identification shall consist of a buried, continuous, preprinted, bright colored, plastic ribbon cable marker provided for each underground pipe.
- C. The legend and flow arrow shall be applied at the following locations:
 1. All valve locations,
 2. All points where piping enters or leaves a wall, partition, cluster of piping, or similar obstruction
 3. All exposed locations
 4. At approximately 20-foot intervals on pipe runs.
- D. Practical variations or changes in locations and spacing may be made with the specific approval of the Architect to meet specific conditions.
- E. Wherever two or more pipes run parallel, the printed legend and other markings shall be applied in the same relative location so that all piping is easily identified.
- F. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.
- G. Where different equipment, such as fire sprinklers, are supplied from a common main, such as domestic water, the main should be identified as "Domestic Water" and each respective branch takeoff as "Fire Water," etc.
- H. The non-potable water plumbing piping shall be marked with the legend "Danger - Unsafe Water". This legend shall be applied to both hot and cold water systems along the length of the pipe in fluorescent orange at a maximum of five foot intervals.
- I. Lettering size and label colors are to be per ASME/ANSI A13.1 Pipe Marking Standards.

3.9 FIREPROOFING

- A. Pack the annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls with UL listed fire stop.
- B. Fireproofing system to be installed in strict accordance with manufacturer's written instructions and details.

3.10 PAINTING

- A. Perform all priming and painting on the equipment and materials as specified herein.
- B. Exposed piping and unfinished portions of equipment to be painted shall be cleaned of grease, oil, rust, or dirt in preparation for painting.
- C. Where applicable, remove pipe clamps prior to painting so that entire pipe is painted. Provide temporary support as required. Re-install clamps after priming/painting is complete.
- D. Priming:
 - 1. Contractor to prime all exposed ferrous metals, including piping, which are not galvanized or factory-finished.
 - a. Black steel pipe exposed to weather shall be cleaned and primed with one coat of Rust-Oleum, or equal, #1069 primer. Color to be Grey.
- E. See Painting Section for detailed requirements.

3.11 CONCRETE

- A. Where specifically indicated on the Drawings or specified as part of Mechanical Work, this Contractor shall furnish and install concrete work, such as thrust blocks or spring isolator bases.
- B. Concrete and reinforcing steel shall be equal to that specified for General Construction.
- C. Except as noted above, concrete work will be furnished and installed under General Work. This Contractor shall coordinate requirements accordingly.

3.12 EXCAVATING AND BACKFILL

- A. Perform all excavating required for work of this Section. Do excavating required for installation of piping and service lines and other work that applies as indicated on Drawings. Verify location and elevation of all existing utilities prior to excavation for installation of new piping. Provide the services of a pipe/cable locating service prior to excavating activities to determine location of existing utilities
- B. Excavations shall be of open vertical construction of sufficient width to provide free working space at both sides of trench and around pipe as required for caulking, joining, backfilling, and compacting. Unless shown otherwise, provide a minimum of 2'-6" cover above top of pipe to finished grade for all service piping unless otherwise

noted. Trim trench bottom by hand or provide a minimum of 4” deep sand bed to provide a uniform grade and firm support throughout entire length of pipe. For PE gas pipe, bed the pipe in a 4” sand bed.

- C. Dig trenches straight and true to line and grade with holes for bells for bell-and-spigot pipe. Evenly support piping for its entire length upon outside periphery of lower one-third of pipe. Where rock is encountered, undercut trenches 3 inches and fill with well-tamped, clean sand and pea gravel to correct pipe elevation.
- D. After pipe lines in excavation have been installed and tested, backfill excavation to point 6 inches above pipe using sand, fine earth, or other materials free of rocks and large lumps. Proceed evenly on both sides of pipe and continuously tamp. Except as hereinafter noted, backfill above 6 inches above top of pipe shall be made by using earth from excavation placed in layers of 8-inch maximum depth. Compaction of each successive layer will be made with mechanical compactor.
- E. Take special care in backfilling over wrapped piping to prevent damage to protective wrapping.
- F. Bed sewers under pavements, wrapped piping, and PVC piping in sand prior to backfilling. Backfill to point 6 inches above pipe with sand.
- G. This Contractor shall replace sod, concrete, asphalt paving, curbs, pavement, walks, and any other type of existing work or surface disturbed by excavation, using workmen skilled in trade involved.
- H. When pipe or underground conduit with a protective wrapping is to be placed in the trench, sand only shall be used for bedding the pipe or conduit. The sand used shall be certified to have a minimum resistance of 5000 ohms per cubic centimeter when wetted to any moisture content with distilled water and shall consist of clean, natural, washed-sand, hard, and durable particles varying from fine particles to particles of such size that all will pass through a 3/8-inch screen, not less than 90 percent will pass through a 1/4-inch screen, and not more than 25 percent will pass through a No. 50 screen.
- I. Any backfill placed under this contract which subsides or settles below the adjacent finished grade or paving level during the guarantee period shall be brought to grade by the Contractor by adding compacted backfill or additional paving in paved areas.

3.13 ELECTRICAL WORK

- A. Adequate working space shall be provided around electrical equipment in compliance with the National Electric Code and other applicable codes or ordinances. The mechanical work shall be coordinated with the Electrical Work in order to comply with these requirements. Any work which does not conform to these regulations shall be properly corrected without additional cost to the Owner.
- B. Furnish and install all line voltage and low-voltage temperature control wiring in the Mechanical Work by the Temperature Control Sub-Contractor, including all interlock wiring between valves, interlock relays, and temperature control equipment. Unless noted otherwise, this does not include primary control wiring between starters and push button or other manual starter switch or branch power circuits required for temperature control systems.

- C. Temperature control equipment, including relays shown on control diagram, shall be furnished and installed by the Temperature Control Subcontractor.
- D. Electrical devices with piping connections, such as solenoid valves, insertion thermostats, strap-on aquastats, and similar items which are to be wired under the Electrical Work or by the Temperature Control Subcontractor, shall be installed by the Mechanical Contractor.
- E. Equipment furnished in this work that is factory wired but requires modification to internal wiring to meet specifications or drawing requirements shall have such internal modifications made at factory before shipment.
- F. All electrical work and equipment, including internal wiring, must comply with applicable codes and applicable portions of electrical specifications. Run line and low-voltage control wiring in conduit. Conduit for temperature control wiring shall be responsibility of Mechanical Contractor and shall be of type specified in electrical specifications.

3.14 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter. Thoroughly clean out flush valves, traps, strainers, and pressure-reducing valves.
- C. Keep the interior of all pipes free of dirt, dust, loose insulation, and other foreign materials at all times.
- D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.15 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.16 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 22 05 23 – VALVES AND ACCESSORIES FOR PLUMBING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes plumbing accessories including the following:
1. Valves
 2. Miscellaneous piping products
 3. Hose Bibbs and Hydrants
 4. Backflow Preventers
 5. Miscellaneous Drains
 6. Cleanouts
 7. Floor Drains and Floor Sinks

1.2 REFERENCES AND STANDARDS

- A. Requirements of Regulatory Agencies: Contractor to conform to the publications listed below. Requirements of these publications are to be considered as a minimum standard. If details and specifications which require more stringent work are indicated within project, Contractor to provide the more stringent.
1. California Plumbing Code (CPC) Compliance: Comply with applicable portions of the California Plumbing Code pertaining to selection and installation of plumbing materials and products. Fabricate and install natural gas systems in accordance with CPC.
 2. ANSI Compliance: Fabricate and install natural gas piping in accordance with ANSI B21.2, *Fuel Gas Piping*.
 3. NFPA Compliance: Fabricate and install natural gas systems in accordance with latest edition of NFPA 54, *National Fuel Gas Code*.
 4. Utility Compliance: Fabricate and install natural gas systems in accordance with local gas utility company requirements.
 5. ASME B31.9 for building services piping valves.
 6. NSF Compliance: NSF 61 for valve materials for potable-water service
- B. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 - 1. Manufacturer and model number
 - 2. Clearly indicate all options, trim, and accessories.
 - 3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification
- C. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each component.
 - 2. Provide "trouble- shooting" maintenance guide
 - 3. Include this data within maintenance manual

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all plumbing valves and accessories against defects in materials and workmanship. Warranty shall cover replacement of all such valves or accessories plus labor to install.

PART 2 – PRODUCTS

2.1 VALVES

- A. General:
 - 1. Similar valves to be by the same manufacturer.
 - 2. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

3. Bronze Valves: 2"Ø and smaller with threaded ends, unless otherwise indicated.
 4. Ferrous Valves: 2 ½"Ø and larger with flanged ends, unless otherwise indicated.
 5. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
 6. Valve Sizes: Same as upstream piping unless otherwise indicated.
 7. Valve Actuator Types:
 - a. Handwheel: For valves other than quarter-turn types.
 - b. Hand-lever: For quarter-turn valves 6"Ø and smaller, except for plug valves.
 - c. Wrench: For plug valves with square heads.
 - i. Furnish Owner with 1 wrench for every 5 plug valves, for each size square plug-valve head.
 8. Valve-End Connections:
 - a. Flanged: With flanges according to ASME B16.1 for iron valves, ASME B16.5 for steel valves.
 - b. Grooved: With grooves according to AWWA C606.
 - c. Valve solder-joint connections are common in smaller sizes of plumbing piping. Soldering and brazing methods used to achieve required pressure-temperature ratings may damage internal valve parts. Special installation requirements for soldered valves may make threaded valves more cost-effective.
 - d. Threaded: With threads according to ASME B1.20.1.
 - e. Valve Bypass and Drain Connections: MSS SP-45.
- B. Acceptable Manufacturers:
1. Ball, gate, butterfly, and check valves:
 - a. Nibco
 - b. Apollo
 - c. Milwaukee
 2. Balance Valves:
 - a. Bell and Gosset Circuit Setter

b. Armstrong

c. Nibco

C. Ball Valves - $\leq 3''\varnothing$:

1. Two-Piece, Full-Port, Lead Free Bronze Ball Valves with Stainless-Steel Trim:

2. NIBCO Model S-585-66-LF or equal.

a. Pressure Rating: 600 PSI non-shock cold working pressure

b. Maximum pressure / Temperature: 100 PSI AT 300°F

c. Body Design: Two piece steel with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.

d. Body Material: Bronze ASTM B 584 Alloy C844.

e. Ends: Threaded or Solder.

f. Seats: PTFE or TFE.

g. Stem: Stainless.

h. Ball: Stainless steel, vented.

i. Port: Full.

D. Gate Valves- $\leq 3''\varnothing$:

1. Screw in Bonnet, Rising Stem, Silicon Bronze Gate Valve

2. NIBCO Model T-111-LF or equal.

a. SWP Rating: 150 psig

b. Maximum Pressure / Temperature: 100 PSI at 300 degree F

c. Body Material: Silicon Bronze ASTM B584

d. Wedge Material: Silicon Bronze ASTM B584

e. Bonnet Material: Silicon Bronze ASTM B584

f. Packing Material: Bronze ASTM B62 or ASTM B584 or Brass ASTM B16

g. Packing nut: Bronze ASTM B62 or ASTM B584 or Brass ASTM B16

h. Handwheel: Malleable Iron ASTM A 47

- i. End Connections: Threaded
- E. Check Valves – $\leq 3''\varnothing$:
- 1. Horizontal Swing, Regrinding type, Y-patter, Renewable seat and disc bronze check valve
 - 2. NIBCO Model T-413 or equal.
 - a. SWP Rating: 125 psig
 - b. CWP Rating: 200 psig
 - c. Body Material: Bronze ASTM B 62.
 - d. Ends: Threaded
 - e. Seats: Buna-N.
 - f. Hinge: Bronze ASTM B140 Alloy
- F. Check Valves - $\leq 2''\varnothing$:
- 1. Inline lift type bronze ring check valve
 - 2. NIBCO Model T-480 or equal.
 - a. WWP Rating: 250 psig
 - b. Body Material: Bronze ASTM B 584.
 - c. Stem: Stainless Steel
 - d. Spring: Stainless Steel
 - e. Disc Holder: Stainless Steel
 - f. Disc: Buna-N
- G. Balance Valves:
- 1. Bell and Gosset Circuit setter or equal
 - a. CWP Rating: 300 psig
 - b. Body: Bronze
 - c. Seat Rings: Caron Filled
 - d. Valve to have differential pressure read-out ports across valve area. Read out ports to be fitted with internal EPT insert and check valve. Valve bodies to have $\frac{1}{4}''$ tapped drain/purge port.

- e. Valve to have memory stop feature.
2. Provide owner with one Bell and Gossett Circuit Setter #RO-2 meter.

2.2 MISCELLANEOUS PIPING PRODUCTS

A. Trap Primers

1. Provide trap primers as indicated, 1/2-inch size, with built-in air gap. Provide with 1/2-inch shut-off valve.
2. Where one trap primer will be used for more than one trap, provide a distribution unit (DU-2 through DU-4 as required) with feeder piping for a maximum of four traps.
3. Acceptable Manufacturers:
 - a. Precision Plumbing Products “Prime Rite”
 - b. Sioux Chief Manufacturing Company “Prime Perfect”
 - c. MiFab “M-500 Series”

B. Water Hammer Arrestors

1. Water Hammer Arrestors to be provided on both hot and cold water branch piping severing ALL plumbing fixtures (not just flush valves).
2. Provide water branch lines at single fixtures with a manufactured water hammer arrestor. Water hammer arrestors shall be sized per Plumbing Drainage Institute Standard PDI-WH201 “Water Hammer Arrestors.”
3. Water hammer arrestor to be with nesting type bellows contained within a casing having sufficient displacement volume to dissipate the calculated kinetic energy generated in piping system. Both casing and bellows constructed of Type 304 stainless steel. Arrestor to have a threaded connection.
4. Where multiple fixtures are located in a row or battery a single or multiple water hammer arrestors, as required, may be used. Multiple fixture installations shall have the arrestor sized and located per standard PDI-WH201 and the manufacturer’s installation instructions.
 - a. Provide Access door for water hammer arrestors in restrooms containing more than 1 flush valve type fixture.
5. All water hammer arrestors shall have male pipe thread connections.
6. Water hammer arrestor to be a Zurn model Z1700 or equal.
7. Acceptable Manufacturers:
 - a. Zurn

- b. J.R. Smith
- c. Wade
- d. Amtrol Inc.

C. Piping Escutcheons:

- 1. Provide chrome plated brass pipe escutcheons with inside diameter closely fitting pipe outside diameter or outside of pipe insulation where pipe is insulated.
- 2. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, ceilings, or pipe sleeve extension, if any.
- 3. Furnish pipe escutcheons with nickel or chrome finish and screw or spring clamping device with concealed hinge

D. Pipe Sleeves:

- 1. Where pipes pass through concrete floors or walls, install galvanized metal or plastic sleeves having not less than 1/2-inch or more than 1-inch clearance around sides of the pipe or pipe covering for the full thickness of the concrete.
- 2. After piping has been installed, fill annular space with fireproof safeing.
- 3. Acceptable Manufacturers:
 - a. Adjustocrete
 - b. Sperzel "Crete-Sleeve"
 - c. Or equal

2.3 HOSE BIBBS AND HYDRANTS

A. Hose Bibbs:

- 1. Where located on interior walls provide Zurn model Z1341 or equal. Hose bibb to have polished bronze body, chrome plated, renewable composition disc, tee key handle, 3/4-inch inlet and hose outlet with non-removable vacuum breaker. Provide with FPT fittings.
 - a. Where hose bibb is located within a Janitors closet or mechanical room, provide with handle.
- 2. Where located on Exterior walls provide Zurn model Z1346 or equal. Hose bibb to have rough brass body, chrome plated, renewable composition disc, tee key handle, 3/4-inch inlet and hose outlet with non-removable non-freeze vacuum breaker. Provide with FPT fittings.

B. Acceptable manufacturers:

1. Zurn
2. Woodford
3. or equal

2.4 MISCELLANEOUS DRAINS

A. Fixed Air Gap: Zurn model Z-1025 or equal. Fixed air gap to have a dura-coated cast iron body with slop joint inlet and no-hub outlet.

B. Hopper Drain:

1. Zurn model Z-325-DB, 7"Ø indirect waste funnel with dura-coated cast iron body, plastic ball float, bronze backwater valve bushing and a replaceable neoprene seat. Provide with optional dome strainer.

2.5 CLEANOUTS

A. Provide cleanouts of same diameter as pipe shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located a minimum of 18" from building construction so as to provide sufficient space for rodding.

B. Cleanouts shall have cast iron ferrules and bronze plugs.

C. Cleanouts extending to floor level shall be provided with membrane flange and clamping collar, bronze raised head plug, and nonslip scoriated top.

D. Cleanouts to be as follows:

1. Cleanouts in cast-iron soil or waste lines: Zurn Z-1440A-BP.
2. Cleanouts in walls: Zurn Z-1446-A-BP with stainless steel access cover.
3. Cleanouts on exterior of building: Zurn Z-1440.
 - a. Provide stainless steel cover and vandal-proof screw where located in wall. Zurn Z-1446-A
 - b. Where located at grade, provide 18- by 18- by 6-inch concrete pad and Zurn Z-1474 heavy duty cover. Provide Z-1440-A cleanout.
4. Cleanouts in floor to be a Zurn ZN-1400 with the following options:
 - a. Where located in terrazzo floor, provide –T, square top option.
 - b. Where located in carpet, provide –T square top option and –CM carpet marker option.

- c. Where located in vinyl tile, provide –TX square top recessed for tile option.
- E. Acceptable Manufacturers:
- 1. Zurn
 - 2. J.R. Smith
 - 3. MiFab

2.6 FLOOR DRAINS, FLOOR SINKS, AND AREA DRAINS

- A. Provide floor drains, floor sinks and area drains of size as indicated on Drawings, and type, including features, as specified herein. Provide flashing ring and clamp at floors with waterproofing membrane. Set top of drain slightly below floor to insure drainage unless noted otherwise. Install vented P- trap below each drain.
- B. Provide with trap primer connections at trap where required.
- C. General Service Floor Drains: Zurn Z-415 or equal. Drain to have a dura-coated cast iron body with bottom outlet, combination invertible membrane clamp and adjustable collar with seepage slots.
 - 1. Provide with “Type B” strainer where installed in concrete.
 - 2. Provide with “Type S” strainer where installed in tile.
 - 3. Provide with “Type SL” strainer where installed in composition type floor.
 - 4. Provide with “Type I” strainer where used at indirect drain locations
 - 5. Provide with “Type B” strainer and optional –DP decorative polished top where installed at a shower.
- D. Floor Drains in Mechanical Rooms: Zurn Z-450-Y or equal. Drain to have a dura-coated cast iron body with bottom outlet, seepage pan and combination membrane flashing clamp and frame, sediment bucket, and a medium duty cast iron slotted grate.
- E. Floor Sinks in Kitchens: Zurn ZN-1900-K-2 or equal. Floor sink to be a 12”x12”x6” deep floor sink with a cast iron body and square slotted light duty ½ grate with white acid resisting porcelain enamel interior and top. Complete with a white A.R.E anti-splash interior bottom dome strainer.
- F. Half size floor sink in kitchen (for refrigerator/freezer condensate drain): Zurn ZN-1930-K-4 or equal. Floor sink to be a 8”x4”x4” deep floor sink with a cast iron body and square slotted light duty full grate with square center opening and with white acid resisting porcelain enamel interior and top. Complete with a white A.R.E anti-splash interior bottom dome strainer.
- G. Area Drain at Trash Enclosure: Zurn Z505-S-HT heavy duty drain with sediment bucket. Drain to have 12-1/4” diameter top drain, dura-coated cast iron body with

bottom outlet, seepage pan and combination membrane flashing clamp and frame for heavy duty deep flange slotted duresist grate with sediment bucket. Provide with square hinged grate and secondary strainer.

H. Acceptable Manufacturers:

1. Zurn
2. J.R. Smith
3. Wade
4. MiFab

PART 3 – EXECUTION

3.1 INSTALLATION OF VALVES

A. Valve Applications:

1. Domestic Water:
 - a. Shut off valves above grade: Ball Vales
 - b. Shut off valves below grade: Gate Valve
2. Check Valves:
 - a. Piping in horizontal orientation: Swing Check Valve
 - b. Piping in vertical orientation: Lift Check Valve

B. General:

1. Install valves with stems upright or horizontal. Valves stem position to be arranged to allow access for maintenance.
2. Do not install swing check valves in vertical position.
3. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
4. Operate valves in positions from fully open to fully closed prior to installing within system.
5. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
6. Locate valves for easy access and provide separate support where necessary.

7. Install valves in horizontal piping with stem at or above center of pipe.
8. Install valves in position to allow full stem movement.
9. Install check valves for proper direction of flow and as follows:
 - a. Swing Check Valves: In horizontal position with hinge pin level.
 - b. Lift Check Valves: With stem upright and plumb.
10. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
11. Coordination location of solenoid valves with Controls Contractor. Solenoid valves to be programmed to be open during normal school hours and closed during off hours.
12. Provide union at each connection to equipment and downstream of each valve. Provide unions at both ends of valves when valves cannot be turned due to an obstruction.
13. After piping systems have been tested and put into service, but before final testing, adjusting, and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks; replace valve if leak persists.
14. Tag each valve and provide a complete listing of valve locations and functions.

3.2 PIPE ESCUTCHEONS

- A. Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view and on exterior of building.
- B. Tighten escutcheon to pipe or insulation so escutcheon covers penetration hole and is flush with adjoining surface.

3.3 SLEEVES

- A. Secure sleeves to metal or wood forms in such a manner that they will not become displaced during pouring of concrete. Fill sleeves on deck with sand.
- B. After forms have been removed from concrete, the sleeves shall be removed from the openings.
- C. Core drill properly sized holes in the concrete to replace metal sleeves that are crushed or knocked out of position during pouring of concrete.
- D. Provide piping passing through concrete fire walls with sleeves of standard black steel pipe nominally one size larger than pipe enclosed, but in the case of insulated pipe, large enough for insulation to pass through. Caulk space between pipe and

sleeve with fire-rated wicking, and provide metal retainer plates at both sides of the wall.

- E. Sleeve Seals: Install in accordance with the following:
 - 1. Lead and Oakum: Fill and pack annular space between sleeve opening and pipe with oakum; caulk with lead on both sides.
 - 2. Mechanical Sleeve Seals: Loosely assemble rubber links around pipe with bolts and pressure plates located under each bolt head and nut. Push into sleeve opening and center. Tighten bolts until links have expanded to form watertight seal.

3.4 INSTALLATION OF UNIONS AND FLANGES

- A. Install unions and flanges so that piping can be easily disconnected for removal of tanks, equipment, and valves. Provide a minimum of two unions at each three-way valve.

3.5 INSTALLATION OF INTERCEPTORS

- A. Install interceptors per manufacturers written instructions. Verify adequate clearance is provided for removal of strainers and for cleaning.
- B. Contractor to remove and clean all strainers after flushing of system and prior to project completion.

3.6 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work.
- B. At completion of work, carefully clean and adjust equipment and trim installed as part of this work.
- C. Leave systems and equipment in satisfactory operating condition.

3.7 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

END OF SECTION.

SECTION 22 07 00 – PLUMBING INSULATION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes insulation types and thickness for plumbing piping and equipment.

1.2 REFERENCES AND STANDARDS

- A. California Code of Regulations – Title 24, Part 4.
- B. California Building Code, California Electric code, NFPA, and UL
- C. ASTM
- D. ASHRAE
- E. NAIMA
- F. NFPA
- G. SMACNA – Sheet Metal and Air Conditioning Contractor’s National Association, Inc.
- H. Underwriter’s Laboratories
- I. GREENGUARD
- J. CAL-GREEN

1.3 ACTION SUBMITTALS

- A. Submit complete data of materials proposed.
 - 1. Indicate individual services for each system.
 - 2. Indicate proposed insulation thickness for each system.
 - 3. Indicate proposed R-values, densities, etc. for each product.
- B. Provide Manufacturer’s installation instructions for each product.

1.4 CLOEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

1.5 QUALITY ASSURANCE

- A. Manufacturer’s Qualifications: Firm specializing in manufacturing of mechanical insulation products applicable to project whose products has been in satisfactory use in similar services for a minimum of 3 years.

- B. Installer's Qualifications: Company specializing in piping insulation application with a minimum of 3 years experience.
- C. Flame/Smoke Ratings: Insulation materials, including but not limited to insulation, jackets, coverings, sealers, adhesives, etc., to have flame-spread rating of 25 or less and smoke-developed index of 50 or less when tested in accordance with ASTM E84.
- D. Insulating products to be installed in accordance with manufacturer's written instructions and in accordance with recognized industry practices.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for insulation against defects in materials and workmanship. Warranty shall cover replacement of insulation plus labor to install

PART 2 – PRODUCTS

2.1 GENERAL

- A. For purposes of this specification, fittings, joints, strainers, flexible piping, valves, etc. shall be considered as piping and shall be insulated with same material and thickness as adjoining piping unless noted otherwise.
- B. Acceptable Manufactures
 - 1. Knauf
 - 2. Johns Manville
 - 3. Certainteed
 - 4. Owens-Corning

2.2 MATERIALS

- A. Fiberglass Piping Insulation:
 - 1. Insulation to be heavy density fiberglass pipe insulation that complies with ASTM C547.
 - 2. Insulation to have factory-applied self-sealing vapor barrier.
 - 3. Maximum K-Value at 75°F = 0.23 Btu-in/hr-FT²-°F.
 - 4. For pipe sizes 1.5 inches in diameter and larger, provide rigid insulation inserts with galvanized metal shields ("Saddles") at hanger locations.
 - a. Shields are not required for pipes 1-1/4" or smaller.
 - 5. Fittings and valves to be insulated with John Manville Zeston 2000 Series 25/50 Smoke-Safe PVC pre-molded insulated covering secured with standard fasteners.

6. Insulation to be Johns Manville Micro-Lok or equal.
- B. Flexible Closed Cell Insulation:
1. Flexible elastomeric thermal closed-cell structure insulation.
 2. Maximum K-Value at 75°F = 0.27 Btu-in/hr-FT²-°F.
 3. Joints to be sealed with Armstrong 520 Adhesive
 4. Insulation to be Armstrong Armaflex 22 or equal

2.3 PIPING INSULATION

- A. Domestic Hot Water Supply and Return:
1. Insulate exposed piping with fiberglass piping insulation with thicknesses as follows:
 - a. Pipes 2"Ø and smaller- 2" thick insulation.
 - b. Pipes 2 1/2"Ø and larger – 2 1/2" thick insulation.
 - c. Exposed pipes installed within 9'-0" of the finished floor to be provided with ASJ-SSL jacket.
 2. Insulate concealed piping with fiberglass piping insulation with thicknesses as follows:
 - a. Pipes 1"Ø and smaller with 1" of fiberglass piping insulation.
 - b. Pipes 1 1/4"Ø and larger – insulate with 1 1/2." of fiberglass piping insulation.
 3. Do not insulate unions, valves, and exposed run-outs to fixture.
 4. For protective pipe insulation at run-outs to fixtures, reference specification section 22 42 00.
- B. Domestic Cold Water:
1. Insulate piping exposed to weather with flexible closed cell insulation.
 2. Wrap valves and fittings with mastic and z-tape.
 3. Insulation to be a minimum of 3/4" thick.
 4. Seal all joints with Armstrong 520 adhesive.
 5. Insulation exposed to weather to be provided with metal protective jacket. Metal protective jacket to be as follows:
 - a. Sheet Aluminum: ASTM B209, 3003 allow, H-14 temper, 0.016" thick.

- b. Longitudinal lap to be at least 2" wide.
 - c. Fitting covers: Factory fabricated die shaped type 3003 sheet aluminum, 0.024" minimum thickness.
 - d. Provide 3/8 inch wide, 0.016 inch thick aluminum bands spaced at a maximum of 2'-0" on center.
- C. Rain Water Leader Piping:
- 1. Insulate exposed piping with 1/2" fiberglass piping insulation.
- D. Condensate Drain Piping:
- 1. Insulated exposed in building and piping within attic with 3/4" closed-cell pipe insulation.
 - 2. Seal with Armstrong 520 adhesive.

PART 3 – EXECUTION

3.1 GENERAL

- A. Insulation to be stored on jobsite in clean / dry location. Any insulation exposed to water must be discarded immediately and removed from jobsite.

3.2 INSTALLATION OF PIPING INSULATION

- A. Install piping insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices.
- B. Installation to be installed after installation of heat tracing, testing, acceptance of testing, and cleaning of pipe.
- C. Insulate each continuous run of piping with full-length units of insulation. Cut pieces to size as required. Do not use multiple cut pieces and/or scraps abutting each other.
- D. Clean and dry piping surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and type fit over surface to be covered.
- E. Install piping insulation without interruption through walls and floors except where otherwise indicated.
- F. Taper raw ends of insulation and seal with canvas and sealant as noted for fittings.
- G. Install pipe hangers on the outside of the insulation.

3.3 INSTALLATION OF EQUIPMENT INSULATION

- A. Clean and dry all surfaces prior to insulating.
- B. Install insulation materials with smooth and even surfaces. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting in poor workmanship.

- C. Do not apply insulation to equipment breechings or stacks while hot.
- D. Do not insulate manholes, handholds, cleanouts, nameplate, ASME stamp. Provide beveled edge at interruptions of insulation.

3.4 INSULATION REPAIR

- A. Repair damaged sections of existing and/or new mechanical insulation where damaged occurred during this construction period. Use insulation of same thickness as existing insulation. Install new jacket lapping and seal over existing.

3.5 CARE AND CLEANING

- A. Repair and/or replace broken, damaged and or otherwise defective insulation. Work to be completed to the satisfaction of the Architect. At completion of work, clean materials installed as part of this work and leave systems and equipment in satisfactory operating condition.
- B. Upon completion of work remove materials, equipment, tools from premises. Leave project area neat, clean and orderly.

END OF SECTION.

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SECTION 22 11 00 – FACILITY WATER DISTRIBUTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes piping for the facility water distribution system.

1.2 REFERENCES AND STANDARDS

- A. Requirements of Regulatory Agencies: Contractor to conform to the publications listed below. Requirements of these publications are to be considered as a minimum standard. If details and specifications which require more stringent work are indicated within project, Contractor to provide the more stringent.
 - 1. California Plumbing Code (CPC) Compliance: Comply with applicable portions of the California Plumbing Code pertaining to selection and installation of plumbing materials and products.
- B. Soldering and Brazing materials and labor shall comply with ASME Code and applicable state labor regulations.
- C. Supports to be in accordance with SMACNA's Seismic Restraint Manual Second Edition 2008.
- D. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 ACTION SUBMITTALS

- A. Submit manufacturer's catalog cut sheets, specifications, installation instructions, and dimensioned drawings for each type of pipe, support, anchor, and seal indicated within this section that is applicable to the project. Clearly indicate item being submitted.
 - 1. Indicate pipe schedules, pressure classes, etc.
 - 2. Indicate all options being submitted.
- B. Provide Brazing Certifications. Submit reports as required for piping work applicable to the project.
 - 1. Brazers that do not have current Certifications shall not be permitted to braze on the project.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

- C. Operation and Maintenance Data: submit the following items in O&M data including:
 - 1. Domestic Water System Sterilization Report.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all domestic water piping and accessories against defects in materials and workmanship. Warranty shall cover replacement of piping or accessories plus labor to install.

PART 2 – GENERAL

2.1 GENERAL

- A. Provide piping materials and factory fabricated piping products of sizes, types, pressure and temperature ratings, and capacities as indicated. Materials and products to comply with the California Plumbing Code.
- B. Where more than one type of material is indicated, selection is the Contractors option.
 - 1. Contractor to provide submittal information on material which is to be installed.
 - 2. Where more than one material is indicated, the Contractor shall only install one material per system and materials shall not be mixed within the same system.
- C. Soldering Materials: Joints in copper tubing for all installations shall be made with brazing alloy sil-fos, or equal. Clean surfaces to be jointed shall be free of oil, grease, rust, and oxides.
 - 1. Harris Stay-Safe 50 solder, or equal, may be permitted on plumbing lines above slab or ground only with prior review for piping sizes 2 inches and smaller only. Solders used shall contain no lead.
- D. Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials.

2.2 PIPING AND FITTINGS:

- A. Domestic Water Piping (cold water, hot water, tempered water, and hot water return):

1. Copper Tube: ASTM B 88, Type L, hard-drawn temper, except as otherwise indicated.
 2. Interior Water Piping:
 - a. Copper tube, Type L, hard-drawn temper, wrought copper fittings.
 - b. Pipe sizes 2" and smaller to have solder joints.
 - c. Pipe sizes 2 ½" and larger to have brazed joints.
 3. Under Slab Water Piping:
 - a. Pipe sizes 1 ½" and smaller: Type K, soft Copper tubing with smoothly formed bends. Runs to be made without joints except where runs are longer than the standard length of tubing role.
 - b. Pipe sizes 2" and larger: Same as exterior water piping.
 4. Exterior Water Piping:
 - a. Copper tube, Type L, hard-drawn temper, wrought copper fittings.
 - b. All pipe sizes to have brazed joints.
 5. Pro-Press type fittings shall not be considered.
- B. Pressure and temperature relief valve discharge piping:
1. Provide materials as specified for domestic water piping.

PART 3 – EXECUTION

3.1 GENERAL

- A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.
- B. Comply with ANSI B31 Code for Pressure Piping.
- C. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes where indicated by use of reducing fittings. Align piping accurately at connections, within 1/16-inch misalignment tolerance.
- D. Locate piping runs, unless detailed otherwise, vertically and horizontally (pitched to drain). Install piping parallel and perpendicular to adjacent building walls/structure and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and

notations. Hold piping close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building; limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping; locate insulated piping for 1" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view by locating in column enclosures, in hollow wall construction, or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

- E. Electrical Equipment Spaces: Do not run piping through transformer vaults, elevator equipment rooms, Data closets or other electrical or electronic equipment spaces or enclosures.
- F. Should structural difficulties or work of other contractors prevent the running of pipes or the setting of equipment at the points shown, Contractor to make the necessary deviations to the piping system, as determined by the Contractor, with the Architect's review, without additional cost to Owner.
- G. Inspect each piece of pipe and each fitting to see that there is no defective workmanship on pipe or obstructions in pipes and fittings.

3.2 INSTALLATION OF WATER PIPING:

- A. Run all water piping generally level, free of traps or unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work. No piping shall be installed so as to cause unusual noise from the flow of water therein under normal conditions.
- B. Water lines shall not be installed in the same trench with non-metallic sewer lines unless the bottom of the water pipe at all points is at least 12 inches above the top of the sewer line and the water line is placed on a solid shelf excavated at one side of the common trench.
- C. Where water and waste piping cross, the pipes shall have no fittings within 10 feet of the crossing, and the water line shall be run above the waste line. Comply with any local codes or requirements.
- D. Close open ends of water piping each day to prevent contamination or foreign matter entering pipe during construction. Thoroughly flush out piping to remove any dirt or foreign matter. Remove and clean all aerators at end of project and prior to sterilization.

3.3 DOMESTIC WATER SYSTEM STERILIZATION:

- A. Water line disinfections are to be performed by a licensed contractor with training in potable water line disinfections or a D-1 water operator licensed by the state of California and trained in water line disinfections.
- B. Water lines shall be cleaned by following guidelines provided by the AWWA standard C-651 for water mains and guidelines provided by DP Disinfection for building water lines.

- C. Prior to system sterilization, provide warning signs at all outlets while chlorinating the system. Provide sign at all outlets, which reads “Water Sterilization in Progress – Do not operate”. Remove signs at conclusion of test.
- D. Disinfection Procedures / 3 Hour Disinfection (Chemical pump Method / Building side of Double Check Valve Assembly):
1. Clean and disinfect all hot and cold water systems connected to the domestic water system in accordance with AWWA Standard C-651 for water mains, DP Disinfection guide lines for building water lines, and as prescribed by the local Building and Health department codes. This procedure shall be performed by a Licensed Contractor trained in the disinfection of water systems or by a state certified Water Operator with a minimum of a D-1 license.
 2. Preliminary Preparation:
 - a. Locate the injection point. Install an injection hose bib to the system at a point within 10'-0" of its junction with the water supply line. When the project is complete, with all the fixtures connected and operable and ready for use and when, by test, the system is proved to be free from leaks, it shall be thoroughly flushed by fully opening every outlet and operating every fixture until clear water flows from all of them. Take a Sample, test for Free chlorine content and record it on the work sheet.
 - b. Use (LR) Low Range Disinfection test strips. A Normally reading will be 2mg/L or less. This is the "Bench Mark" reading.
 3. Disinfecting Agent:
 - a. The chlorine shall be a registered product with Cal-EPA for use in California in potable water lines, such as Bacticide, Cal-EPA Registration No. 37982-20001. Use liquid Sodium Hypochlorite conforming to ANSI/AWWA B300.
 4. Disinfecting Procedure (Chemical Pump Method):
 - a. Connect the chemical pump to the injection hose bibb. If the existing pressure exceeds 50psi use a DP Disinfection Backflow / Regulator Injection Assembly.
 - b. With system completely full of water and supply valve open, adjust every faucet of system so that a trickle of water flows from each. Find the furthest fixture and trickle at a higher rate until you obtain your first reading. Then work backwards.
 - c. Inject disinfectant until a test at each branch outlet shows a chlorine residual concentration of 200 parts per million (ppm).
 - d. Close all outlets and valves. Shut down the pump. Close the valve connected to the fresh water supply line. Close the injection hose bib. Maintain condition for 3 hours at 200ppm.

- e. When the above procedure has been completed, flush out entire system with fresh water until a test at any outlet shows a residual of not more than the original "Bench Mark" reading taken in the preliminary preparation.
 - i. When flushing, pay attention to any special requirements. Never flush highly chlorinated water into storm drains, creeks, rivers or septic tanks. De-chlorinate the discharge water with Ascorbic Acid.
- E. Disinfection Procedures / 24 Hour Disinfection (Chemical pump Method / Building side of Double Check Valve Assembly):
- 1. Clean and disinfect all hot and cold water systems connected to the domestic water system in accordance with AWWA Standard C-651 for water mains, DP Disinfection guide lines for building water lines, and as prescribed by the local Building and Health department codes. This procedure shall be performed by a Licensed Contractor trained in the disinfection of water systems or by a state certified Water Operator with a minimum of a D-1 license.
 - 2. Preliminary Preparation:
 - a. Locate the injection point. Install an injection hose bib to the system at a point within 10'-0" of its junction with the water supply line. When project is complete, with all fixtures connected and operable and ready for use and when, by test, the system is proved to be free from leaks, it shall be thoroughly flushed by fully opening every outlet and operating every fixture until clear water flows from all of them. Take a Sample, test for Free chlorine content and record it on the work sheet.
 - i. Use a L/R (low range) Disinfection test strip or a chlorine meter. A Normally reading will be 2mg/L or less. This is the "Bench Mark" reading.
 - 3. Disinfecting Agent:
 - a. The chlorine shall be a registered product with Cal-EPA for use in California in potable water lines, such as Bacticide, Cal-EPA Registration No. 37982-20001. Use liquid Sodium Hypochlorite conforming to ANSI/AWWA B300.
 - 4. Disinfecting Procedure (Chemical Pump Method):
 - a. Connect the chemical pump to the injection hose bib. If existing pressure exceeds 50psi use a DP Disinfection Backflow / Regulator Injection Assembly.
 - b. With system completely full of water and supply valve open, adjust every faucet of system so that a trickle of water flows from each.. Find the furthest fixture and trickle at a higher rate of speed until you obtain your first reading. Then work backwards.

- c. Inject disinfectant until a test at each branch outlet shows a chlorine residual concentration of 50 parts per million (ppm).
 - d. Close all outlets and valves. Close Fresh water hose bib. Shut off pump. Close injection hose bib. Maintain condition for 24 hours and chlorine residual of at least 25 ppm must be retained in system for this 24 hour period. If, after 24 hours, tests indicate that chlorine residual concentration has decreased below 25ppm. The disinfection procedure must be repeated until an approved result is obtained.
 - e. When the above procedure has been completed, flush out entire system with fresh water until a test at any outlet shows a residual of not more than the original "Bench Mark" readings taken in the preliminary preparation.
 - i. When flushing, pay attention to any special requirements. Don't flush highly chlorinated water into storm drains, creeks, rivers or septic tanks. De-chlorinate the discharge water with Ascorbic Acid.
- F. Chemical and bacteriological tests shall be conducted by a state-certified laboratory and approved by the local authorities having jurisdiction.
- G. Submit written report to Health Department as required by State Regulations. Provide a copy of report to Architect prior to completion of project.

3.4 PIPING SYSTEM JOINTS

- A. General: Provide joints of type indicated in each piping system.
- B. Cut all steel pipe and hard copper tubing by power hacksaw, a circular cutting machine using an abrasive wheel or in square end vise by means of hand hacksaw. Wheel cutters may be used for steel pipe provided that pipe shall have ends reamed to full inside diameter and beveled before being made up into fittings. Pipe shall have round edges or burrs removed so that a smooth and unobstructed flow will be obtained.
- C. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, Rector- Seal #5, on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Teflon tape may be used on piping smaller than 2 inches.
- D. Braze copper tube-and-fitting joints where indicated, in accordance with ASME B32.
- E. Solder copper tube and fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Solder shall be 95 percent tin, 5 percent antimony and shall be used above grade only. Wipe excess solder from joint before it hardens.

- F. Flanged Joints: Match flanges within piping system and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

3.5 TEST OF PIPING

- A. Test piping at completion of roughing in, in accordance with the following schedule. Show no loss in pressure or visible leaks after a minimum duration of 4 hours at the test pressures indicated. Tests to be verified by Inspector of Record.

SYSTEM TESTED	TEST PRESSURE PSIG	TEST WITH
Hot, Cold, Tempered, and Hot Water Return Piping	150 lbs. rough-in 100 lbs. after equipment connection	Water

- B. Testing equipment, materials, and labor shall be furnished by this Contractor.
- C. Repair piping systems sections which fail required piping test, by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
- D. Drain test water from piping systems after testing and repair work has been completed.

3.6 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

SECTION 22 11 23 – DOMESTIC WATER PUMPS

PART 1 – GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to work within this section.
- B. This Section includes pumps and pump accessories, including:
 - 1. In-Line Recirculation Pumps

1.2 REFERENCES AND STANDARDS

- A. UL Compliance: Provide electric components for pumps which have been listed by Underwriters Laboratories.
- B. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 - 1. Manufacturer, model number, and pump specifications
 - 2. Clearly indicate all options and accessories.
 - 3. Provide pump curves with selection points indicated.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each type of pump, control, and accessory
 - 2. Provide "trouble- shooting" maintenance guide
 - 3. Include this data, product data and Shop Drawings in maintenance manual

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of pumps, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Company specializing in piping insulation application with a minimum of 3 years' experience.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all pumps and accessories against defects in materials and workmanship. Warranty shall cover replacement of pumps or accessories plus labor to install.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Provide pumps, thoroughly cleaned, and painted with one coat of machinery enamel prior to shipment. Type, size, and capacity of each pump to meet pump schedule.
- B. Provide pumps of same type by same manufacturer.
- C. Motors to be open drip proof type. Motors to be non-overloading at any point on pump curve and provided with built-in overload protection on single phase motors. Scheduled motor horsepowers are estimated minimums and larger motors must be furnished if necessary to meet non-overloading requirements.
- D. Capacities to be as scheduled on plans.
- E. Where scheduled, provide variable frequency drive for pump.
- F. Acceptable Manufactures
 - 1. ITT Bell and Gossett
 - 2. Grundfos
 - 3. Paco
 - 4. Taco

2.2 IN-LINE DOMESTIC HOT WATER RECIRCULATION PUMPS

- A. Provide in-line recirculation pumps where indicated and of capacities as scheduled.
- B. Type: Horizontal, oil-lubricated, designed for 125 PSI working pressure, 225° F continuous water temperature, and specifically designed for quiet operation.
- C. Body: Bronze.
- D. Shaft: Steel, ground and polished, integral thrust collar with two horizontal sleeve bearings.
- E. Seal: Mechanical with carbon-seal face rotating against ceramic seat.
- F. Coupling: Self-aligning, flexible coupling.
- G. Provide with timer and aquastat.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which pumps are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF PUMPS

- A. Install pumps in accordance with manufacturer's published instructions, complying with recognized industry practices to ensure that pumps comply with requirements and serve intended purposes.
- B. Contractor to provide temporary covers on pump inlet and outlet during construction. Contractor to verify pump is clean of debris prior to connecting to pipe.
- C. Provide access space around pumps for service as indicated, but in no case less than that recommended by manufacturer.
- D. Install in-line pumps with support from structure on each side of pump, or as indicated on Drawings.
- E. Piping shall be supported from the building structure so as to prevent any strain on the pump casings. A final check for perfect alignment of the piping connections shall be made after pump has been secured to its base. Provide valves, accessories, gauges, flexible connections, and supports as indicated.
- F. Contractor to verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Do not proceed with equipment start-up until wiring installation is complete and correct.
- G. Check alignment, and where necessary, realign shafts of motors and pumps within recommended tolerances by manufacturer.
- H. Lubricate pumps before start-up. Start-up in accordance with manufacturer's instructions.
- I. Pumps shall not be connected to piping before piping is thoroughly flushed and cleaned of all debris and dirt. After piping connections have been made, systems shall be filled before starting pumps. Pumps shall not be run dry under any circumstances.

3.3 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements

3.4 CLEANING UP

- A. Repair and/or replace broken, damaged and or otherwise defective insulation. Work to be completed to that satisfaction of the Architect. At completion of work, clean materials installed as part of this work and leave systems and equipment in satisfactory operating condition.

- B. Upon completion of work remove materials, equipment, tools from premises. Leave project area neat, clean and orderly.

END OF SECTION.

SECTION 22 13 00 – FACILITY SANITARY SEWAGE

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes piping required for the Sanitary Sewage system.

1.2 REFERENCES AND STANDARDS

- A. Requirements of Regulatory Agencies: Contractor to conform to the publications listed below. Requirements of these publications are to be considered as a minimum standard. If details and specifications which require more stringent work are indicated within project, Contractor to provide the more stringent.

- 1. California Plumbing Code (CPC) Compliance: Comply with applicable portions of the California Plumbing Code pertaining to selection and installation of plumbing materials and products.

- B. Supports to be in accordance with SMACNA's Seismic Restraint Manual Second Edition 2008.

1.3 ACTION SUBMITTALS

- A. Submit manufacturer's catalog cut sheets, specifications, installation instructions, and dimensioned drawings for each type of pipe, support, anchor, and seal indicated within this section that is applicable to the project. Clearly indicate item being submitted.

- 1. Indicate pipe schedules, pressure classes, etc.
- 2. Indicate all options being submitted

1.4 CLOSEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all sanitary sewage piping and accessories against

defects in materials and workmanship. Warranty shall cover replacement of all such piping systems or accessories plus labor to install.

PART 2 – GENERAL

2.1 GENERAL

- A. Provide piping materials and factory fabricated piping products of sizes, types, pressure and temperature ratings, and capacities as indicated. Materials and products to comply with the California Plumbing Code.
- B. Where more than one type of material is indicated, selection is the Contractors option.
 - 1. Contractor to provide submittal information on material which is to be installed.
 - 2. Where more than one material is indicated, the Contractor shall only install one material per system and materials shall not be mixed within the same system.
- C. Soldering Materials: Joints in copper tubing for all installations shall be made with brazing alloy sil-fos, or equal. Clean surfaces to be jointed shall be free of oil, grease, rust, and oxides.
 - 1. Harris Stay-Safe 50 solder, or equal, may be permitted on plumbing lines above slab or ground only with prior review for piping sizes 2 inches and smaller only. Solders used shall contain no lead.

2.2 PIPING AND FITTINGS

- A. Sanitary Sewer Piping:
 - 1. Cast iron, no-hub soil pipe. Provide with neoprene sleeve gaskets and stainless steel 4 band couplings.
 - 2. Cast Iron Hub and Spigot Soil Pipe and Fittings: CISPI Standard 301 (Latest Edition) and ASTM A 74.
 - 3. Sanitary Sewer couplings to be super-duty type in conformance with Factory Mutual Standard 1680, Class I and/or ASTM C 1540.
 - a. Couplings to be as follows: “Husky” SD4000, Orange Shield coupling as manufactured by Husky Technologies, or equal. Minimum Shield thickness to be 0.015”.
 - b. No-Hub Cast-Iron Soil Pipe Couplings: Couplings for use in connection with no-hub Cast Iron Soil Pipe and Fittings shall comply with CISPI 310. Shield and clamp assembly shall consist of a 300 series stainless steel corrugated shield, stainless steel bands (4-bands minimum), and sealing sleeve in conformance with ASTM C564.

4. At Contractor's option, Type DWV hard drawn copper tubing with cast bronze solder joint fittings and lead free solder may be used above ground in lieu of cast iron drainage fittings. Provide test tees as specified.
 5. Acceptable manufacturer's
 - a. Tyler pipe
 - b. AB&I
 - c. Or Equal
- B. Sanitary Vent Piping:
1. Cast iron, no-hub soil pipe. Provide with neoprene sleeve gaskets and stainless steel 4 band couplings.
 2. Vent Couplings to be heavy-duty type in conformance with Factory Mutual Standard 1680, Class I and/or ASTM C 1540.
 - a. Couplings to be as follows: "Husky" HD2000, White Shield coupling as manufactured by Husky Technologies, or equal. Minimum Shield thickness to be 0.010".
 - b. No-Hub Cast-Iron Soil Pipe Couplings: Couplings for use in connection with no-hub Cast Iron Soil Pipe and Fittings shall comply with CISPI 310. Shield and clamp assembly shall consist of a 300 series stainless steel corrugated shield, stainless steel bands (4-bands minimum), and sealing sleeve in conformance with ASTM C564.
 3. At Contractor's option, Type DWV hard drawn copper tubing with cast bronze solder joint fittings and lead-free solder may be used above ground in lieu of cast iron drainage fittings. Provide test tees as specified.

PART 3 – EXECUTION

3.1 GENERAL

- A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.
- B. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes where indicated by use of reducing fittings. Align piping accurately at connections, within 1/16-inch misalignment tolerance.
- C. Locate piping runs, unless detailed otherwise, vertically and horizontally (pitched to drain). Install piping parallel and perpendicular to adjacent building walls/structure

and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations. Hold piping close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building; limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping; locate insulated piping for 1" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view by locating in column enclosures, in hollow wall construction, or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

- D. Electrical Equipment Spaces: Do not run piping through transformer vaults, elevator equipment rooms, Data closets or other electrical or electronic equipment spaces or enclosures.
- E. Should structural difficulties or work of other contractors prevent the running of pipes or the setting of equipment at the points shown, Contractor to make the necessary deviations to the piping system, as determined by the Contractor, with the Architect's review, without additional cost to Owner.
- F. Inspect each piece of pipe and each fitting to see that there is no defective workmanship on pipe or obstructions in pipes and fittings.

3.2 INSTALLATION OF SANITARY DRAINAGE SYSTEMS

- A. Make joints between PVC pipe and cast iron pipe or fittings using cast iron adapter fittings, installed as recommended by the manufacturer.
- B. Sewer Piping: Run all horizontal sanitary drain piping inside of building on a uniform grade of not less than 1/4-inch per foot, unless otherwise noted on the plans. Piping shall have invert elevations as shown and slope uniformly between given elevations.
- C. Run all drainage piping as straight as possible and provide easy bends with long turns; make all offsets at an angle of 45 degrees or less.
- D. Grade all vent piping so as to free itself quickly of any water condensation.
- E. Hubless Cast-Iron Joints: Comply with coupling manufacturer's installation instructions and in accordance with CISPI Pamphlet No. 310, latest edition.
- F. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees, at minimum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping, and at base of each conductor.
- G. Flashing Flanges: Install flashing flange and clamping device with each cleanout passing through waterproof membrane.
- H. Install drains in accordance with manufacturer's written instructions and in locations indicated. Unless detailed otherwise, install floor drains and floor sinks with lip of drain slightly below finished floor to ensure drainage. Coordinate with other Contractors to ensure that floor slopes to drain.

3.3 TEST OF PIPING

- A. Test piping at completion of roughing in, in accordance with the following schedule. Show no loss in pressure or visible leaks after a minimum duration of 4 hours at the test pressures indicated. Tests to be verified by Inspector of Record.

SYSTEM TESTED	TEST PRESSURE PSIG	TEST WITH
All Soil, Waste Drain & Vent Piping; All Storm Drains Within Buildings.	Fill with water to top of highest vent.	Water
Minimum height of standpipe shall be 10 feet above piping being tested.		

- B. Testing equipment, materials, and labor shall be furnished by this Contractor.
- C. Repair piping systems sections which fail required piping test, by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
- D. Drain test water from piping systems after testing and repair work has been completed.

3.4 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 22 33 00 – ELECTRIC DOMESTIC WATER HEATERS

PART 1 – GENERAL

1.1 SUMMARY

- A. This specification section includes plumbing equipment, including:
 - 1. Electric Water Heater
 - 2. Potable Water Expansion Tanks

1.2 REFERENCES AND STANDARDS

- A. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this section:
 - 1. California Plumbing Code – CPC
 - 2. American National Standards Institute – ANSI
 - 3. Federal Standards - F.S.
- B. UL and NEMA Compliance: Provide electrical components required as part of plumbing equipment, which have been listed and labeled by Underwriters Laboratories and comply with NEMA standards.
- C. Water heaters to Comply with ANSI/ASHRAE/IES 90A for energy efficiency.
- D. CEC Compliance: Comply with California Electrical Code (ANSI/NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of plumbing equipment.
- E. California Energy Commission Compliance: Provide written confirmation of listing of all water heaters in the "Directory of Certified Water Heaters," latest edition.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 - 1. Manufacturer and model number
 - 2. Clearly indicate all options, trim, and accessories.
 - 3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.

- B. Certification: Submit Contractors Certification
- C. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each type of fixture.
 - 2. Provide "trouble- shooting" maintenance guide
 - 3. Include this data within maintenance manual

1.5 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of plumbing equipment of type and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for all water heaters and accessories against defects in materials and workmanship. Warranty shall cover replacement of water heater or accessories plus labor to install.
- B. Furnish three-year limited warranty on tank leakage.

PART 2 – PRODUCTS

2.1 ELECTRIC WATER HEATERS

- A. Acceptable Manufacturers:
 - 1. A.O. Smith
 - 2. State
 - 3. PVI
- B. General:
 - 1. Provide commercial electric water heater of size, capacity, recovery rate and electrical characteristics as scheduled on Drawings. Provide UL Listing and NSF approval.

- C. Tank:
1. All internal surfaces of the tank shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel.
 2. Tank shall be cathodically protected with adequate extruded magnesium rod.
 3. ASME tank construction for 125 psi working pressure.
- D. Heater:
1. Working pressure of 150 psi, magnesium anode rod; glass lining on internal surfaces exposed to water.
- E. Heating Elements:
1. Heavy-duty, medium watt density, with incoloy sheath, thermostat stepped through magnetic contactors
- F. Safety Controls:
1. Double-pole, manual-reset, high-limit, probe- type electric water flow cutoff; both factory wired
- G. Jacket:
1. Equip with full-size control compartments with front panel opening.
 2. Insulate tank with vermin-proof glass fiber insulation.
 3. Provide outer steel jacket with bonderized undercoat and baked enamel finish.
- H. Accessories:
1. Provide brass drain valve.
 2. Provide ASTM temperature and pressure relief valve, minimum size = $\frac{3}{4}$ "Ø.
- I. Controls:
1. Adjustable immersion thermostat; power circuit fusing
 2. Control compartment to be hinged and shall house the following:
 - a. 120 volt control circuit transformer
 - b. Transformer fusing
 - c. Magnetic contactor(s)

- d. Immersion style operating thermostat(s)
- e. High limit thermostat(s)
- f. Element fusing per N.E.C.
- g. Heater to be equipped with night setback operation.
- h. Heater to be equipped with BACnet compatible ICC gateway.
- i. Commercial grade incoloy sheathed flange mounted elements with pre-wired terminal leads

2.2 POTABLE WATER EXPANSION TANK

- A. Provide potable water expansion tank at domestic hot water heater as detailed within drawings.
- B. Potable water expansion tank shall be of drawn steel construction. Tank to have a Butyl diaphragm separating the air chamber from the water containing chamber. Inlet connector shall be brass or stainless steel. Materials of manufacture for the diaphragm shall be FDA approved.
- C. Pressure Expansion tank to be as follows:
 - 1. ASME Section VIII Construction
 - 2. Carbon Steel Shell
 - 3. Fixed Butyl Bladder (FDA Approved)
 - 4. Stainless Steel System Connection
 - 5. Pre-charged to 40 PSI (Field Adjustable).
- D. The potable water expansion tank shall be a Watts Series DETA, or equal.

PART 3 – EXECUTION

3.1 INSTALLATION OF ELECTRIC HOT WATER HEATERS

- A. Install electric water heaters as indicated, in accordance with manufacturer's installation instructions and in compliance with applicable codes.
- B. Furnish wiring diagram to Electrical Installer. Refer to Division 26 for wiring of units, not work of this section.
- C. Connect hot and cold water piping to units with shutoff valves and dielectric unions. Connect drain and relief piping as noted on Drawings.
- D. Start-up, test, and adjust electric water heaters in accordance with manufacturer's start-up instructions. Check and calibrate controls.

3.2 POTABLE WATER EXPANSION TANK

- A. Install potable water expansion tank per manufacturer's written instructions. Secure tank to structure with strut-material and steel strap.

3.3 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.4 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.5 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 22 42 00 – PLUMBING FIXTURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This submittal section describes plumbing fixtures and trim.

1.2 REFERENCES AND STANDARDS

- A. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this section:
1. California Plumbing Code – CPC
 2. American National Standards Institute – ANSI
 3. Federal Standards - F.S.
- B. All plumbing components within the waterways shall comply with the Safe Drinking Water Act (SDWA) “No-Lead” restrictions of ANSI/NSF Standard 61 Section 9.
- C. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
1. Manufacturer and model number
 2. Clearly indicate all options, trim, and accessories.
 3. Cross reference manufacturer’s cut sheet to fixture callout ID on submittal sheet.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
1. Maintenance data and parts lists for each type of fixture.
 2. Provide "trouble- shooting" maintenance guide.
 3. Include this data within maintenance manual.

1.5 WARRANTY

- A. Manufacturer: In addition to the Contractor’s Standard Guarantee, furnish Owner with manufacturer’s warranty for all plumbing valves and accessories against defects

in materials and workmanship. Warranty shall cover replacement of all such valves or accessories plus labor to install.

PART 2 – PRODUCTS

2.1 GENERAL

- A. All fixtures shall be first class in every respect. Accurately line up finished plumbing. Take special care with the roughing-in and finished plumbing where batteries of fixtures occur.
- B. Consult Architectural Drawings, as well as Plumbing Drawings, for locations, dimensions and mounting height of plumbing fixtures.
 - 1. Take location and mounting heights for roughing-in from Architectural Drawings.
- C. Follow Plumbing fixture rough-in schedule on Drawings for roughing-in connections. Set roughing-in for all fixtures exactly as per measurements furnished by the manufacturers of the fixtures used.
- D. Roughing-in for sinks and lavatories shall be brought in through the wall under the centerline of the drain from the fixture wherever possible and as close to the fixture as possible.
- E. Provide all water supplies to fixtures with compression shut-off stops. Stops to be as follows:
 - 1. IPS inlets with threaded brass nipples at pipe connection
 - 2. Lock shield-loose key.
 - 3. Lead Free
 - 4. Provide combination fixtures with compression stop on each water supply fitting.
 - a. Provide loose key handle for each stop.
- F. Provide 1/2 inch flexible risers for all fixtures, unless otherwise noted. Risers to be as follows:
 - 1. Engineered polymer braded fibers
 - 2. Reinforced PVC inner hose
 - 3. Rubber washers
 - 4. Riser to have brass barbs, stainless steel Ferrules, Brass nut, and rubber washer.
- G. Unless noted otherwise, all finish for exposed metal trim on fixture shall be polished chromium plated.

1. This also applies to wall flanges, nuts, and washers.
 2. Trim exposed under sinks shall be considered exposed and to be chromium plated.
 3. Handles on all faucets and stops shall be all-metal chromium plated.
- H. Make connection between fixtures and flanges on soil pipe gastight and watertight with neoprene-type gaskets (wall-hung fixtures) or bowl wax (floor outlet fixtures).
1. Rubber gaskets or putty will not be permitted.
- I. P-Traps
1. Provide fixtures not having integral traps with chromium plated P-trap connected to concealed waste within wall and sanitary fittings. Trap to be:
 - a. Tubular Brass
 - b. 17-gauge
 2. Provide ADA fixtures waste offsets.
 3. Acceptable Manufacturers:
 - a. McGuire Manufacturing
 - b. Dearborn Brass
 - c. Or equal
- J. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets.

2.2 PLUMBING FIXTURE HANGERS AND SUPPORTS

- A. Install and support plumbing fixtures as required and specified herein.
- B. Carriers and supports
1. Provide as recommended by fixture manufacturer for the particular installation and type of fixture being installed.
 2. Residential-type fixture supports are not acceptable.
 3. Install floor-mounted water closets with J.R. Smith or equal government pattern cast iron closet flanges with brass bolts, nuts, washers, and porcelain caps secured with spackle.
 4. Install the following fixtures on concealed support with feet of support securely anchored to floor. Anchor top of support to wall construction in an approved manner.

- a. Wall mounted urinals
 - b. Drinking fountains / Electric water coolers
5. Install wall-hung lavatories in stud walls with concealed arms and floor support, with feet of support securely anchored to floor.
- a. In addition, anchor top of support to wall construction in an approved manner.
6. Acceptable Manufacturers:
- a. Zurn
 - b. J.R. Smith
 - c. Josam
 - d. Wade
 - e. By Fixture manufacturer

2.3 WATER CLOSET SEATS

- A. Provide seats for all water closets as scheduled. Seats to be Olsonite model 10SSC or equal as follows:
1. Heavy Duty injected molded high impact solid plastic
 2. Elongated bowls
 3. Open Front, less cover
 4. Self sustaining check hinges
 5. Stainless steel posts
 6. White color.
- B. Acceptable Manufacturers:
1. Olsonite
 2. Bemis
 3. or equal

2.4 PLUMBING FIXTURES

- A. Fixtures to be as scheduled on drawings.
- B. Provide stops for all concealed supplies.

- C. Insulate domestic hot water, cold water, and waste piping below ADA plumbing fixtures with Provide ADA Sinks and Lavatories with protective covers “Truebro” Lav Guard Protective Pipe Covers. Protective covers to be:
1. Molded closed cell vinyl pipe covers,
 2. Have vandal resistant snap-clip fasteners
 3. ASTM E-84 smoke test rating of 0.
- D. Similar fixtures to be by same manufacturer.
- E. Acceptable Manufacturers to be as follows:
1. Water Closets, Urinals, and Lavatories:
 - a. Kohler
 - b. Sloan
 - c. American Standard
 2. Mop Sinks:
 - a. Kohler
 - b. American Standard
 - c. Or Equal
 3. Stainless Steel Sinks:
 - a. Just
 - b. Elkay
 - c. Or equal
 4. Flush Valves:
 - a. Sloan “Royal”
 - b. Or equal
 5. Manual Faucets:
 - a. Chicago
 - b. Zurn
 - c. Or Equal
 6. Sensor Faucets:

- a. Chicago
 - b. Sloan
 - c. Zurn
7. Drinking Fountains / Electric Water Coolers
- a. Haws
 - b. Elkay
 - c. Halsey Taylor
8. Bubblers
- a. Chicago Faucet
 - b. Haws
 - c. Elkay
9. Eye Washes / Safety Showers
- a. Haws
 - b. Guardian Equipment
 - c. Or equal
10. Garbage Disposers
- a. In-sink-erator
 - b. Hobart
 - c. Waste King

PART 3 – EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors, substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install plumbing fixtures of types indicated where shown and at mounting height indicated on Architectural Drawings in accordance with fixture manufacturer's written

instructions, roughing-in Drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the Uniform Plumbing Code pertaining to installation of plumbing fixtures.

- B. In all cases where plumbing fixtures are mounted on or against building walls of concrete or other materials having relatively rough or non-planar surfaces, it shall be the responsibility of this Contractor to provide any necessary grout or backing materials required to facilitate fixture mounting and eliminate void spaces between fixtures and wall to ensure adequate bearing contact.
- C. On completion of installation, provide silicone sealer at all points of fixture contact with walls or floors.
- D. Any fixture broken, cracked, or otherwise damaged during installation must be replaced by Contractor at his own expense.

3.3 TRAPPING AND VENTING OF FIXTURES

- A. Trap and vent all plumbing fixtures in accordance with Uniform Plumbing Code adopted by the Western Plumbing Officials Association and local plumbing codes, whether or not shown on Drawings. Strictly adhere to any local codes. Only exceptions to above will be those fixtures which are specially noted herein or on Drawings to be provided with special wastes.
- B. No vent shall intersect another vent at a point less than 6" above extreme overflow level of highest fixture served.
- C. Take vents off top half of horizontal runs and grade so as to free vents quickly of any water or condensation.

3.4 ADJUSTMENT OF PLUMBING PIPING SYSTEM

- A. Test and adjust fixtures so that each fixture receives the proper amount of water.
 - 1. Adjust flush valves so that each fixture receives the proper amount of water.
 - 2. Regulate all faucets, drinking fountains, etc. to the approval of the Architect so that the entire system is left in first-class condition.
 - 3. Adjust all slow-off valves to turn off between 12-15 seconds.
 - 4. Adjust sensitivity of sensor faucets to the satisfaction of the owner.

3.5 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.
- C. Clean fixtures, equipment, and materials installed under this contract. Remove cement, plaster, paint and/or rust, etc. Also remove all manufacturers' stickers.

1. Dirt, rubbish, paint spots, or grease on walls or fixtures for which this Contractor is responsible must be removed by him.

D. Fixtures to not be used by Contractors during construction.

3.6 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements.

1. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

B. Inspect each installed unit for damage to finish. If damaged, cracked, or dented, remove fixture and replace with new unit.

3.7 OPERATION TEST

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.8 EXTRA STOCK

A. Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every 10 units.

3.9 TRAINING

A. Train owner on operation and adjustment of all sensor valves.

3.10 CLEANING UP

A. After installation and testing but prior to acceptance, Contractor to clean fixtures with mild detergent and water solution, rinse with clean water, and wipe dry.

B. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING

- 23 00 00 – HVAC General Conditions
- 23 05 00 – Common Work Results for HVAC
- 23 05 93 – Testing, Adjusting, and Balancing for HVAC
- 23 07 00 – HVAC Insulation
- 23 09 00 – Building Management System
- 23 31 00 – HVAC Ductwork
- 23 33 00 – Air Duct Accessories
- 23 34 00 – Exhaust Fans
- 23 37 00 – Air Outlets and Inlets
- 23 81 28 – Ductless Split System AC Units

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SECTION 23 00 00 – HVAC GENERAL CONDITIONS

PART 1 – GENERAL

1.1 GENERAL

- A. This Section specifies the Division 23 Work coordination requirements with general work provisions.
- B. For convenience and reference the Division 23 Specifications are separated into Divisions and Sections. Such separations shall not operate to make the Engineer an arbitrator to establish subcontract limits between the Prime Contractor and his Subcontractors. In any case, the Prime Contractor is responsible to the owner for a complete job.
- C. This section consists of General Requirements and Standard Specifications covering certain parts of work under Division 23 and is supplemented by other Division 23 sections covering additional work, requirements, and materials specifically applicable to the work of each section.
 - 1. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.
- D. No material installed as part of this WORK shall contain asbestos in any form.

1.2 CONDITIONS OF THE CONTRACT

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.
- B. This section is a Division-23 Basic Materials and Methods section and is a part of each Division -23 section.

1.3 DESCRIPTION OF REQUIREMENTS

- A. Provide finished work, tested and ready for operation including apparatus, appliances, materials, and work. Provide incidental accessories necessary to make the work complete and ready for operation without additional expense to the Owner.
- B. Before beginning work or ordering materials, consult Architect for clarification of discrepancies between, or questionable intent, of the Contract Documents.
- C. Contractor shall visit the site and field survey the existing site conditions prior to bid. Any site conditions which may cause significant deviation from the design drawings shall be brought to the attention of the Owner's representative for clarification prior to bid.

1.4 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Provide work and materials in full accordance with the latest rules and regulations of the following:

1. California Code of Regulations - Title 24 - Parts 2, 3, 4,5, and 9
 2. California Code of Regulations - Title 22 - Chapter 7
 3. California Building Code, 2022
 4. California Mechanical Code, 2022
 5. California Plumbing Code, 2022
 6. California Electric Code, 2022
 7. California Fire Code, 2022
 8. California Building Energy Efficiency Standards 2022
 9. California Green Building Standards 2022
 10. California Energy Code 2022
 11. National Fire Protection Association
 12. CAL-OSHA
 13. Occupational Safety and Health Administration
 14. State Fire Marshal, Title 19 CCR
 15. Other applicable state laws
- B. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.
- C. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.
- D. The above Codes and Standards define minimum requirements required for the project. Where Contract Documents differ from governing codes, furnish and install higher standard.
- 1.5 FEES, PERMITS, AND UTILITY SERVICES
- A. Arrange for required inspections and permits required in installation of the work.
- B. The Owner will pay charges for permits required.
- 1.6 SITE EXAMINATION
- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.

- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.
- C. Exercise care in excavating near existing utilities to avoid any damage thereto. This Contractor is responsible for any damage caused by his operations.

1.7 ACTION SUBMITTALS / MATERIAL LIST AND SUBSTITUTIONS

- A. Prior to commencement of work, and within 35 days after award of Contract, submit to Architect for review electronic copies of a complete list of equipment and materials to be furnished, including all substitutions. All submittals to be in electronic format as follows:
 - 1. Submittals to be in PDF Format.
 - 2. Individual PDF cut sheets shall be inserted into a single file for review.
 - 3. All sheets to be “unprotected” and writable.
- B. Provide submittal information for all materials proposed for use as part of this project. Provide standard items on specified equipment at no extra cost to the contract regardless of disposition of submittal data. Other material or methods shall not be used unless approved in writing by the Architect. The Architect’s review will be required even though “or equal” or synonymous terms are used.
- C. It is the responsibility of the Contractor to assume all costs incurred because of additional work and/or changes required to incorporate the proposed substitute into the project including possible extra compensation due to the Architect. Refer to Division 1 for complete instructions.
- D. Contractor to provide complete Submittal packages for each system. At a maximum, submittals to be broken into the following packages:
 - 1. Mechanical – Dry Side package including: Ductwork, Diffusers/Grilles, and Accessories, etc.
 - 2. Mechanical – Source Equipment (e.g.: Packaged Heat Pumps, Exhaust Fans, VRF systems, Ductless Split Systems, DOAS Units, etc.)
 - 3. Mechanical – Building Automation System
 - 4. Mechanical – Duct coordination shop drawing package.
- E. Identify each item by manufacturer, brand, trade name, model number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment.
 - 1. Where submittal sheets indicate more than one product, Contractor to clearly identify product being submitted. Contractor to cross-out information not being submitted for review.

2. Submittals that do not clearly identify submitted item will be returned to the Contractor un-reviewed.
- F. Identity each submitted item by reference to specification section number and paragraph in which item is specified. Cross reference submittals by equipment ID where applicable.
- G. Quantities are the Contractor's responsibility and will not be reviewed.
- H. If Contractor desires to make a substitution, he shall submit complete information or catalog data to show equality of equipment or material offered to that specified.
1. Only one request for substitution will be considered on each item of material or equipment. No substitutions will be considered thereafter.
 2. Scheduled Products and first named manufacturer/product forms basis of design. All other manufacturers' products are substitutions.
 3. No substitutions will be allowed unless requested and reviewed in writing.
 4. The Architect shall review and take appropriate action on shop Drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor.
 5. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated items have not been received. Architect reserves right to require originally specified item.
 6. Named non-basis-of-design manufacturer does not guarantee approval of equipment submittals. Manufacturers must comply with all the performance and features as specified within the specifications and as indicated on the design documents.
- I. Installation of reviewed substitution is Contractor's responsibility. Any changes required for installation of reviewed substituted equipment must be made without additional cost to the owner. Review by the Architect of the substituted equipment and/or dimensional Drawings do not waive these requirements.

1.8 CLOSEOUT SUBMITTALS / MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Instruct the Owners' authorized representatives in the operation, adjustment, and maintenance of all mechanical equipment and systems. Provide PDF copy of

certificate signed by Owner's representatives attesting to their having been instructed.

- B. Furnish Architect with PDF complete sets of operating and maintenance (O&M) instructions.
 - 1. O&M manuals to be scanned and provided in an organized PDF file.
 - 2. O&M manuals to include: descriptive literature, catalog cuts, and diagrams covering all items of operation and maintenance for each and every mechanical system and piece of equipment furnished under these specifications.
 - 3. Include in each set a copy of the air balance test report specified hereinafter.
- C. Contractor must start compiling the above data (including obtaining operating and maintenance instruction data and catalog cuts and diagrams from the manufacturer of the reviewed equipment) immediately upon review of his list of materials, so as not to delay the final installation of the work.
- D. Final observation will not be made until booklets are submitted and have been reviewed by the Architect.
- E. O&M manuals to incorporate the following:
 - 1. Complete operating instructions for each item of heating, ventilating and air conditioning equipment and associated piping and ductwork systems.
 - 2. Test data and system balancing reports as specified.
 - 3. Temperature control diagrams and literature.
 - 4. Manufacturer's bulletins with parts numbers, instructions, etc. for each item of equipment. Remove information not applicable to project.
 - 5. Typewritten maintenance instructions for each item of equipment listing in detail the lubricants to be used, frequency of lubrications, inspections required, adjustment, etc.
 - 6. A complete list and/or schedule of all major valves giving the valve ID, location of valve, and the rooms or area controlled by the valve.
 - 7. Provide copies of start-up reports for each piece of mechanical equipment provided as part of this work.
 - 8. Name, address, and phone number of contractors involved in work under this Division.
 - 9. Detailed step-by-step instructions for starting, summer operation, winter operation, and shutdown of each system.

10. Detailed maintenance instructions for starting, summer operation, winter operation, and shutdown of each system.
11. Spare parts list.
12. Full size Record as built shop drawings in hard copies and PDF files.

1.9 COORDINATION SHOP DRAWINGS

A. General:

1. Prepare and submit for review coordination drawings where work by separate entities requires fabrication of products and materials which must accurately interface or for which space provided is limited.
2. Coordination drawings shall indicate how the work will interface and installation will be sequenced. It is the intent of this provision to find, bring forth, and resolve potential constructability problems prior to actual construction, thereby allowing for the resolution of issues before construction cost and schedule are impacted.

B. The General Contractor shall oversee preparation of coordination drawings, assign priority space, and bring to the attention of the Architect any conflicts or interferences of an unresolved nature found during preparation of coordination drawings. Expedite conflict or interferences and submit solutions/ recommendations for approval review.

C. Drawings: Shop drawings shall include but are not necessarily limited to the following:

1. Submit 1/4" = 1'-0" minimum scale, a combined, comprehensive mechanical coordination drawing. Coordination drawing shall include all ductwork, mechanical piping, plumbing, sprinkler systems, and ceiling systems overlaid on structural frame and architectural plan. Shop drawings are to be coordinated with all electrical and Telecom systems.
2. Criteria: Ductwork, mechanical piping, plumbing, and sprinkler system components shall be sized as shown on Drawings. Seismic restraints shall be shown where required. Nonconforming Mechanical work installed within designated coordination areas is subject to removal and replacement by the installing contractor at no additional cost to Owner.
3. Provide sections for congested areas.
4. Identify typical areas, start preparation of coordination drawings for such areas first.

D. Where required for coordination purposes, Contractor to modify duct shape to an equivalent flattened size at no additional cost to the owner. Contractor to limit duct aspect ratio to 3:1 unless provided special written permission by the Architect.

E. Coordination drawings shall be signed and dated by individual trade contractors. By act of signature and submittal of singular combined coordination drawing, each trade

contractor acknowledges their coordinated portion of the work with all other mechanical, electrical, telecom, architectural, and structural work contractors.

- F. After completion of coordination shop drawings signed by individual trade contractors. Submit copies to the architect for review. Once approved, provide copy at the job site for reference. No work shall be performed without the complete coordination shop drawings.
- G. No request for information regarding the routing of pipes, ductwork and placement of equipment will be reviewed and responded to without a completed shop drawings.

1.10 SITE CONDITIONS

- A. Information of the drawings relative to existing conditions is approximate only. Deviations found necessary during progress of construction to conform to actual conditions as approved by the Architect shall be made without additional cost to the Owner. The Contractor shall be held responsible for any damage caused to existing services. Promptly notify the Architect if services are found which are not shown on the Drawings.

1.11 WARRANTY

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show damage to itself or other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.
- C. Provide manufacturer's written warranties covering defects in material and workmanship of products and equipment utilized for the project.
- D. Warranties shall be for a period of 2 years from the date of substantial completion unless more stringently specified within individual Sections of this Division.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted or equal. Refer to subsequence division 23000 specification sections for specific equipment and system materials and accessories.
- B. All material shall be new, full weight, standard in all respects, and in first- class condition.
- C. Provide materials of the same brand or manufacture throughout for each class of material or equipment wherever possible.

- D. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- E. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.
- F. Conform to the State Energy Conservation Standards for all material and equipment.

2.2 MATERIALS FURNISHED

- A. Identify all materials and equipment by manufacturer's name and model number. Remove unidentified materials and equipment from site.
- B. Equipment specified by manufacturer's number shall include all accessories, controls, etc. listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance from this permitted only with written consent of the Architect.
- D. Deliver, Protection, and Care:
 - 1. Deliver materials or equipment to the Project in the manufacturer's original, unopened, labeled containers.
 - 2. Added costs associated with reordering, expediting orders, or project delays due to rejected materials shall be borne by the Contractor.
 - 3. Protect from damage which may be caused by theft, weather, and building operations. Failure to protect materials and apparatus adequately shall be sufficient cause for rejection of any damaged material or equipment.
 - 4. Close pipe and equipment openings to prevent intrusion of obstructions and damage.
 - 5. Owner or Architect will require removal and replacement of such material or work from the premises which is not in accordance with Contract Documents. Replace unsatisfactory work without delay, at no additional cost to the Owner.
 - 6. All material and equipment shall be protected against moisture, dirt and damage. Protective coverings shall be provided for bearings, open connections to pumps and tanks, coils, ducts, pipes and similar equipment that is vulnerable to grit and dirt.
 - 7. The interior of the pipes and ducts shall be kept clean at all times.

PART 3 – EXECUTION

3.1 GENERAL

- A. General arrangement and location of piping, ductwork, equipment, etc. are shown on Drawings or herein specified. Carefully examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work. Provide all offsets as required to avoid other trades at no additional cost to the owner.
- B. In advance of construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.
- C. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both. Omission from Drawings or specifications of any minor details of construction, installation, materials, or essential specialties does not relieve this Contractor from furnishing same in place complete.
- D. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
 - 1. Minor piping associated with instrumentation and control is generally not shown. Interconnection of sensors, transducers, control devices, instrumentation panels, combustion control panel, burner control panels is the responsibility of the contractor. Small piping associated with water cooling, drips, drains and other minor piping may not be shown to avoid confusion in the plan presentation but shall be provided as part of contract work. Drains shall be piped to the nearest floor drains.
- E. Furnish materials and work at proper time to avoid delay of the work.
- F. Coordinate with testing and balancing contractor to review drawings for proposed additional balancing components required for proper system testing and balancing.

3.2 ACCESS

- A. Continuously check Architectural Drawings for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind will be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.3 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.4 PROJECT MODIFICATIONS

- A. During the progress of construction, if such conditions arise that require revisions, modifications, or relocations to any mechanical equipment or materials incorporated in this project, such alterations shall be immediately called to the attention of the Architect. Contractor shall then prepare necessary Drawings showing proposed changes. Submit proposed changes for review by the Architect prior to actual revision work in the field.
- B. Two sets of Drawings showing all revisions shall be immediately presented to Architect for his records. Maintain additional copies on the project as necessary to comply with "RECORD DRAWINGS" requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings.

3.5 FORMING, CUTTING AND PATCHING

- A. Coordinate with other contractors as necessary to provide any special forming, recesses, chases, etc., and provide wood blocking, backing, and grounds as necessary for proper installation of mechanical work.
- B. If this Contractor fails to coordinate with other contractors at proper time or fails to locate items properly, resulting in extra work, then this Contractor is responsible.
- C. This Contractor is responsible for proper placement of pipe sleeves, hangers, inserts, and supports for work.
- D. Cutting, patching, and repairing of existing construction to permit installation of piping, etc. is responsibility of this Contractor. Repair or replace damage to existing work with skilled mechanics for each trade involved in first-class manner.
- E. Cut existing construction in a neat and workmanlike manner by the use of a concrete saw. Use of pneumatic devices will not be allowed.
- F. Core openings through existing construction as required for the passage of new piping and conduits. Cut holes of the minimum diameter to suit size of pipe installed and associated insulation.

3.6 DEMOLITION AND SALVAGE

- A. Provide demolition of mechanical work under this SECTION as indicated on Drawings.
- B. Removed materials which will not be re-used and which are not claimed by the owner shall become the property of the Contractor and shall be removed from the premises. Consult Owner before removing any material from the premises. Carefully remove materials claimed by the owner to prevent damage. Coordinated delivery of such items to owner.
- C. Removed materials which are to be reused are to be removed, cleaned, and stored in a safe location. If such items are lost or damaged by the Contractor, item shall be replaced with new item at no added cost to owner. If item is found to be damaged

prior to removal, inform Architect prior to removal so that item may be examined by Architect and owner for further instructions.

3.7 WELDING FOR MECHANICAL WORK

- A. All mechanical welding and inspection requirement shall be in accordance with the California Mechanical Code.
- B. Qualify welding procedures, welders and operators shall be in accordance with ASME boiler and pressure vessel code, section IX, welding and brazing qualifications. Welding procedures and testing shall comply with ANSI standard B31.9 - standard code for pressure piping, and the American Welding Society (AWS) welding handbook.
- C. Soldering and brazing procedures shall conform to ANSI B9.1 standard safety code and NFPA 99.
- D. All welders shall be certified by a state approved welding bureau. Fabricator shall have current and valid certificated registration by the building official for the types of welds required by the project. Prior to start of the project, the fabricator shall submit a copy of certificate of registration for approval. Prior to project close out, the fabricator shall submit a certificate of compliance that the work was performed in accordance with the approved plans and specifications to the building official and to the Engineer or Architect of record.

3.8 ASBESTOS ABATEMENT

- A. Existing systems within the area of this scope of work may have asbestos-bearing materials. Testing, encapsulation, removal, treatment, or correction of existing asbestos-bearing materials is not a part of this scope of work and is not the responsibility of the mechanical contractors.

3.9 STRUCTURAL DESIGN OF EQUIPMENT AND SEISMIC RESTRAINTS

- A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2022 California Building Code, Section 1617A.1.18 through 1617A.1.26 and ASCE 7-10, Chapters 13, 26 and 30.
- B. Provide seismic sway bracing for all suspended piping and ductwork in accordance with the OSHPD anchorage pre-approval OPM-0043-13, the "Mason Industries Seismic Restraint Guidelines for Suspended Piping, Ductwork, and Electrical Systems".

3.10 WARRANTY

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show damage to itself or other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.

- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.
- C. Provide manufacturer's written warranties covering defects in material and workmanship of products and equipment utilized for the project.
- D. Warranties shall be for a period of 1 year from the date of substantial completion unless more stringently specified within individual Sections of this Division.

3.11 TEMPORARY HEAT

- A. The General Contractor will provide for all temporary heat at such times as may be required or directed by the Architect and pay all fuel and energy costs incurred. Temporary heating facilities proposed for use by the General Contractor will be subject to review of the Architect.
- B. The permanent heating, ventilating, and air conditioning (HVAC) system shall not be operated or used to provide air to the space during construction. Start-up of this system shall not commence until the building is cleaned.
 - 1. If the permanent HVAC system is required to operate during the course of construction and prior approval of owner and architect is obtained, the Contractor shall provide 2" thick, MERV 13 filters at all return, exhaust, and transfer grilles. Filters shall also be provided at all return air ducts open to the plenum. Filter shall completely cover opening and be sealed tight as to not allow dirt/debris into the system. Filters to be provided at no additional cost to the owner and are to be removed upon completion of project. Filters to be inspected daily prior to the start of the HVAC system. Dirty filters are to be replaced.
 - a. Failure to comply with the above shall result in a complete cleaning of the duct system at no additional cost to the owner.

3.12 START-UP PROVISIONS FOR MECHANICAL WORK

- A. General: Major equipment (such as air handling units, boilers, and chillers) start-up shall be performed by the equipment manufacturer or authorized representative.
- B. Adjusting and Aligning Equipment: Adjust all equipment. Check all motors for proper rotation.
- C. Lubrication:
 - 1. Extend grease fittings on bearings to points of ready and easy accessibility.
 - 2. Lubricate fan bearings, etc., before operation of any equipment.
 - 3. Provide a final lubrication to equipment immediately before turning over to Owner.

- D. Upon completion of the mechanical work, or at such time prior to completion as may be determined by the Architect, operate and test all mechanical equipment and systems to demonstrate the satisfactory overall operation of the building or project as a complete unit. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install new air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests. Test equipment and systems for a minimum as follows:
 - 1. Packaged Heat Pump (under 25 tons), VRF Systems, and Ductless Split systems: 2 consecutive 8-hour days
- E. Provide training and orientation of Owners operating staff in proper care and operation of equipment, systems and controls.
- F. Neatly tabulate and deliver to the Architect complete operational data, including air flows, room temperatures, fan speeds, motor currents, plenum and duct static pressures, and other data as required. The Architect reserves the right to spot check results, and if discrepancies or errors are noted, Contractor will be required to redo balancing tests and tabulations entirely.
- G. During test period, make final adjustments and balancing of equipment, systems, controls, and circuits so that all are placed in first-class operating condition.
- H. Mark final positions of balancing valves after balancing is complete.
- I. All areas of building shall receive proper flow of hot and chilled water to assure adequate and uniform temperatures throughout.
- J. Final observation will not be made until all of the above have been completed and a preliminary copy of the balance report has been submitted and reviewed.

3.13 POST-CONTRACT COMPLETION TESTS

- A. If the required full-load operation conditions cannot be obtained at the time of the Project Completion Tests due to outdoor seasonal temperatures, return to the job site when requested by the Architect and complete proper loading of equipment and systems as required. Changing of any air filters will not be required under these tests. Contractor will be allowed seven calendar days after notification to begin tests.

3.14 PRE-SEASON START UP

- A. When requested by the Owner within one year of the filing of Notice of Completion, and when full-load tests required under Project Completion Tests and Post Contract Completion Tests have not been performed, start up any equipment or systems required for heating or cooling season operation by the Owner when such equipment and systems have remained shut down immediately after the Project Completion Tests. Make proper assurance that all equipment and systems are operating properly before being turned over for the first operational use of the Owner within one year of filing of Notice of Completion. The changing of any air filters will not be required under these start-up requirements. The Contractor will be allowed seven calendar days after notification, to begin test.

3.15 MECHANICAL RECORD AS-BUILT DRAWINGS

- A. During the course of Project Construction, Mechanical Contractor shall maintain recorded “As-built” information by distinctively marking up approved shop drawings prints to depict all actual work installed on a daily basis form but not limited to field conditions, addendums, architectural supplemental instructions (ASIs) , instruction bulletins (IBs), change orders (COs), responses to Request For Information (RFIs), and approved product substitutions.
- B. The marked-up shop drawings will be made available at the Construction Site to the Architect upon request, at any time.
- C. The marked-up shop drawings with the recorded information shall then be used to create Record As-built drawings at the completion of the project. Contractor shall submit the Record As-built drawings in full size hard copies and also in PDF format.
 - 1. Provide 2 complete sets of full-size drawings on 20 pound white bond paper.
 - 2. Provide 1 CD (compact disc) or Thumb Drive with Record drawings in PDF format. Files to be names the same as sheets.
 - 3. Record as-built drawings are to be full size drawings (same size as Contract Documents) and all plans are to be to standard engineering scale. The minimum drawing scale to match those provided within the Contract Documents.
- D. Record As-built drawings shall include the followings:
 - 1. Work on Record As-built drawings shall be provided with horizontal and vertical dimensions. Underground work shall be provided with invert elevations. All dimensions shall be references to permanent building fixed points and/or column lines.
 - 2. Provide sufficient details and sections to depict actual installations.
 - 3. Equipment identifications and system labeling nomenclatures shall match the Project Design Documents.
 - 4. Identification of main shut-off valves shall be based on the approved valve tag list and as actually installed in field.
 - 5. Ductwork mains and branches, size and location with duct elevation information.
 - 6. Locations of all dampers, including but not limited to balancing dampers, fire dampers, combination fire and smoke, air inlets and outlets, terminal units reheat coils, humidifiers, duct access doors and ceiling access panels.
 - 7. Piping mains and branches, size and location with pipe elevation information and invert elevations for underground piping.

8. Locations of all manual and automatic valves, pipe strainers, expansion joints and compensators, pipe guides and anchor points, steam traps and air vents.
9. Equipment locations with dimensions from prominent building lines and required service access.
10. Seismic bracing information for ductwork, piping and equipment.
11. Locations of control system panels, control power transformer panels miscellaneous relay panels, control workstations, routing of control system communication loops.
12. Locations of all installed instruction and control field devices in occupied space and above ceiling including but not limited to thermometers, pressure gauges, flow meters, airflow stations, temperature sensors, differential pressure sensors, thermostats and humidistats.

3.16 CLEANING UP

- A. Remove tools, scaffolding, surplus materials, barricades, temporary walks, debris, and rubbish from the Project promptly upon completion of the work of each Section. Leave the area of operations completely clean and free of these items.

END OF SECTION.

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SECTION 23 05 00 – COMMON WORK FOR HVAC

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes general mechanical materials and methods required within the project. Items included within this specification section include:

1. Access Doors
2. Roof Flashing
3. Dielectric Unions
4. Pipe and Equipment Identification
5. Fireproofing
6. Painting
7. Concrete
8. Electrical Work
9. Commissioning and preliminary operational tests

1.2 ACTION SUBMITTALS

A. Product data: submit complete data of materials proposed including:

1. Manufacturer and model number
2. Clearly indicate all options, trim, and accessories.
3. Cross reference manufacturer's cut sheet to specification section on submittal sheet.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: where applicable, submit complete O&M data including:

1. Maintenance data and parts lists for each component.
2. Provide "trouble- shooting" maintenance guide
3. Include this data within maintenance manual

1.4 QUALITY ASSURANCE

- A. **Manufacturer's Qualifications:** Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.
- B. **Contractor's Qualifications:** Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

PART 2 – PRODUCTS

2.1 ACCESS DOORS

- A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14-inch by 14-inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 18-inch by 24-inch minimum usable opening.
 - 1. All access doors less than 7'-0" above finished floors and exposed to public access shall have keyed locks.
- B. Access doors shall match those supplied in Division 08 in all respects, except as noted herein.
- C. Where panels are installed against stainless steel panels, access doors to be stainless steel to match adjacent surfaces.
- D. Where panels are located on ducts or plenums, provide neoprene gaskets to prevent air leakage, and use frames to set door out to flush with insulation.
- E. Provide insulated doors where located in internally insulated ducts or casings.
- F. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.
- G. Do not locate access doors in highly visible public areas such as lobbies, waiting areas, and primary entrance areas. Coordinate with the architect when access is required within these areas.
- H. **Available Manufacturers:**
 - 1. Milcor
 - 2. Karp
 - 3. Nystrom
 - 4. Cesco
- I. Access doors to be equivalent to the following Milcor access doors:

1. Style M (plaster)
2. Style A (A/C tile, gypsum board)
3. Style M (Masonry)
4. Style "Fire Rated" where required.

2.2 ROOF FLASHING

A. Flashings in metal deck or membrane type roofing:

1. Flashing for penetrations of the roof for mechanical items such as flues, ducts, and pipes will be furnished and installed under other sections of these specifications. The work of this section shall include layout, sizing, and coordination of penetrations required for the mechanical work.
2. Furnish and install counterflashings above each flashing required in the mechanical work. Flues and ducts shall have 24-gauge galvanized sheet metal storm collar securely clamped to the flue or duct above the flashing.
3. Sewer vents and other piping extending through roof structure shall have flashing provided and installed as part of the roofing work. This contractor shall coordinate his Work accordingly.

B. Flashing in built-up roofing assemblies:

1. Where flashing is not provided and installed as part of other Work, furnish and install a waterproof flashing and counterflashing for pipe, duct, and flue passing through roof. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe, flue, or duct.
2. Sewer vents and other piping extending through roof structure shall have four-pound sheet lead flashings and Semco, Smith, or equal to Semco #1100-4, counterflashing sleeves installed as detailed.
 - a. Provide Hydroseal at underside of counterflashings as recommended in Semco installation instructions.
3. Flues shall have 24-gauge galvanized steel flashings on all roofs. Securely clamp a storm collar (counterflashing) around the flue above the flashing. Storm collars shall be of same material as flashing.
4. Seal all pipes and/or ducts passing through exterior walls in an approved, watertight manner.

2.3 DIELECTRIC UNIONS

- A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal-to-metal contact. Heavily line the couplings with a hard, insulating, phenolic

plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.

B. Acceptable Manufacturers:

1. Watts Regulator Co.
2. Eclipse, Inc.
3. Perfection Corp.

2.4 EQUIPMENT IDENTIFICATION

A. Equipment Identification:

1. Provide white lamacoid plate for each and every piece of equipment installed in this work.
 - a. Lettering on plate shall be black, with size of lettering to suit equipment.
 - b. Lettering shall be minimum of 3/8-inch in height.
 - c. Plates shall be riveted or bolted to equipment.
2. Equipment to include, but not limited to:
 - a. Heat Pumps
 - b. Exhaust Fans
 - c. Split Systems AC Units
 - d. Etc.

B. Acceptable Manufacturers:

1. Marking Services Incorporated, (MSI)
2. LEM Products
3. Seton
4. Craftmark

2.5 FIREPROOFING

- A. Fireproofing to be installed at all pipe and duct penetrations of rated assemblies.
- B. Fireproofing to be UL Rated fire stop material.

- C. Acceptable Manufacturers:
 - 1. Hilti
 - 2. 3M Pro-Set
 - 3. Or Equal

PART 3 – EXECUTION

3.1 ACCESS DOORS

- A. Access doors shall be furnished and installed wherever valves, balance valves, damper operating mechanisms, air terminal boxes, fans, and similar items normally requiring adjustment or servicing are installed in concealed or inaccessible spaces. Coordinate with access doors shown on architectural Drawings.
- B. Comply with manufacturer's instructions for installation of access doors.
- C. Where access panels are detailed on architectural or mechanical Drawings, sizes indicated thereon shall be used.
- D. Keyed access doors shall be keyed alike.
 - 1. Provide owner with 4 copies of keys for access doors.

3.2 ROOF FLASHING

- A. Provide pipe flashings as noted on the Drawings.
- B. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.3 DIELECTRIC UNIONS

- A. Install dielectric unions in the following locations:
 - 1. In all metallic water and gas service connections into the building within 5 feet of the building wall. Install adjacent to the shut-off valve or cock and above ground where possible.
 - 2. At points of connections where copper water lines connect to steel domestic water heater tanks and other equipment.
 - 3. At points in piping where dissimilar metal pipes are connected together.
 - 4. Any special applications shown on the Drawings.
 - 5. Where steel or cast-iron pipe in the ground connects to copper or brass piping above the ground, the transition from steel or cast- iron pipe to the copper or brass pipe shall be made above ground in all cases and in an accessible location where practicable.

6. Where copper or brass piping is connected to steel or cast-iron piping and the connection is buried in the ground, the connection shall be covered with coal tar protective tape extending outward a minimum of 5 feet on all pipes, from the point of connection. The tape shall have a minimum thickness of 10 mils and a maximum thickness of 12 mils and shall be applied so as to provide at least two full thicknesses of the tape over the piping. A primer, specifically designed for use with the tape, shall be used. The piping shall be thoroughly cleaned before any tape or primer is applied.

3.4 EQUIPMENT IDENTIFICATION

- A. Identification shall be applied equipment.
- B. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.

3.5 FIREPROOFING

- A. Pack the annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls with UL listed fire stop.
- B. Fireproofing system to be installed in strict accordance with manufacturer's written instructions and details.

3.6 PAINTING

- A. Perform all priming and painting on the equipment and materials as specified herein.
- B. Exposed piping and unfinished portions of equipment to be painted shall be cleaned of grease, oil, rust, or dirt in preparation for painting.
- C. Where applicable, remove pipe clamps prior to painting so that entire pipe is painted. Provide temporary support as required. Re-install clamps after priming/painting is complete.
- D. Priming:
 1. Contractor to prime all exposed ferrous metals, including piping, which are not galvanized or factory-finished.
 - a. Black steel pipe exposed to weather shall be cleaned and primed with one coat of Rust-Oleum, or equal, #1069 primer. Color to be Grey.
- E. See Painting Section for detailed requirements.

3.7 ELECTRICAL WORK

- A. Adequate working space shall be provided around electrical equipment in compliance with the National Electric Code and other applicable codes or ordinances. The mechanical work shall be coordinated with the Electrical Work in order to comply with these requirements. Any work which does not conform to these regulations shall be properly corrected without additional cost to the Owner.

- B. Furnish and install all line voltage and low-voltage temperature control wiring in the Mechanical Work by the Temperature Control Sub-Contractor, including all interlock wiring between motor starter coils, interlock relays, and temperature control equipment. Unless noted otherwise, this does not include primary control wiring between starters and push button or other manual starter switch or branch power circuits required for temperature control systems.
- C. Temperature control equipment, including relays shown on control diagram, shall be furnished and installed by the Temperature Control Subcontractor.
- D. Equipment furnished in this work that is factory wired but requires modification to internal wiring to meet specifications or drawing requirements shall have such internal modifications made at factory before shipment.
- E. All electrical work and equipment, including internal wiring, must comply with applicable codes and applicable portions of electrical specifications. Run line and low-voltage control wiring in conduit. Conduit for temperature control wiring shall be responsibility of Mechanical Contractor and shall be of type specified in electrical specifications.

3.8 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter. Thoroughly clean out flush valves, traps, strainers, and pressure-reducing valves.
- C. Keep the interior of all ductwork free of dirt, dust, loose insulation, and other foreign materials at all times.
- D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.9 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.10 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes total system balance, as defined by AABC, which constitutes the process of testing, adjusting, and balancing each system component so that the entire system produces the results for which it was designed. Testing results of total system balance shall be accepted by the Mechanical Engineer of Record and Owner

1.2 REFERENCES AND STANDARDS

- A. Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.
- B. Reference Standards: Comply with the following Standards:
 - 1. AABC - Associated Air Balance Council - A National Standard Volume 1.
 - 2. ASHRAE - American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
 - 3. AMCA Publication 203, "A Guide to the Measurement of Fan System Performance in the Field."
 - 4. ASHRAE HVAC Applications Handbook, Chapters 34 and 42 as applicable.
 - 5. ADC Test Code No. 1062, "Equipment Test Code."
 - 6. ANSI A1.4, Specification for Sound Level Meters.
 - 7. ANSI S1.11, Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets.

1.3 WORK INCLUDED

- A. Test and balance of new air distribution system and associated equipment.
- B. Setting and adjusting speed and volume of systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required by contract documents.
- C. Component types of testing, adjusting, and balancing specified in this section includes the following as applied to mechanical equipment:
 - 1. Fans
 - 2. Air handling units
 - 3. Ductwork systems

4. Relief vent and/or power exhaust section of economizers.

D. TAB agency shall perform the following during installation phase of systems:

1. Study design specifications and engineering Drawings and prepare schedule to physically inspect mechanical equipment for hydronic and air distribution systems to be tested and balanced.
 - a. Contractor shall provide TAB agency with one copy of Contract Drawings and specifications, mechanical equipment submittals, and change orders necessary for proper balancing of air distribution systems.
2. TAB agency shall make periodic field inspections prior to closing in portions of systems to be balanced. Agency shall verify to its satisfaction that all work, fittings, dampers, balancing devices, etc. are properly fabricated and installed as shown or specified and that Agency will be able to properly balance system.
3. Prepare test and balancing schedule, test record forms, and necessary technical information about hydronic and air distribution systems for installed heating-cooling equipment.
4. Recommend adjustments and/or corrections to mechanical equipment and hydronic and air distribution systems that are necessary for proper balancing of systems.
 - a. Corrections required based on TAB Contractor field inspections shall be made at no additional cost to the owner.

1.4 ACTION SUBMITTALS

A. Contractor data: Provide TAB Contractor company information.

1.5 CLOSEOUT SUBMITTALS

A. Field Inspection Report: TAB Contractor to provide written verification of field inspections.

1. Include date of inspection and list of all items to be corrected prior to balance.

B. TAB Contractor to provide Test Reports as follows:

1. Submit data on printed report forms published by AABC.
2. Include identification and types of instruments used and their most recent calibration date with submission of final test report.
3. Reports to have computer generated drawings. Drawings to include: general building layout, ductwork and piping layout, HVAC equipment, and air inlet/outlet locations.
 - a. Hand drawn/numbered drawings shall not be accepted.

4. Reports to be stamped and signed licensed TAB Contractor.
 5. Submit PDF copy of complete test report prior to final acceptance of project.
- C. Balance agency shall submit the results of tests in this SECTION for review by the Architect.

1.6 QUALITY ASSURANCE

- A. Obtain the service of an independent test and balance (TAB) agency that specializes in, and whose business is limited to, testing, analysis, and balancing of air distribution and hydronic systems.
- B. Balance agency shall be a member of Associated Air Balance Council.
- C. Work shall be done by qualified engineering technicians and trained personnel, using instruments certified accurate to limits used in standard practice for testing and balancing of hydronic and air distribution for heating-cooling systems. Agency shall field test air and hydronic flows in accordance with methods set up by Associated Air Balance Council, National Standard Volume 1, latest edition.
- D. Approved Balancing Firms: Obtain service from one of the following firms (No others will be considered):
1. RS Analysis
 2. Raglen System Balance
 3. MESA 3
- E. AABC Compliance: Comply with AABC's "National Standards," Volume 1, as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus.

1.7 WARRANTY

- A. Provide AABC National Performance Guarantee. Guarantee to include:
1. If the building owner or project engineer believes that the test and balance work was not performed properly, a complaint must be submitted, in writing, to AABC National Headquarters
 2. Upon receipt of the complaint, AABC will notify the member agency in question and request a written response within 14 days. The AABC Board then reviews both the complaint and the response to determine if an investigation is necessary.
 3. If it is determined that an investigation is necessary, the AABC Board will appoint a representative to conduct the investigation and determine a satisfactory resolution. If necessary, the Board may at its discretion provide supervisory personnel, at no cost to the building owner, to help complete the project

- B. Guarantee to be valid for one year from the date of submission of a test and balance report.

PART 2 – PRODUCTS

2.1 PATCHING MATERIALS

- A. Except as otherwise indicated, use same products as used by original installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
 - 1. At tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2.2 TEST INSTRUMENTS

- A. Utilize test instruments and equipment for test and balance work required, of type, precision, and capacity as recommended in the following test and balance standards:
 - 1. Comply with AABC's Manual "AABC National Standards," Volume 1.

PART 3 – EXECUTION

3.1 BALANCING

- A. Upon completion of hydronic and air handling systems, balance agency shall complete tests, analysis, and balance of hydronic and air handling systems for heating-cooling equipment.
- B. This report shall include as minimum, but not be limited to, following design and actual information:
 - 1. Air-Moving Equipment Data:
 - a. Fan or unit number.
 - b. Location.
 - c. Area served.
 - d. Manufacturer.
 - e. Model number and serial number.
 - f. Design and actual air-flow measurements:
 - i. Total CFM.
 - ii. Return air CFM
 - iii. Outdoor air CFM

- iv. Relief air CFM
 - v. Total/external static pressure in w.g.
 - vi. Approximate suction static pressure in w.g.
 - vii. Approximate discharge static pressure in w.g.
 - viii. Fan rpm
 - ix. Supply, Return, and Outside air Temperatures
2. Rated and Actual Motor Data:
 - a. Horsepower / Break-horsepower
 - b. Phase
 - c. Voltage.
 - d. Amperage.
 3. Individual Outlet and Inlet Data:
 - a. Identify each outlet for location, area, and fan or unit system
 - b. Outlet or inlet manufacturer and type
 - c. Outlet or inlet size, effective area or A_k factor
 - d. Design and actual velocity in feet per minute (FPM)
 - e. Design and actual CFM
 4. Other information required to establish completely balanced systems.

3.2 BALANCE REQUIREMENTS

- A. Make allowance for air filter resistance at time of tests. Balance main air supplies at design air quantities and at an air resistance across filter bank midway between design specifications for clean and dirty filters.
- B. Balance work within the following tolerances:
 1. Supply, Return, Exhaust inlets/outlets:
 - a. For rooms with less than 500 CFM, balance inlet and outlets within -10% / +10% of design CFM.
 - b. For rooms with 500 CFM or greater, or rooms with multiple inlets or outlets in a single room, balance each inlet/outlet to within -10% / +10% of design CFM and overall room CFM within -5% / +5% of design.

2. Outside Air Inlets: balance within -0% / +10% of design CFM.
- C. Rooms with positive or negative pressure requirements to maintain a minimum of 15% differential pressure regardless of the above tolerances.
- D. Provide a room or building pressure test for each system. Maximum building pressure shall not exceed 0.03” inches of pressure.
- E. HVAC systems shall be balanced at normal "minimum outside air" condition. Where such systems are required to deliver 100-percent return air or a variable amount of outside air, as indicated in specifications for automatic temperature control sequences, total CFM test shall be repeated for 100-percent return air and maximum outside air shall agree with conditions found under maximum outside air operation before system is considered to be in balance. Adjustments of proper dampers shall be made to achieve balance and marked so that control systems contractor may set damper motors accordingly.
- F. After final air and hydronic balance of systems, make adjustments to obtain uniform temperatures as required by actual occupancy.
- G. Take static pressure readings with inclined manometer. Take air velocity readings with instruments of recent calibration. Take final velocity readings with Anor Velometer, Anemotherm or Vane Type Anemometer, calibrated prior to test and recalibrated at end of test. Include certified correction curves for each calibration as part of record. Certify instruments accurate to standards currently used in common practice for system balance work. Use test cones for diffusers.
- H. Run tests with supply, return, and exhaust systems operating and doors, windows, etc. closed or under regular traffic. If possible, make final readings with cooling coils under load to ensure that static pressures are at maximum.
- I. Adjust deflection of supply outlets to ensure proper and uniform air distribution throughout area served by such outlets.
- J. Work with temperature Control Subcontractor in adjustment of automatic dampers, valves, thermostats, etc. required to maintain proper temperatures in all portions of building.
- K. Contractor responsible for installing heating, cooling, and ventilating equipment shall make any changes, additions, or modifications to dampers, fan drives and motor sheaves, pump impellers, motors, and other equipment necessary for proper air and hydronic balance.
- L. Balance of systems shall be reviewed by Architect and during this review Mechanical Contractor shall furnish men, materials, ladders, etc. to enable Architect to take all readings as he may direct. If errors are found, Balancing Agency shall readjust system to satisfaction of Architect.

END OF SECTION.

SECTION 23 07 00 – HVAC INSULATION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes insulation types and thickness for mechanical piping, ductwork, and equipment.

1.2 REFERENCES AND STANDARDS

- A. California Code of Regulations – Title 24, Part 4.
- B. California Building Code, California Electric code, NFPA, and UL
- C. ASTM
- D. ASHRAE
- E. NAIMA
- F. NFPA
- G. SMACNA – Sheet Metal and Air Conditioning Contractor's National Association, Inc.
- H. Underwriter's Laboratories
- I. GREENGUARD

1.3 ACTION SUBMITTALS

- A. Submit complete data of materials proposed.
 - 1. Indicate individual services for each system.
 - 2. Indicate proposed insulation thickness for each system
 - 3. Indicate proposed R-values, densities, etc. for each product.
- B. Provide Manufacturer's installation instructions for each product.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firm specializing in manufacturing of mechanical insulation products applicable to project whose products has been in satisfactory use in similar services for a minimum of 3 years.

- B. Installer's Qualifications: Company specializing in piping insulation application with a minimum of 3 years experience.
- C. Flame/Smoke Ratings: Insulation materials, including but not limited to insulation, jackets, coverings, sealers, adhesives, etc., to have flame-spread rating of 25 or less and smoke-developed index of 50 or less when tested in accordance with ASTM E84.
- D. Insulating products to be installed in accordance with manufacturer's written instructions and in accordance with recognized industry practices.

1.6 WARRANTY

- A. Manufacturer: In addition to the Contractor's Standard Guarantee, furnish Owner with manufacturer's warranty for insulation against defects in materials and workmanship. Warranty shall cover replacement of insulation plus labor to install

PART 2 – PRODUCTS

2.1 GENERAL

- A. For purposes of this specification, fittings, joints, strainers, flexible piping, valves, etc. shall be considered as piping and shall be insulated with same material and thickness as adjoining piping unless noted otherwise.
- B. Acceptable Manufactures
 - 1. Knauf
 - 2. Johns Manville
 - 3. Certainteed
 - 4. Owens-Corning

2.2 MATERIALS

- A. Flexible Closed Cell Insulation:
 - 1. Flexible elastomeric thermal closed-cell structure insulation.
 - 2. Maximum K-Value at 75°F = 0.27 Btu-in/hr-FT²-°F.
 - 3. Joints to be sealed with Armstrong 520 Adhesive
 - 4. Insulation to be Armstrong Armaflex 22 or equal
- B. Fiberglass Ductwork Insulation:
 - 1. Duct wrap to be blanket-type thermal and acoustical insulation made from glass fibers, bonded with white formaldehyde-free resin, compliant with ASTM C1290.

2. Labeled K-Value to equal 0.29 Btu-in/hr-FT²-°F.
3. Compressed K-Value to equal 0.27 Btu-in/hr-FT²-°F.
4. Insulation to be Johns Manville Microlite Formaldehyde-Free Faced Duct Wrap or equal or equal.

2.3 PIPING INSULATION

A. Refrigerant Piping:

1. Insulate both liquid and suction lines with closed-cell pipe insulation.
2. Insulation to be a minimum of 3/4" thick.
3. Seal all joints with Armstrong 520 adhesive.
4. Insulation exposed to weather to be provided with metal protective jacket. Metal protective jacket to be as follows:
 - a. Sheet Aluminum: ASTM B209, 3003 allow, H-14 temper, 0.016" thick.
 - b. Longitudinal lap to be at least 2" wide.
 - c. Fitting covers: Factory fabricated die shaped type 3003 sheet aluminum, 0.024" minimum thickness.
 - d. Provide 3/8" wide, 0.016 inch thick aluminum bands spaced at a maximum of 2'-0" on center.

B. Condensate Drain Piping:

1. Insulated condensate drain piping within building (exposed and in attic) with 3/4" closed-cell pipe insulation.
2. Seal with Armstrong 520 adhesive.

2.4 DUCTWORK INSULATION

A. Wrap all concealed unlined supply and return ductwork, with duct wrap insulation as follows:

1. Where installed over unconditioned spaces, wrap ductwork with type 75, 3" thick duct wrap. Minimum installed R-value to equal 8.3 (hr-ft²-°F)/BTU.
2. Where installed over or within conditioned concealed ceilings, wrap ductwork with type 75, 2" thick duct wrap. Minimum installed R-value to equal 5.6 (hr-ft²-°F)/BTU.
3. Duct wrap to have FSK vapor barrier facing.

4. Insulation to be Johns Manville Microlite Formaldehyde-Free Faced Duct Wrap or equal or equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. Insulation to be stored on jobsite in clean / dry location. Any insulation exposed to water must be discarded immediately and removed from jobsite.

3.2 INSTALLATION OF PIPING INSULATION

- A. Install piping insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices.
- B. Installation to be installed after installation of heat tracing, testing, acceptance of testing, and cleaning of pipe.
- C. Insulate each continuous run of piping with full-length units of insulation. Cut pieces to size as required. Do not use multiple cut pieces and/or scraps abutting each other.
- D. Clean and dry piping surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and type fit over surface to be covered.
- E. Install piping insulation without interruption through walls and floors except where otherwise indicated.
- F. Taper raw ends of insulation and seal with canvas and sealant as noted for fittings.
- G. Install pipe hangers on the outside of the insulation.

3.3 INSTALLATION OF CONCEALED DUCTWORK INSULATION

- A. Install ductwork insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices.
- B. Prior to applying duct wrap, sheet metal duct shall be clean, dry and tightly sealed at all joints and seams.
- C. Wrap insulation around duct with facing to the outside so the 2" flap completely overlaps facing and insulation at the other end of stretch out. Insulation shall be snugly butted. Follow stretch-out dimension recommendations to prevent over-compressing insulation.
- D. Secure seams with outward clinching staples on 6" centers.
- E. Neatly cut insulation at all volume control dampers.
- F. Tape all seams and loose edges with scrim backed foil tape.
- G. For ducts which are greater than 24" wide, provide mechanical fasteners at bottom of duct spaced at a maximum of 18" on center.

1. Fasteners to be weld pins or clinch pins. Adhesive type pins shall not be used.

3.4 INSULATION REPAIR

- A. Repair damaged sections of existing and/or new mechanical insulation where damaged occurred during this construction period. Use insulation of same thickness as existing insulation. Install new jacket lapping and seal over existing.

3.5 CARE AND CLEANING

- A. Repair and/or replace broken, damaged and or otherwise defective insulation. Work to be completed to the satisfaction of the Architect. At completion of work, clean materials installed as part of this work and leave systems and equipment in satisfactory operating condition.
- B. Upon completion of work remove materials, equipment, tools from premises. Leave project area neat, clean and orderly.

END OF SECTION.

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SECTION 23 09 00 – BUILDING MANAGEMENT SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. This section provides requirements for the Building Automation System.
- B. Furnish all labor, materials, equipment, and service necessary for a complete and operating Johnson Controls Control System.
- C. Provide all necessary hardware and software to meet the system's functional specifications. Provide Protocol Implementation Conformance Statement (PICS) for Windows-based control software and every controller in system, including unitary controllers.
- D. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices. Provide and install all interconnecting cables between all operator's terminals and peripheral devices (such as printers, etc.) supplied under this section.
- E. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.
- F. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.
- G. Provide all new low voltage components related to the UBMS. No used components shall be used as any part or piece of ins.

1.2 REFERENCES

- A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof, shall govern design and selection of equipment and material supplied:
 - 1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
 - 2. ANSI/ASHRAE Standard 135-2008, BACnet.
 - 3. Uniform Building Code (UBC), including local amendments.
 - 4. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.
 - 5. National Electrical Code (NEC).
 - 6. FCC Part 15, Subpart J, Class A.
 - 7. EMC Directive 89/336/EEC (European CE Mark).

8. UL-864 UUKL listing for Smoke Controls for any equipment used in smoke control sequences.
- B. City, county, state, and federal regulations and codes in effect as of contract date.
- C. Except as otherwise indicated, the system supplier shall secure and pay for all permits, inspections, and certifications required for his work, and arrange for necessary approvals by the governing authorities.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 1. Drawings
 - a. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.
 - b. Drawings shall be submitted in the following standard sizes: 11" x 17" (ANSI B).
 - c. Submittals shall be in PDF format.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
 1. Provide "trouble- shooting" maintenance guide
 2. Provide manufacturer's instructions and drawings for installation, maintenance and operation of all materials.
 3. Overall system operation and maintenance instructions, including preventive maintenance and troubleshooting instructions.
 4. Upon completion of the work, provide a set of 'record drawings' including manufactures descriptive literature, operating instructions and maintenance and repair data all in accordance with the requirements of the general mechanical specification section. Provide electronic copies of all control system as-built AutoCAD drawings.

1.5 WARRANTY

- A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of one year from completion of system acceptance.
- B. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the vendor. The maximum acceptable response time to provide this service at the site shall be 24 hours, Monday through Friday and 48 hours on Saturday and Sunday.
- C. This warranty shall apply equally to both hardware and software.

PART 2 – PRODUCTS

2.1 Wireless, mesh networked, internet accessible temperature system.

1. System shall be a Johnson Controls Wireless control system consisting of:
Johnson Controls Wireless Gateway (Johnson Controls model GW400):
 - a. Unit to be a single bridge for up to 2000 Johnson Controls thermostats to access the internet with a single device.
 - b. Unit to have 100 to 300 foot maximum wireless range to nearest thermostat depending on building materials.
 - c. Requires 110V electrical outlet and out-bound data connection.
 - d. System to utilize isolated network with AES encryption to Johnson Controls servers.
 - e. Provide with AC adapter.
2. Johnson Controls Thermostat (Johnson Controls model TS200): Installed with existing HVAC units low voltage wiring. Installation requires one thermostat per HVAC unit.
 - a. Thermostat will automatically repeat and route signals from other thermostats (100 to 300 foot maximum range), extending the Gateway's communication range beyond its 100 to 300 foot maximum range - establishing an automatic, self-healing, mesh network.
3. Thermostat shall have four minute compressor short cycle protection, temporary scheduling override, thermostat keypad lock-out, and be UL certified.
Wireless Remote Thermostat (Johnson Controls Model RT1-AC): Allows for averaging of temperature readings for more balanced air temperatures between spaces within the same zone (maximum 8 Remote Thermostats per TS200). The remote thermostat will automatically wirelessly connect to a Master Johnson Controls Thermostat.
 - a. Thermostat will automatically repeat and route signals from other thermostats.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.
- B. Notify the owner's representative in writing of conditions detrimental to the proper and timely completion of the work.

- C. Do not begin work until all unsatisfactory conditions are resolved.

3.2 INSTALLATION (GENERAL)

- A. All electric wiring and all installation work including piping of control systems and internal wiring of panels for temperature control and indicating systems shall be done by an authorized representative of the controls manufacturer whose primary business is the installation and maintenance of temperature control and indicating systems. Wiring shall conform to National Electric Code.
- B. Install in accordance with manufacturer's instructions.
- C. Provide all miscellaneous devices, hardware, software, interconnections, installation, and programming required to ensure a complete operating system in accordance with the sequences of operation and point schedules.
- D. The installation and supervision of this project shall be carried out by factory-trained personnel who are directly employed by the C-10 BACnet System Contractor and must be California Certified Electricians.

3.3 LOCATION AND INSTALLATION OF COMPONENTS

- A. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum 3 feet of clear access space in front of units. Obtain approval on locations from owner's representative prior to installation.
- B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture, and high or low temperatures.
- C. Identify all equipment and panels. Provide permanently mounted tags for all panels.
- D. Provide stainless steel or brass thermowells suitable for respective application and for installation under other sections, and sized to suit pipe diameter without restricting flow.

3.4 INTERLOCKING AND CONTROL WIRING

- A. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with all national, state and local electrical codes.
- B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.
- C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner's representative prior to rough-in.
- D. Provide auxiliary pilot duty relays on motor starters as required for control function.
- E. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings; coordinate with electrical contractor.

- F. All control wiring shall be installed in conduit.

3.5 FIELD SERVICES

- A. Prepare and start logic control system under provisions of this section.
- B. Start-up all BACnet DDC Control System components provided under this section. Allow sufficient time for startup and pre-functional testing (if specified) prior to placing control systems in permanent operation.
- C. Provide the capability for off-site monitoring at control contractor's local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download. Owner shall provide phone line or Remote Desktop connection for this service for one year or as specified.
- D. Provide owner's representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

3.6 AS-BUILT DOCUMENTATION REQUIRED

- A. Provide all as-built documentation specified in this section and the general conditions.

3.7 TRAINING

- A. Initial Training – Provide 4 hours of on-site customer training to familiarize owner personnel with basic log-in and navigation function.

3.8 DEMONSTRATION

- A. Demonstrate complete operating system to owner's representative.
- B. Provide certificate stating that control system has been tested and adjusted for proper operation.

END OF SECTION.

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SECTION 23 31 00 – HVAC DUCTWORK

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes sheet metal materials, fasteners, supports, and duct construction classifications for:
 - 1. Supply, return, and exhaust systems.

1.2 REFERENCES AND STANDARDS

- A. AABC – Associated Air Balance Council Manual: National Standards for Total System Balance
- B. ANSI – American National Standard Institute
- C. ASHRAE Standards: Comply with American Society of Air Conditioning, Refrigeration, and Air Conditioning Engineers Handbook.
- D. NFPA – Compliance. Comply with ANSI/NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*, and ANSI/NFPA 90B *Standard for the Installation of Warm Air Heating and Air Conditioning Systems*, latest accepted edition.
- E. CBC – California Building Code
- F. CFC – California Fire Code
- G. CMC – California Mechanical Code
- H. Local Codes
- I. SMACNA – Sheet Metal and Air Conditioning Contractor’s National Association, Inc.
 - 1. Duct Construction Standards
 - 2. Fire damper and heat stop guide.
 - 3. HVAC Systems testing adjusting and balancing.
 - 4. Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Pipe systems.
- J. UL – Underwriters’ Laboratory Standards for Safety: referred to as UL 181, UL 555, etc.

1.3 ACTION SUBMITTALS

- A. Submit typical shop standards and/or SMACNA details for each class of duct specified. Indicate the following for each standard:

1. Gauge sizes and joint details
 2. Pressure Class
 3. Seam Construction
 4. System type (e.g. supply air, return, transfer air, etc.)
- B. Submit shop drawings for ductwork including elevations and showing all terminal units and air devices connections. Drawings shall be a minimum scale of $\frac{1}{4}''=1'-0''$ and be coordinated with all other trades.

1.4 CLOSEOUT SUBMITTALS

- A. Record Drawings: At project closet-out, submit Record Drawings of installed ductwork, duct accessories, and inlets / outlets in accordance with the requirements of Division 1.

1.5 QUALITY ASSURANCES

- A. Contractor to comply with all the above referenced standards.
- B. The above referenced standards may be superseded by notes and details on Drawings and in specification.
- C. Where two or more references are in conflict, the most stringent, as determined by the Architect, shall take precedence.
- D. Flame-Smoke Ratings: All products used in ductwork system to comply with flame-spread index of 25 or less, fuel-contributed index of 50 or less, and smoke-developed index of 50 or less.
- E. Installer: A firm with at least three years of successful installation experience on projects similar to that required for this work.
- F. Fabricate all ductwork with sheet metal. Fiberglass ductwork will not be accepted.
- G. Duct liner to be certified by Greenguard: Greenguard Environmental Institute, independent testing of products for emissions of respirable particles and Volatile Organic Compounds (VOCs), including formaldehyde and other specific product-related pollutants. Provides independent, third-party certification of IAQ performance. Certification is based upon criteria used by EPA, OSHA and WHO

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufactured Round and Oval Ductwork:
1. Omni Duct
 2. United McGill Sheet Metal

3. Or equal
- B. Duct Connection Systems:
 1. Ductmate Industries, Inc.
 2. Travers Duct Connection (TDC)
 3. or equal
- C. Flexible Ductwork:
 1. Flexmaster
 2. Thermaflex
 3. or equal
- D. Duct Sealants:
 1. United McGill Corp.
 2. Ductmate Proseal
 3. Or Equal
- E. Duct Liner:
 1. Johns Manville - Linacoustic
 2. Owens Corning Fiberglas Corporation – Aeroflex Plus
 3. Certainteed Corporation - Toughgard
- F. Duct adhesives:
 1. Fosters Adhesive – 85-462
 2. Swifts Adhesive – 7336
 3. Or Equal

2.2 DUCT CONSTRUCTION CLASSIFICATIONS

- A. General: Construct and seal ductwork in accordance with SMACNA pressure classifications and seal classes listed for ductwork systems involved.
 1. Minimum duct gauge for concealed ductwork to be 26 gauge.
 2. Provide 20 gauge minimum for ductwork exposed within occupied areas.
- B. Rectangular Ductwork:

1. +2" W.G. Class ductwork:
 - a. Supply air Ductwork downstream of terminal boxes.
 - b. Constant volume supply air ductwork in systems without terminal boxes
 2. -2" W.G. Class ductwork:
 - a. General exhaust ductwork.
 - b. Return Air Ductwork
- C. Round or oval ductwork: Same as rectangular ductwork

2.3 GENERAL

- A. All duct sizes listed on drawings are external sizes.
- B. Galvanized Sheet Steel to be lock-forming quality, ASTM A924. Coating to be Designation G90. Provide mill phosphatized finish for exposed surfaces of ducts exposed to view.
 1. Provide mill certification for galvanized material at request of IOR, Owner, Architect, or engineer.
- C. Tapers to be as follows:
 1. Limit diverging tapers to a maximum of 30 degrees.
 2. Limit expanding tapers to a maximum of 20 degrees.
- D. Run ductwork parallel to adjacent walls unless shown otherwise on plans.
- E. Ductwork exposed to weather to be cross-broken to shed water.
 1. At contractor's option, ductwork can be manufactured with a sloped top, with a minimum angle of 5 degrees.
- F. Joint Sealing:
 1. Seal all concealed ductwork within the building, all ductwork within mechanical rooms, and all ductwork exposed to weather airtight. Seal all standing seams, transverse joints, manufactured joints and seams with duct sealant. Duct Sealant to be rated for indoor and outdoor use.
 2. Seal punched holes, corner cracks, and all sheet metal screws.
 3. After testing, reseal joints found to be leaking.
 4. At ductmate joints, in addition to ductmate gaskets, seal all bolted corners to eliminate air leakage at corners.

5. Pressure sensitive tapes shall not be considered.
- G. Provide sheet metal angle frame at all duct penetrations to wall, floor, roof, or ceiling.
1. Ducts to penetrate perpendicular to walls, ceilings and floors.
- H. Internal Duct Liner:
1. Provide internal duct liner as follows:
 - a. All Transfer air ducts.
 2. Supply air ductwork downstream of packaged heat pumps, DOAS Units, or ERVs.
 - a. Minimum length to be 8'-0" unless noted or shown otherwise.
 - b. All supply and return air ductwork exposed to weather.
 - c. Concealed supply air ductwork downstream of fan, fan casing, or unit casing – minimum length to be 12'-0".
 - d. Concealed return air ductwork upstream of fan, fan casing, or unit casing – minimum length to be 12'-0".
 3. Elsewhere as indicated on the drawings.
 4. Internal duct liner within building installed over conditioned spaces to be as follows:
 - a. 1" thick, 1.5-pound density (minimum) with matt facing.
 - b. Thermal Performance - C Value – $0.24 \text{ BTU} / (\text{h} * \text{FT}^2 * ^\circ\text{F})$ – minimum
 - c. Thermal Performance - R Value – $4.2 (\text{h} * \text{FT}^2 * ^\circ\text{F}) / \text{BTU}$ – minimum
 - d. Minimum Acoustical Performance shall be as follows:

Absorption Coefficients @ Octave Band Frequencies (Hz)						
125	250	500	1000	2000	4000	NRC
0.10	0.32	0.66	0.84	0.91	0.91	0.70
 - e. Liner to be CertainTeed, ToughGard R Duct Liner, Type 150, or equal.
5. Internal duct liner exposed to weather or installed over un-conditioned space to be as follows:

- a. 2” thick, 1.5-pound density (minimum) with matt facing.
- b. Thermal Performance - C Value – 0.14 BTU / (h * FT² * °F) – minimum
- c. Thermal Performance - R Value – 8.3 (h * FT² * °F) / BTU – minimum
- d. Minimum Acoustical Performance shall be as follows:

Absorption Coefficients @ Octave Band Frequencies (Hz)						
125	250	500	1000	2000	4000	NRC
0.24	0.79	1.09	1.05	1.02	1.01	1.00

- e. Liner to be CertainTeed, ToughGard R Duct Liner, Type 150, or equal.
- 6. Cement duct liner in place with nonflammable, non-hardening duct adhesive. Seal up all raw edges of insulation inside ductwork with adhesive.
- 7. Provide sheet metal weld pin fasteners and washers on all duct work on 12-inch intervals with the first row within 3 inches of the leading edge of each piece of insulation and 4 inches from corners. No substitutions on fastening method will be allowed.
- 8. Duct liner and adhesive shall not exceed flame-spread rating of 25 and smoke-developed rating of 50, all in conformance with NFPA 90A.
- 9. Provide metal nosing at all locations where liner is preceded by unlined metal.
- I. Ductwork Support: Provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork, unless noted otherwise.
- J. Miscellaneous Ductwork Materials:
 - 1. Duct Joints: Install duct sealers, pop rivets, or sheet metal screws at each fittings and joint. Use a minimum of #10 galvanized sheet metal screws.

2.4 2” W.G. RECTANGULAR DUCT CONSTRUCTION/FABRICATION

- A. Shop fabricate ductwork of gauges and reinforcement complying with the more stringent of the following standards, except as noted herein.
- B. California Mechanical Code (CMC).
- C. SMACNA HVAC Duct Construction Standards, latest Edition.
- D. Fabricate Ducts with minimum gauges and joint reinforcement as follows:

Duct Dimension	Minimum Gauge	Joint Reinforcement per CMC
Up through 12"	26	Not Required
13" through 18"	24	Not Required
19" through 30"	24	C/4
31" through 42"	22	E/4
43" through 54"	22	F/2
55" through 60"	20	G/4
61" through 84"	20	I/2

- E. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Fabricate elbows with center-line radius equal to 1.5 times associated duct width. Fabricate to include single thickness turning vane in elbows where space does not permit the above radius or where square elbows are shown.
- F. Fabricate round supply connections at rectangular, plenum type fittings using spin-in type fittings, complete with extractor and volume control damper.
- G. Provide drive slip or equivalent flat seams for ducts exposed in the condition space or where necessary due to space limitations. On ducts with flat seams, provide standard reinforcing on inside of duct. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.

2.5 ROUND/OVAL DUCT CONSTRUCTION

- A. Spiral lock seam prefabricated factory-built round and oval duct and fittings shall be used wherever possible. Shop fabricated ducts shall be used only where rectangular shaped ducts are shown on plans or where transitions and special fittings cannot be prefabricated by factory. Provide couplings to join each length of duct.
- B. Fabricate duct fittings to match adjoining ducts and comply with duct requirements as applicable to fittings. Except as noted otherwise, fabricate elbows as follows:
 1. Center-line radius to be equal to 1.5 times associated duct width.
 2. Provide two-piece, die stamped, 45 degree to 90 degree elbows for sizes up to 12 inches.
 3. Provide 5 piece 90 degree elbows for sizes 12" and above, conical tees, and conical laterals.
 4. All reducers to be located after tap. Reducers shall be long-taper style. Reducing tees shall not be allowed.
- C. Round Ductwork: Construct of galvanized sheet metal complying with ANSI/ASTM A527 by the following methods and in minimum gauges listed.

Duct Diameter	Minimum Gauge	Method of Manufactured
4"Ø – 14" Ø	26	Spiral Lockseam
15"Ø - 23"Ø	24	Spiral Lockseam
24"Ø - 36"Ø	22	Spiral Lockseam
37"Ø - 50"Ø	20	Spiral Lockseam

D. Fittings and Couplings:

1. Construct of same minimum gauges listed for ductwork.
2. Provide continuous welds along seams.
3. At Contractors option, provide spot welded fittings sealed inside and out.

2.6 FLEXIBLE DUCTWORK

- A. Flexible ducts may be used in concealed areas where detailed and as specified.
- B. Flexible ducts from rigid run-outs to registers shall be Flexmaster USA, Inc., Type 1M Acoustical Insulated flex duct, or equal.
- C. Flexible ducts shall be as follows:
 1. Minimum Operating Pressure:
 - a. Positive = 6" w.g. for all sizes
 - b. Negative = 1" w.g. for sizes thru 12" and 1/2" w.g. for sizes 14"-20"
 2. Rated Velocity = 5,000 FPM
 3. Minimum Burst Pressure = 2 1/2 times working pressure
 4. Minimum R Value = $6.0 (h * FT^2 * °F) / BTU$
 5. Duct to be ETL Class 1 Air duct.
 6. Flame spread to be less than 25 and smoke developed less than 50.
 7. Flex duct to consist of an exterior reinforced metalized vapor barrier, fiberglass insulation, mechanical lock wire helix, and polyethylene inner film. Inner liner to be mechanically locked without adhesives.
- D. Minimum length of three feet and a maximum length of five feet to be installed at each air terminal. Flexible duct shall have no bends greater than 45 degrees. Specifications and any applicable drawings or details will be strictly enforced.

- E. Make connections to rigid ductwork with Panduit style draw band. Provide one draw-band at inner liner and a second draw band over the outer vapor barrier material.

PART 3 – EXECUTION

3.1 INSTALLATION OF DUCTWORK

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight (leakage class 12 for 2-inch pressure class and leakage class 3 for 4-inch pressure class) and noiseless (no objectionable noise) systems capable of performing each indicated service. Install each run with minimum of joints. Align ductwork accurately at connections within 1/8- inch misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will hold ducts true to shape and to prevent buckling.
- B. Seal ductwork after installation to seal class required and method prescribed in SMACNA "HVAC Leakage Test Manual," latest edition.
- C. Paint inside of duct visible through grille dull black.
- D. Duct Supports:
 - 1. Support ductwork in manner complying with SMACNA "HVAC Duct Construction Standards," latest edition, hangers and supports sections. Where special hanging of ductwork is detailed or shown on Drawings, Drawings shall be followed.
 - a. Except where modified in individual paragraphs in this section or detailed on drawings, provide hanger support with minimum 18 gauge straps, 1 inch wide. Fold duct strap under bottom of duct.
 - b. Install duct supports to rectangular ducts with sheet metal screws. Provide one screw through strap at top of duct and one screw through strap at bottom of duct.
- E. Where ducts pass through interior partitions and exterior walls, conceal space between construction opening and duct or duct-plus- insulation with sheet metal flanges of same gauge as duct. Overlap opening on four sides by at least 1-1/2 inches.
- F. Where ductwork is exposed, Contractor to paint ductwork, supports, and air inlets and outlets to match adjacent architectural surfaces, or as directed by Architect.

3.2 INSTALLATION OF FLEXIBLE DUCTWORK

- A. Provide flexible ducts with supports at or near mid-length with 2-inch wide, 26-gauge steel hanger collar attached to the structure with an approved duct hanger. Installation shall minimize sharp radius turns or offsets.
- B. Make connections to rigid ductwork with Panduit style draw band. Provide one draw-band at inner liner and a second draw band over the outer vapor barrier material.

- C. Bends in flexible ductwork shall be kept to a minimum. When required, the minimum bend radius shall be 1.5 times the duct diameter. Duct offsets to be limited to 45 degree turns.

3.3 CLEANING AND PROTECTION

- A. Ductwork being stored on site to be covered and protected from elements. Internally lined ductwork to be stored on jobsite in clean / dry location. Any insulation exposed to water must be discarded immediately and removed from jobsite.
- B. Clean ductwork internally, unit by unit as it is installed, of dust, dirt, and debris.
- C. Clean external surfaces of dirt and foreign substances which might cause corrosive deterioration of metal or where ductwork is to be painted.
- D. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.
- E. If HVAC System is operated prior to the completion of construction, Contractor to provide temporary filters at all return air and exhaust air grilles. Filters to be 2" thick, MERV 8 filters. Contractor to secure filters in place with tape or wiring. Filters to completely cover grille opening.

3.4 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.5 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, and tools, and leave premises clean, neat, and orderly.

END OF SECTION.

SECTION 23 33 00 – AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes requirements for the following duct accessories:
 - 1. Volume Control Dampers
 - 2. Turning Vanes
 - 3. Flexible Connections
 - 4. Duct Access Doors

1.2 REFERENCES AND STANDARDS

- A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) HVAC Duct Construction Standards (Metal and Flexible), latest edition, for all work in this section.
- B. ASHRAE Standards: Comply with American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations, latest edition, for all work in this section.
- C. NFPA Compliance: Comply with ANSI/NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," and ANSI/NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
- D. Compliance: Construct, test, install and label fire dampers and fire doors in accordance with Underwriters Laboratories (U.L.) Standard 555, "Fire Dampers and Ceiling Dampers."

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 - 1. Manufacturer and model number
 - 2. Clearly indicate all options, trim, and accessories.
 - 3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.
- B. Sound Traps:
 - 1. Furnish sound data for dynamic insertion losses for the 2ND through 7TH octave bands as tested in strict accordance with ADC standards. Sound levels shall not exceed those of units scheduled on the Drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each type of fixture.
 - 2. Provide "trouble- shooting" maintenance guide
 - 3. Include this data within maintenance manual

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firm specializing in manufacturing of mechanical insulation products applicable to project whose products has been in satisfactory use in similar services for a minimum of 3 years.
- B. Installer's Qualifications: Company specializing in piping insulation application with a minimum of 3 years experience.

PART 2 – PRODUCTS

2.1 VOLUME CONTROL DAMPERS

- A. General:
 - 1. Provide dampers throughout the duct system where indicated on the drawings to facilitate complete balancing.
 - 2. Provide any dampers not shown on drawings but requested by Test and Balance Contractor add no additional charge to the owner.
 - 3. Locate volume control dampers within 18" of the branch duct take off. Dampers shall not be located at or near the end of the duct branch run.
 - 4. Provide for each damper quadrant lock device on one end of shaft and end-bearing plate on other end.
 - a. Quadrant lock device to be Ventlock 641, or equal.
 - b. End bearing plate to be Ventlok 607, or equal.
 - 5. Provide extended quadrant locks and extended bearing plates for externally insulated ductwork.
- B. Identification:
 - 1. Provide 1" wide identification nylon ribbon for each damper.
 - 2. Tie identification ribbon through hole at each end of damper quadrant. Ribbons to have a minimum of 12" of ribbon hanging free. Install ribbon at the time each damper is installed.

C. Inaccessible Ceilings:

1. Where volume control dampers are located in inaccessible ceilings, or where noted otherwise, furnish cable operated remote controlled volume damper. Reference architectural drawings for locations of gypsum board ceilings.
2. Dampers are to be adjustable with standard tools at the ceiling line through a self supporting 2" round Ceiling Cup.
3. Powder painted steel box cover plate shall be fastened with standard countersunk screws providing a secure, unobtrusive appearance flush with the ceiling surface.
4. Galvanized steel, square-shafted damper shall be worm gear actuated via a brass plated rotary cable meeting Mil-spec I-45208 and supported at the damper end by a self lubricating bearing integral to the worm gear assembly.
5. Additional cable retainer supports shall be factory furnished as required by the cable length. Rotary cable shall have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions.
6. Ceiling Cup, rotary cable, and worm gear shall be furnished as one piece for installation with no linkage adjustment required or small parts to get lost on site. Positive, direct, two-way damper control shall be provided with no sleeves, springs, or screw adjustments.
7. Cable operated dampers shall be Metropolitan Air Technology, or equal Model #RT-250 with model RT-CCR ceiling cup.

D. Rectangular Dampers with either height or width less than 16 inches:

1. Butterfly type damper with 18-gauge steel or duct casing angle reinforced as required.
2. Provide single thickness 16-gauge minimum, galvanized steel blades, welded or permanently bolted to continuous solid 3/8" minimum square shaft. Permanently mark end shaft to indicate blade position and fit with a locking quadrant mounted on outside of frame. Bearings shall be pressed into frame and designed for dynamic requirements

E. Rectangular Dampers with either height or width greater than or equal to 16 inches:

1. Frame with 5" by 1", 16-gauge galvanized steel channel. Blades to be 8" maximum width, extruded aluminum, airfoil blade, opposed blade, having shafts/bearings designed to meet dynamic requirements, positively locked to shafts.
2. Control shafts to be 3/8" square, plated steel, permanently marked to indicate blade position and fitted with locking quadrant mounted on outside of frame.
3. Provide single thickness 16-gauge minimum, galvanized steel blades, welded or permanently bolted to 1/2" minimum diameter through shaft. Permanently mark end shaft to indicate blade position and fit with a locking quadrant

mounted on outside of frame. Bearings shall be pressed into frame and designed for dynamic requirements

F. Round Dampers:

1. Frame shall be 20 gauge galvanized steel or duct casing reinforced.
2. Provide single thickness 18 gauge galvanized steel blade, welded or permanently bolted to 3/8" minimum diameter through shaft. Permanently mark end shaft to indicate blade position and fit with a locking quadrant mounted on outside of frame. Damper to be provided with end bearing plates.

G. Backdraft Dampers:

1. Provide dampers with parallel blades, constructed of 16-ga. aluminum; provide 1/2-inch diameter ball bearings, 1/2-inch diameter steel axles spaced on 9-inch centers. Construct frame of 2 inches by 1/2-inch by 1/8-inch steel channel for face areas 25 sq. ft. and under; 4 inches by 1-1/4 inches by 16-ga. channel for face areas over 25 sq. ft. Provide galvanized steel finish on frame with aluminum touch-up.

H. Acceptable Manufacturers:

1. Air Balance Inc.
2. Ruskin Manufacturing Company
3. Greenheck

2.2 TURNING VANES

A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards," latest edition.

B. Acceptable Manufacturers:

1. Duro-Dyne Corporation
2. Ductmate
3. Or equal

2.3 DUCT ACCESS DOORS

A. Acceptable Manufacturers:

1. Nailor
2. Ductmate
3. Vent Fabrics

4. Or equal
- B. General:
1. Provide airtight access doors in ducts and plenums for cleaning and repairs for volume and fire dampers for control devices within such ductwork and where shown on the Drawings.
 2. Access doors into 2" w.g. pressure class ductwork shall be made of No. 24 gauge galvanized steel minimum, reinforced with angle iron stiffeners. Doors shall be hinged and provided with latches and gasket around entire edge to provide an airtight fit. Reinforce openings for doors with structural steel.
 3. Access doors shall be sandwich-type construction, consisting of three layers of .030" galvanized steel. The inside door shall combine two layers of metal spot welded together at rim and encapsulating high density fiberglass insulation –UL classified FHC 25/50. Doors shall have a minimum R-value of 4.0 total. Access doors shall be pressure rated for 20" WG positive and 10" WG negative with no leakage.
 4. Identification: Access doors shall be permanently identified on the exterior by a label with letters not less than 1/2 inch in height reading: SMOKE/FIRE DAMPER or FIRE DAMPER.
- C. 2" w.g. pressure class or less:
1. Un-insulated round ducts: Nailor model 0890, or equal.
 - a. 16-gauge galvanized steel.
 - b. Door hinge with Strike and catch, zinc plated steel and gasket.
 2. Insulated round ducts: Nailor model 0890, or equal.
 - a. 16-gauge galvanized steel.
 - b. Door hinge with Strike and catch, zinc plated steel and gasket.
 3. Rectangular ducts: Nailor model 08SH, or equal.
 - a. 16-gauge galvanized steel.
 - b. Door hinge with Strike and catch, zinc plated steel and gasket.
 - c. Where space does not allow hinged access door, provide Nailor model 08SCL, or equal.

2.4 FLEXIBLE CONNECTIONS

- A. Furnish and install flexible connections at following locations:
1. Duct connection of supply fan

2. Duct connection of return fan
 3. Duct connection of exhaust fan
 4. Elsewhere as shown on Drawings
- B. Flexible duct connections shall be preassembled flexible connectors constructed of coated glass fabric applied in accordance with manufacturer's recommendations.
- C. Install sheet metal band completely around duct or fan outlet, at end of flexible connection. Fasten with metal screws through band and coated glass fabric. Space screws approximately 4" apart.
1. Provide with TDC/TDF connectors where connecting to like ductwork.
- D. Flexible Connections to be as follows:
1. For all equipment: Duro-Dyne Model Metal Fab, or equal.
 - a. Provide with Neoprene (commercial/specification grade) fabric.
 - i. Neoprene to be 30 oz./square yard,
 - b. Provide with 4" fabric with 4" metal connectors on each end.
 - c. Minimum 24 gauge.
- E. Provide galvanized sheet metal sun shield over flexible connections located outdoor.
- F. Acceptable Manufacturers:
1. Duro-Dyne Corporation
 2. Ventfabrics, Inc.
 3. Ductmate PROflex
 4. Or Equal

PART 3 – EXECUTION

3.1 GENERAL

- A. Install duct accessories in accordance with manufacturer's installation instructions with applicable portions of details of construction as shown in SMACNA standards and in accordance with recognized industry practices to ensure that products serve intended function.

3.2 INSTALLATION OF VOLUME CONTROL DAMPERS

- A. Provide volume control dampers at all supply, return, and exhaust branch ductwork and elsewhere where shown on the drawings.

- B. Locate volume control dampers at or near branch take off. Volume Control dampers shall not be located at the end of branch duct.

3.3 INSTALLATION OF TURNING VANES

- A. Install turning vanes in square or rectangular 90-degree elbows in supply, return, and exhaust air systems and elsewhere as indicated.

3.4 INSTALLATION OF DUCT ACCESS DOORS

- A. Provide for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, smoke dampers, combination fire/smoke dampers, before humidifiers and duct heating coils, and at turning vanes, splitter dampers. In addition, provide access doors at minimum 50 feet on center in duct runs to facilitate cleaning. Review locations prior to fabrication. Doors shall be square, sized to 3/4 of the larger of the duct width or height, but no smaller than 8" x 8" nor no larger than 24" x 24".
- B. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.
- C. Coordinate with other work as necessary to interface installation of duct accessories properly with other work.
- D. Field Quality Control: Operate installed duct accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

3.5 INSTALLATION OF FLEXIBLE CONNECTIONS

- A. Install flexible connection in accordance with manufacturer's installation instructions.
- B. Furnish and install flexible connections at following locations:
 1. Duct connection of supply fan.
 2. Duct connection of return fan.
 3. Duct connection of exhaust fan
 4. Duct connection of factory-built fan unit
 5. Elsewhere as shown on Drawings

3.6 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.7 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

SECTION 23 34 00 – EXHAUST FANS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes exhaust systems including:
 - 1. Cabinet Fans
 - 2. Ceiling Exhaust Fans

1.2 REFERENCES AND STANDARDS

- A. AFBMA 9 – Load Ratings and Fatigue Life for Ball Bearings.
- B. AFBMA 11 – Load Ratings and Fatigue Life for Roller Bearings.
- C. AMCA 99 – Standards Handbook
- D. ACMA 210 – Laboratory Methods of Testing Fans for Rating Purposes
- E. ACMA 300 – Test Code for Sound Rating Air Moving Devices
- F. AMCA 301 – Method of Calculating Fan Sound Ratings form Laboratory Test Data
- G. ANSI B3.15
- H. California Electrical Code (C.E.C.)
- I. SMACNA – HVAC Duct Construction Standards

1.3 ACTION SUBMITTALS

- A. Product Data: Submit complete data of materials proposed including the following:
 - 1. Manufacturer.
 - 2. Model.
 - 3. Fan Type
 - 4. Wheel type
 - 5. Fan Construction Class
 - 6. Fan size and arrangement
 - 7. Dimensional data including bolt hole locations
 - 8. Fan Weight
 - a. Were fans are mounted on vibration isolators, provide corner

operating weight data for each fan.

9. Air flow capacity, fan curves, and efficiency data
 10. Static pressure
 11. Fan motor drive
 12. Motor HP and Fan bHP
 13. Sound Power: discharge and inlet for each octave band.
- B. In cases of Substitution, equivalent fan shall not (when compared to basis of design fan):
1. Increase motor horsepower
 2. Increase bHP by more than 5%
 3. Increase noise level
 4. Increase tip speed by more than 10%
 5. Increase air inlet velocity by more than 20%
 6. Change motor type (e.g.: from ECM motor to non ECM motor).
 7. Change Voltage
- C. Named non-basis-of-design manufacturer does not guarantee approval of equipment submittals. Manufacturers must comply with all the performance and features as specified within the specifications and as indicated on the design documents.
- D. All fans are to be by the same manufacturer (unless specified otherwise).

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit operations and maintenance data and parts list for each fan type. Include this data in Maintenance Manual.

1.5 QUALITY ASSURANCE

- A. Conform to AMCA bulletins regarding construction and testing. Fans shall bear AMCA certified rating seal.
- B. Fans of similar type shall be by the same manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURES

- A. General Exhaust Fans, Inline Centrifugal Fans, Roof Exhaust fans, and Cabinet Fans:

1. Greenheck
 2. Loren Cook
 3. Or equal
- B. Roof Curbs
1. By Fan Manufacturer
 2. Or Equal

2.2 GENERAL

- A. Provide motors so that they cannot be overloaded above nameplate rating throughout the full speed range of the adjustable pitch driving sheave.
- B. Fan wheels shall be balanced statically and dynamically near operating speed.
- C. Provide drives and guards conforming to the requirements hereinbefore specified.
- D. Fan construction, speed, noise level, tip speeds, outlet velocities and efficiencies will be taken into consideration in approval of fans offered. Fans shall be as scheduled on drawings, or approved equal.

2.3 CABINET FANS – FORWARD CURVED – DIRECT DRIVE

- A. Duct mounted supply, exhaust fans shall be of the centrifugal, direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel and shall include pre-punched mounting brackets. The housing interior shall be lined with 0.5 in. acoustical insulation. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge.
- B. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan wheel(s) shall be of the forward curved centrifugal type, constructed of galvanized steel and dynamically balanced.
- C. Fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed and C.S.A. approved.
- D. Provide with vibration isolator kit for suspended installation.
- E. Provide with additional options and accessories as scheduled.

2.4 CEILING EXHAUST FANS – DIRECT DRIVE CEILING AND CABINET FANS

- A. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be lined with 0.5 in. acoustical insulation. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators.

The fan wheel(s) shall be of the forward curved centrifugal type, constructed of galvanized steel and dynamically balanced.

1. The grille for sizes 210-228 shall be constructed of high impact polystyrene
 - a. Grilles shall be non-yellowing.
 2. The grille for sizes 250-265 shall be constructed of aluminum.
- B. All fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed and C.S.A. approved.
- C. Provide with the following Options and Accessories:
1. Steel construction with black enamel finish
 2. Integral flashing flange
 3. Built in birdscreen and damper
 4. Vibration isolators kit.
- D. Speed Control: Where noted, furnish fan with remote fan speed control, solid state, capable of controlling fan speed from full speed to approximately half speed. Unless noted otherwise, locate speed controller adjacent to fan.
- E. Accessories: Provide manufacturer's standard roof jack, and transition fittings as indicated on drawings or schedules.

PART 3 – EXECUTION

3.1 GENERAL

- A. Install fans and ventilators in accordance with equipment manufacturer's installation instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes.
- B. Install flexible connections between fan inlet and ductwork. Metal bands of connectors are to be parallel with 1" (minimum) flex between ductwork and fan while running.
- C. Supply and install sheaves as necessary for final air balancing.
- D. Ensure air distribution equipment is wired properly, with rotation in direction indicated and intended for proper performance.

3.2 START UP

- A. Inspect equipment after installation to verify installation is in accordance with specifications and manufacturers installation guidelines. Verify equipment is lubricated, proper belt tension, and that equipment is otherwise ready to operate.
- B. Perform air side test and balance as applicable.

3.3 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 23 37 00 – AIR OUTLETS AND INLETS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes requirements for HVAC air inlets and outlets.

1.2 REFERENCES AND STANDARDS

- A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) HVAC Duct Construction Standards (Metal and Flexible), latest edition, for all work in this section.
- B. ASHRAE Standards: Comply with American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations, latest edition, for all work in this section.
- C. NFPA Compliance: Comply with ANSI/NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," and ANSI/NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."
- D. The Diffuser, Register, Grille manufacturer shall provide published performance data for all air inlets/outlets. Performance tests shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

1.3 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
 - 1. Manufacturer and model number
 - 2. Clearly indicate all options, trim, and accessories.
 - 3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
 - 1. Maintenance data and parts lists for each type of fixture.
 - 2. Provide "trouble- shooting" maintenance guide
 - 3. Include this data within maintenance manual

1.5 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of plumbing equipment of type and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years

- B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.

PART 2 – PRODUCTS

2.1 AIR INLETS AND OUTLETS

- A. Acceptable Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
- B. General:
 - 1. Provide manufacturer's standard inlets and outlets where indicated on Contract Drawings. Provide size, shape, capacity, type, and throw patterns as indicated. Construct of materials and components as indicated and as required for complete installation.
 - 2. Furnish and install sponge rubber gaskets between grilles and grounds of finished surfaces. Wood grounds will be furnished by others. Metal grounds shall be furnished by this Contractor.
 - 3. All supply diffusers, registers, and grilles located at ceiling shall have factory-applied, bone-white finish unless noted otherwise.
 - 4. All diffusers, registers, and grilles to be steel construction unless noted otherwise.
- C. Reference Diffuser/Grille Schedule of drawings for Manufacturer/model numbers of each inlet/outlet type.

PART 3 – EXECUTION

3.1 GENERAL

- A. Install duct accessories in accordance with manufacturer's installation instructions with applicable portions of details of construction as shown in SMACNA standards and in accordance with recognized industry practices to ensure that products serve intended function.

3.2 INSTALLATION OF AIR INLETS AND OUTLETS

- A. Locate ceiling air diffusers, registers, and grilles as indicated on general construction "Reflected Ceiling Plans." Unless otherwise indicated, locate units in center of acoustical ceiling modules.

- B. Install outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that products serve intended functions.
- C. Examine areas and conditions under which outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.
- D. Ceiling-mounted air terminals or services shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.
- E. Terminals or services weighing 56 pounds or less shall have two No. 12 gauge hangers connected from the terminal or service to the structure above. These wires may be slack.
- F. Terminals or services weighing more than 56 pounds shall be supported directly from the structure above by approved hangers.
- G. Paint visible ductwork behind grilles, registers, and diffusers dull black.

3.3 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.4 CLEANING UP

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION.

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SECTION 23 81 13 – DUCTLESS SPLIT SYSTEM AC UNITS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section provides requirements for single zone Ductless Split System Air Conditioning Units.

1.2 ACTION SUBMITTALS

- A. Submit the following information for each packaged unit:
 - 1. Manufacturer's product data and cut sheet for each unit.
 - 2. Submit manufacturer's specifications for air conditioning units showing dimensions, weights, capacities, efficiency ratings, motor electrical characteristics, gauges, finishes of materials, and installation instructions.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data:
 - 1. Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists.
 - 2. Include this data in maintenance manuals only.

1.4 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL) and shall bear the ETL label.
- B. All wiring shall be in accordance with the California Electrical Code (C.E.C.).
- C. The units shall be rated in accordance with Air-conditioning Refrigeration Institute's (ARI) Standard 210 and bear the ARI Certification label
- D. The units shall be manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
- E. Flame-Smoke Ratings: Except as otherwise indicated, provide thermal insulation with flame-spread index of 25 or less, fuel- contributed index of 50 or less, and smoke-developed index of 50 or less.
- F. AMCA Standards: Comply with Air Movement and Control Association (AMCA) Standards as applicable to testing and rating fans.
- G. SMACNA Compliance: Comply with Sheet metal and Air-Conditioning Contractors National Association (SMACNA) ductwork construction standards as applicable to split system heat pumps.

- H. UL Compliance: Provide electric components for split system heat pumps which have been listed and labeled by Underwriters Laboratories or by a testing organization of equal standing.

1.5 WARRANTY

- A. The units shall have a manufacturer's parts and defects warranty for a period one (1) year from date of installation. The unit (including compressor) shall have a warranty of 10 years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Unit to be variable capacity, split system air conditioning system. The system shall consist of a wall mounted indoor evaporator model matched to the outdoor condensing unit model. The outdoor condensing unit shall be a direct expansion (DX), air cooled system with a variable speed inverter driven compressor & fan motor using R-410A refrigerant. The outdoor unit is a horizontal discharge, variable speed, single fan unit using a single phase power supply.
- B. The outdoor unit will be factory charged with R-410A
- C. A holding charge of dry nitrogen shall be provided in the evaporator.
- D. Installation must comply with installation manual. It is recommended the system be installed by a contractor/dealer who has been through Daikin training programs.
- E. Acceptable manufacturers:
 - 1. Daikin
 - 2. LG
 - 3. Or Equal
- F. In cases of Substitution, equivalent units shall not (when compared to basis of design fan):
 - 1. Decrease specified SEER of unit
 - 2. Change power requirements
 - 3. Provide lower capacity
 - 4. Increase weight from maximum scheduled weight
- G. Named non-basis-of-design manufacturer does not guarantee approval of equipment submittals. Manufacturers must comply with all the performance and features as specified within the specifications and as indicated on the design documents.

H. Delivery, Storage, and Handling:

1. Unit shall be stored and handled according to the manufacturer's recommendations.
2. Wireless controllers shall be shipped inside the carton with the indoor unit and able to withstand 105°F storage temperatures and 95% relative humidity without adverse effect.

I. COOLING OPERATING RANGE

1. The operating range in cooling will be 23°F DB ~ 122°F DB and 0°F DB ~ 115°F DB when used with an optional wind baffle.

J. HEATING OPERATING RANGE

1. The operating range in heating will -4°F WB – 60°F WB.

2.2 REFRIGERATION PIPING

- A. The system shall be capable of refrigerant piping up to 164 total feet with a 98 feet maximum vertical difference, without any oil traps or additional components.
- B. Copper Tubing: ASTM B 280, Type ACR, hard-drawn straight lengths, and soft-annealed coils, seamless copper tubing. Tubing shall be factory cleaned, ready for installation, and have ends capped to protect cleanliness of pipe interiors prior to shipping.
- C. Copper Tubing: ASTM B 88, Type L, hard-drawn straight lengths, and soft-annealed coils, seamless copper tubing.
- D. Fittings: Wrought copper, ANSI B16.24, 150 psi.
- E. Joints: Use silver solder and non-corrosive flux.
- F. Valves and Sight Glasses: Alco or Henry.
- G. Oil Loops and Double Risers: Provide to assure successful operation.

2.3 DUCTLESS SPLIT SYSTEM AIR CONDITIONER

A. General:

1. The Air Conditioner / Heat Pump system shall be a split system with Variable Speed Inverter Compressor technology. The system shall consist of a wall mounted indoor section with wired, wall mounted controller and a horizontal discharge, single phase outdoor unit.
2. Provide model and capacity to be as scheduled on drawings.
 - a. Cooling performance shall be based on 80°F DB, 67°F WB for the indoor unit and 95°F DB, 75°F WB for the outdoor unit.

B. Outdoor unit

1. General: The outdoor condensing unit is designed specifically for use with matched capacity indoor evaporator units.
2. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of a Daikin swing compressor, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4 way valve, distribution headers, capillaries, filters, shut off valves, service ports and suction accumulator.
3. Both liquid and suction lines must be individually insulated between the outdoor and indoor units.
4. The outdoor unit can be wired and piped in the front, lateral or downward directions, accessed from the right side of the unit.
5. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit.
6. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for re-programming.
7. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
8. The following safety devices shall be included on the condensing unit; high pressure switch, outdoor fan driver overload protector, inverter overload protector, fusible plugs, fuses.
9. Each condensing unit shall utilize an algorithm to automatically adjust the refrigerant suction and condensing temperatures in response to the heating and cooling loads, and in response to the current weather conditions. The VRT control shall be capable of being customized in the following modes and sub modes:
 - a. Automatic (factory preset) – The Automatic VRT control shall allow the target evaporator temperature (T_e) and target condensing temperature (T_c) to float based on outdoor ambient temperature conditions, and shall incorporate the following sub-modes:
 - i. Powerful
 - ii. Quick
 - iii. Mild (factory preset)
 - b. High Sensible – The High Sensible mode shall allow the system T_e and T_c values to be programmed to series of fixed

Te and Tc values. The High Sensible mode shall also be capable of incorporating the following sub-modes:

- i. Eco
 - c. Basic – The Basic mode shall disable the VRT control of the outdoor unit and allow the system to operate with constant Te and Tc values.
- C. Outdoor Unit Cabinet:
1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.
 2. The outdoor unit will come furnished with four (4) mounting feet, mounted across the base pan, to allow bolting to a cement pad or optionally supplied mounting bracket.
- D. Outdoor Unit Fan:
1. The condensing unit shall consist of one propeller type, direct-drive 70 W fan motor that has multiple speed operation via a DC (digitally commutating) inverter.
 2. The fan shall be a horizontal discharge configuration with a nominal airflow maximum of 2,682 cfm.
 3. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
 4. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
- E. Outdoor Unit Condenser Coil:
1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure highly efficient performance.
 3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube.
 4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1 rated for up to 1000 hours salt spray.
 5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

F. Outdoor Unit Compressor:

1. The Daikin swing compressor shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity shall be controlled to eliminate deviation from target value.
2. The inverter driven compressor shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed swing type.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall range from 14 – 100%.
5. The compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
6. The compressor shall be mounted to avoid the transmission of vibration.

G. Outdoor Unit Electrical:

1. The power supply to the outdoor unit shall be 208-230 volts, 1 phase, 60 hertz +/- 10%.
2. AMPS and MOCP to be as scheduled.
3. The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable.
4. The control wiring shall be a two-wire multiplex transmission system.

H. Indoor Unit - General:

1. Daikin indoor unit model FAQ shall be a wall mounted fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC2A71. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range

from 37 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.

2. Performance: Each units performance is based on nominal operating conditions and shall be as scheduled.
 3. The Daikin indoor unit FAQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The front grille shall be easily removed for washing. The drain pipe can be fitted to from either left or right sides.
 4. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 5. Both refrigerant lines shall be insulated from the outdoor unit.
 6. Return air shall be through the a resin net mold resistant filter.
 7. The indoor units shall be equipped with a condensate pan.
 8. The indoor units shall be equipped with a return air thermistor.
 9. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
 10. The voltage range will be 253 volts maximum and 187 volts minimum.
- I. Indoor Unit Cabinet:
1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.
 2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- J. Indoor Unit Fan:
1. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output of 43 W.
 3. The airflow rate shall be available in high and low settings.

4. The fan motor shall be thermally protected.

K. Indoor Unit Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2-row cross fin copper evaporator coil with 14 FPI design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
5. A thermistor will be located on the liquid and gas line.
6. A condensate pan shall be located in the unit.

L. Indoor Unit Electrical:

1. A separate power supply will be required of 208-230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet.
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

M. Indoor Unit Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. A full array of fault diagnostics shall be accessible via the remote controller.
3. The unit shall be compatible with interfacing with connection to BACnet and LonWorks networks or interfacing with connection to BMS system.
4. The unit shall be compatible with a Daikin Intelligent touch Manager advanced multi-zone controller.
5. Each unit to be provided with a Simplified Wired Controller (BRC2A71).

2.4 CONDENSATE DRAIN

- A. Provide type L hard drawn copper tubing with wrought copper solder joint fittings; no iron to copper connections; copper fittings with IPS outlets and threaded brass nipples

at connections to fixtures and equipment; di-electric couplings or unions at connections to dissimilar materials. Supply piping with temporary caps on all piping.

PART 3 – EXECUTION

3.1 TEST OF PIPING

- A. Test piping at completion of roughing in, in accordance with the following:
 - 1. Pressurize with dry nitrogen to 300 psig and test all joints with an electronic detector or halide torch.
 - 2. Release the pressure and attach a high vacuum pump. Evacuate to 4,000 microns and hold for 30 minutes.
 - 3. Break vacuum with dry nitrogen and pressurize to 5 psig. Hold pressure in system for 10 minutes.
 - 4. Evacuate to 2,000 microns and hold for 30 minutes.
 - 5. Use a mercury manometer or electronic vacuum gauge to measure pressures. Do not start timing until recommended vacuum range is reached.
 - 6. Show no loss in pressure or visible leaks after each test at the test pressures indicated. Tests to be verified by Inspector of Record.
- B. Testing equipment, materials, and labor shall be furnished by this Contractor.
- C. Repair piping systems sections which fail required piping test, by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

3.2 INSTALLATION OF UNITS

- A. Install ductless split system air conditioners / heat pump units where indicated on drawings.
- B. Install in accordance with equipment manufacturer's written instructions and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.
- C. At the end of the piping pressure tests, if the system has been proved leak-free, charge with refrigerant and fill the crankcase to the oil level specified by the manufacturer. All refrigerant oil shall be delivered to the location in sealed containers.
- D. Program unit thermostats to operate 24/7/365 with temperatures set as required by owner.

3.3 UNIT OPERATION TEST

- A. Upon completion of installation of AC / heat pump units, start up and operate equipment to demonstrate capability and compliance with requirements. Field correct malfunctioning units, then retest to demonstrate compliance.
- B. Install heat pump units where indicated, in accordance with equipment manufacturer's written instructions and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.

END OF SECTION.

DIVISION 26 – ELECTRICAL

- 26 01 00 – General Requirements of Electrical Work
- 26 05 02 – Supporting from Building Structure
- 26 05 19 – Low Voltage Electrical Conductors and Cables
- 26 05 26 – Grounding and Bonding for Electrical Systems
- 26 05 34 – Conduit
- 26 05 37 – Boxes
- 26 05 53 – Identification for Electrical Systems
- 26 08 01 – Electrical Acceptance Testing
- 26 22 00 – Low Voltage Transformers
- 26 24 16 – Panelboards
- 26 27 26 – Wiring Devices
- 26 50 00 – Lighting

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SECTION 26 01 00 – GENERAL REQUIREMENTS OF ELECTRICAL WORK

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section describes the general requirements for the electric work. These requirements apply to all sections of Division 26.
- B. Provide electrical materials, equipment, services, rentals, labor and testing to complete the installation and testing of the electrical work specified in the Construction Documents.

1.2 GENERAL REQUIREMENTS

- A. No exposed conduit or surface raceway, except in Mechanical yard or equipment rooms, shall be permitted without written approval from the Engineer.
- B. Multi-wire branch circuits shall not be permitted. Provide a dedicated neutral for all branch circuits requiring a neutral.
- C. Provide shop drawings, materials, labor and testing for all work not explicitly shown or specified in the Construction Documents but is still required to be completed in order to have a complete and functioning system or facility as specified. Review the bid documents carefully and identify all areas in the construction documents which require shop drawings and include them in the bid. For example, if an emergency generating system is specified with a remote tank and fuel transfer system and the interconnection wiring of the fuel transfer system was not explicitly included in the Construction Documents, then it is the Contractor's responsibility to provide shop drawings, services (e.g., structural engineer services), materials and labor necessary to complete and test the fuel transfer system so that specified Emergency Generating System meets codes requirements and functions as intended. This also includes but is not limited to mounting details, vendor supplied systems such as UPS, digital lighting, Telecom Systems, Audio Visual, Fire Alarm, etc. Shop drawings shall be submitted to the Engineer for review and approval. Shop drawings will be stamped in accordance with code and plan review requirements.
- D. Provide a UL label or evidence of UL listing for all electrical material, unless the material is of a type for which a label or listing service is not provided.

1.3 CODE COMPLIANCE

- A. Perform all work in accordance with the following codes:
 - 1. California Electrical Code 2022
 - 2. California Building Code 2022
 - 3. California Fire Code 2022
 - 4. California Mechanical Code 2022
 - 5. California Plumbing Code 2022

6. California Building Standards Administrative Code 2022
7. California Green Building Standards Code 2022
8. California Energy Code 2022
9. All Applicable State and Local Codes and Regulations

1.4 PERMITS, FEES AND INSPECTIONS

- A. Obtain all permits that are required for the work.
- B. Call for all local building department inspections.
- C. Obtain approvals from local building inspector prior to final observation by Engineer.
- D. Advise Engineer, one week prior to:
 1. Installation of underground work. Obtain Engineer's approval prior to backfill. The Engineer may direct uncovering of any work not so approved.
 2. Start of interior rough-in work.
 3. Installation of switchboards and motor control centers.

1.5 STANDARDS

- A. Comply with the current applicable standards of the listed agencies for electrical materials and installation.
- B. Underwriters Laboratories, Inc. (UL): Provide a UL label or evidence of UL listing for all electrical material, unless the material is of a type for which a label or listing service is not provided.
- C. National Electrical Manufacturer's Association (NEMA).
- D. American National Standards Institute (ANSI).
- E. American Society for Testing Materials (ASTM).
- F. Insulated Power Cable Engineers Association.
- G. Certified Ballast Manufacturer's Association.
- H. Institute of Electrical and Electronic Engineers (IEEE).

1.6 SUBMITTALS

- A. Provide submittals for items specified in individual sections of Division 26 00 00, in accordance with the requirements of Division 1.
- B. Procedure: Submit under provisions of Section 01 33 00.

- C. Provide submittals for items listed documenting compliance with specification requirements.
 - 1. Materials and Services
 - 2. Contractor prepared Acceptance Test Procedures for Engineering review and approval.
 - 3. Acceptance Test Results
 - 4. Shop drawings
 - 5. Operation and Maintenance Manual, in accordance with Section 01 78 36 – Warranties and Bonds.
 - 6. Record Drawings, in accordance with Section 01 77 00 – Project Closeout.
 - 7. Other: Submittals required elsewhere in the Construction Documents.

1.7 MATERIALS AND SUBSTITUTIONS

- A. Provide new material of the quality specified and satisfactory to the Engineer.
 - 1. Provide major equipment which is the product of a manufacturer who has, for a period of not less than five years been in successful manufacture of similar equipment to that specified and who has a catalog covering ratings and specifications of proposed equipment.

1.8 DRAWINGS AND SPECIFICATIONS

- A. Data given herein and on the plans are exact as could be secured, but their absolute accuracy is not guaranteed. Plans and specifications are for the assistance and guidance of the Contractor and exact locations, distances, levels and other data will be governed by the structures. The contractor shall provide a layout plan of all electrical equipment showing actual dimensions and working clearances. The contractor is responsible for ensuring that all electrical equipment will fit and no working clearances are exceeded.
- B. Clarification of plans and specifications for the purpose of facilitating construction, but not involving additional labor and materials, may be prepared during construction by the Engineer. Said revised plans and specifications shall become a part of the contract. The Contractor shall conform to the revised plans and specifications at no additional cost to the Owner.
- C. Layouts of equipment, accessories, and wiring systems are diagrammatic but follow these as closely as possible. Examine Architectural, Structural, and Mechanical and other drawings, noting all conditions that may affect this work. Report conflicting conditions to the Engineer for adjustment before proceeding with the work. Should the Contractor proceed with work without so reporting the matter, he does so, on his own responsibility and shall alter work if directed by the Engineer at his own expense.

- D. The right is reserved to make minor changes in locations of equipment and wiring systems shown, providing the change is ordered before conduit runs and/or work directly connected to same is installed and no extra materials are required.

1.9 UTILITY COORDINATION

- A. Coordinate with the electric utility company and the telephone company whenever necessary, to determine service equipment requirements, conduit and backfill requirements, electric metering requirements and other requirements to provide complete utility services, adequate to supply the electrical and communication system(s) indicated. Provide materials that are specified in Division 26 in addition to conforming to utility company requirements.
- B. Include in bid, all work required by the utility companies. All work required for utility services shall be in accord with contract documents, specifications, drawings and as required by the utility companies.
- C. Use extreme caution when digging to avoid buried electrical cables.
 - 1. Before digging, call:
 - 2. (800) 642-2444

1.10 HOMERUNS AND MAXIMUM NUMBER OF CIRCUITS

- A. 120 VAC, 20 A circuit- Maximum of (9) #12 conductors in conduit (assume ambient temp for 120 Deg F, 90 Deg C wire). Homeruns may combine branch circuits by using a maximum of (20) # 10 conductors in 1.25" minimum diameter conduit.

1.11 CUT OVER

- A. Prepare, submit and implement the cut over procedure. Provide all necessary materials, equipment, services, and rentals (e.g., generators, UPS, ATS) for the cut over. No disruption in power or any interference with Operations is permitted without Owner's approval. Have cut over coordination meetings with all necessary participants (Owner, Engineers, Vendors, Subcontractors) at least before preparing the cut over procedure and before conducting the approved procedure. Additional meetings may be required (e.g., resolve start up issues).

1.12 SUPERVISION

- A. Provide adequate and competent supervision. Maintain complete control of the project execution and complete liability for the materials and work until the job is completed and accepted by the Owner.

1.13 MANUFACTURER'S INSTRUCTION

- A. Follow the manufacturer's instructions when specific installation or connection details are not indicated or specified.
- B. Notify the Engineer of conflicts between the manufacturer's instructions and installation or connection details prior to the installation of materials.

1.14 WORKMANSHIP

- A. Firmly and permanently secure in place all electrical equipment to the structure so that it is level, plumb, and true with the structure and other equipment. Installation methods shall be as recommended by the National Electrical Contractors' Standard of Installation, except when methods specified or shown on the plans differ. The minimum installation standards shall be as required by the Codes.

1.15 PROTECTION

- A. Protect all equipment and materials required for the performance of this work from damage by the elements, vandalism, or work during construction.
 - 1. Do not subject the work and materials of other trades to damage during execution of the work in this division of the specifications.

1.16 COORDINATION WITH OTHER TRADES

- A. Coordinate with other trades and promptly transmit all information required by them. Coordinate the sequence of construction with other trades to ensure that all work proceeds with a minimum of interference and delay. Perform all work that requires relocation due to negligence or absence of regard for the work of other trades.

1.17 EXAMINATION OF SITE

- A. Examine the site prior to bid to determine existing site conditions that may affect the work. No allowance will be allowed for any extra work required due to a failure to recognize, or negligence to discover conditions prior to bid.

1.18 STRUCTURAL REQUIREMENTS

- A. Secure all anchors for electrical equipment in a manner that will not decrease the structural value of any structure to an unsafe level. Inform the Engineer of any proposed modifications to the structure that involves cutting or patching of concrete, masonry, steel, or wood in the project.

1.19 IDENTIFICATION

- A. Install nameplates on electrical equipment including:
 - 1. Individual circuit breakers on switchboards, distribution panelboards and motor control centers.
 - 2. Motor starters.
 - 3. Pilot lights, selector switches, overload resets, timers and other pilot control devices.
 - 4. Panelboards, switchboards, transformers, control cabinets and other major equipment.
 - 5. Disconnect switches, time switches, contactors, relays and other miscellaneous equipment enclosures.

6. Light switches for which the control functions are not evident.
 7. Provide labeling on receptacles and light switches which describe the source panel and circuit number. Use clear adhesive label with typed text. Example, "EH-3", that is panel "EH" circuit 3.
- B. Describe item, control function of sequence or operation on each nameplate, as applicable.
- C. Fabricate nameplates of laminated phenolic plastic, black front and back with white core. Bevel edges. Engrave through outer layer to produce white letters and numerals. For control pilot devices, engraved metallic plates, filled with enamel, are acceptable. Fasten nameplates to equipment with No. 4 Phillips, round head, cadmium steel, self-tapping screws.

1.20 TESTS AND REPORTS

- A. Perform routine insulation-resistance, continuity, equipment settings and rotation tests for all affected distribution and utilization equipment prior to and in addition to tests performed by the testing firm specified herein. Prepare inspection and test reports for all equipment as specified herein and submit to the Electrical Engineer for review and approval. Submit at least two weeks before the planned testing. Perform these inspections and test prior to or as part of system Acceptance Testing. Examples include:
1. Grounding systems, for resistance to earth. Provide additional grounding electrodes if main service or separately derived system ground resistance exceed 5 ohms.
 2. Motor circuits with motor disconnected, for resistance to ground.
 3. Control circuits for resistance to ground.
 4. Lighting circuits, for resistance to ground.
 5. Power feeders, for resistance to ground.
 6. Switchboards, Motor Control Centers for resistance to ground.:
 7. Main bus, power and control circuits, for resistance to ground.
 - a. Check connection; tighten if necessary.
 - b. Operation of each device.
 - c. Set relays and trip settings in accord with the Engineer's directions.
 - d. Check thermal overload heaters for size and reset operation.
 8. Prior to energization of equipment, check the insulation resistance of listed circuits, with a 500-volt "Megger".

9. Set circuit protective devices to provide proper long-time, short-time and ground-fault tripping coordination
10. Coordinate phase rotation of all motors with installer to ensure proper direction of rotation. List motor data:
 - a. Item of equipment.
 - b. Nameplate data.
 - c. Overload heater catalog number and rating.

1.21 DEMONSTRATIONS

- A. After testing and final inspection, demonstrate operation of all affected systems and equipment to Engineer and Owner.
- B. Arrange date of test with Owner.
- C. Advise the manufacturers' representative to be present when required.
- D. Instruct Owner's personnel in operation, adjustment and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

1.22 GUARANTEE

- A. Guarantee the electrical work against defects in work or materials for one year after filing of Notice of Completion.
- B. Undertake repairs within 24 hours after notice from the Owner.
- C. If the operation of the electrical system fails to conform to Division 26 requirements, approved submittals, or operation and maintenance manuals, the Owner may operate the electrical system without liability to Owner. Repair or replace defective or unsatisfactory equipment or systems.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

PART 4 3.1 EQUIPMENT MOUNTING SEISMIC CRITERIA

- A. Brace or anchor all electrical equipment to resist a horizontal force acting in any direction using the criteria of Section 1613A and 1615A, 2022 California Building Code, Title 24, Part 2.
- B. Where anchorage details are not shown on the drawings, the field installation shall be subject to the approval of the electrical and structural engineers.

END OF SECTION.

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SECTION 26 05 02 – SUPPORTING FROM BUILDING STRUCTURE

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This specification defines the seismic design criteria to be used for the design of equipment anchorage and seismic bracing for electrical equipment/components. This section provides guidelines and limitations for supporting all electrical items from the building structure, and for seismic bracing for all such items.
- B. The Contractor is responsible for engaging the services of a qualified licensed professional engineer in the state of California with a minimum 5 years of experience in structural seismic design to provide the analysis, calculations, seismic bracing, and installation details for equipment and equipment anchorage, skids and frames in accordance with specified criteria and applicable codes. The Contractor's engineer is to provide construction support during the equipment installation for any field problem that may arise during construction. The Contractor is required to design support and bracing for items for which the contract documents do not provide specific attachment, support, and bracing.
- C. Unless the item is classified by the owner as essential, seismic bracing and restraint may be waived for the following.
 - 1. Anchorage for equipment with operating weighs less than 400 pounds and is supported at 4 feet or less above the floor.
 - 2. Temporary or movable equipment when rolling/sliding is prevented and is not subject to tipping.
 - 3. Equipment weighing less than 20 pounds supported on vibration isolators.
 - 4. Equipment weighing less than 20 pounds suspended from the floor or roof or mounted to walls.
 - 5. Verification and investigation on Item C.2, whether the equipment will be tipped over under the code required seismic forces using $R=1.0$ and 60% of the operating weight, shall be performed by a qualified engineer per Paragraph 1.01B.
- D. Seismic bracing is not required for the following items:
 - 1. All electrical conduits less than 2.5 inches inside diameter, unless racked together.
 - 2. All conduits mounted less than 12" from hanger anchorage.
- E. Design and install all support and bracing systems except as noted. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not overstress the building structure

1.2 RELATED REQUIREMENTS

- A. Section 26 0100: General Requirements for Electrical Work.

1.3 REFERENCES

- A. California Building Code (CBC), with local amendments where the project is located.
- B. American Society of Civil Engineers (ASCE), ASCE 7, Minimum Design Loads for Buildings and Other Structures,
- C. American Society of Heating and Ventilating and Air Conditioning (ASHRAE), HVAC Applications, Latest Edition, Seismic and Wind Restrain Design
 - 1. The lateral force equations in ASCE 7, as appropriate, should be used to determine the lateral seismic force. The force calculations found in these standards are based on a previous code provision that may not comply with the latest ASCE 7.
- D. American Society of Mechanical Engineers (ASME), including addendum through the latest edition
- E. Structural Engineers Association of California, Recommended Lateral Force Requirements and Commentary, Latest Edition
- F. Seismic Restraint Manual Guidelines for Mechanical Systems, Latest Edition (SMACNA)

1.4 SYSTEM DESCRIPTION

- A. Site Criteria: Obtain the required parameters from the Structural Specifications/Structural Engineer of Record.
- B. Design Requirements:
 - 1. All electrical equipment/devices, attachments and supports shall be designed to withstand the specified seismic loads and comply with the latest ASCE 7 seismic design detailed requirement for strength and displacement.
 - 2. Equipment design is solely the responsibility of the equipment supplier. The equipment shall be designed so the strength and anchorage of the internal and external components or equipment piping exceed that of the forces used to restrain and to anchor the equipment to the supporting structure. Guidance as to which pieces of equipment and parts require seismic design can be found in the commentary section of SEAOC Recommended Lateral Force Requirements and Commentary, specifically Section C107. Equipment with flexible and /or cantilevered lateral system shall be avoided.
 - 3. Seismic design parameters as defined by the latest ASCE 7.
 - a. R_p for anchorage shall consider the ductility and the embedment depth of the anchor.
 - b. Additional factor for anchorage to cracked concrete and masonry structure shall be applied as required by codes.

4. Components and Equipment Supported by Structures
 - a. The lateral force is to be applied at the center of mass of the component and can act in any lateral direction.
5. Seismic restraint for electrical system is to be designed per the latest ASCE 7 - seismic design requirements.

C. Connection Requirements:

1. Component attachments are to be welded, bolted, or otherwise positively connected without consideration of frictional resistance resulting from gravity loads. Do not weld on any joists or beams without written approval from Structural Engineer.
 2. Attachments to concrete shall be made with anchors suitable for cyclical loads. Expansion or chemical anchors not rated for Seismic Design Category “D”, “E” & “F” shall not be used for seismic anchorage.
 3. Powder driven fasteners shall not be used for tension load applications.
 4. Friction clips shall not be used for anchorage.
 5. Welded plate washers with standard holes shall be used at bolted connections with oversized holes on the base plate.
 6. Unless the base sheet metal is reinforced with stiffeners and is designed to take the bending from the uplift forces, oversized plate washers shall be used at bolted connection through the base sheet metal
 7. Isolators must be designed to withstand the seismic loads. Provide snubbers if the isolator cannot withstand the specified load and see below for the design force.
 8. Components mounted on vibration isolator system shall have a bumper restraint or a snubber in each horizontal direction. The design force is to be taken as $2F_p$ unless the nominal clearance (air gap) between the frame and restraint is equal or less than 0.25”.
- D. Refer to structural drawings for material specifications of structure. If no structural drawings are available, assume 3000 psi concrete and ASTM A36 steel for attachment design and confirm these values with Structural Engineer before proceeding with the design

1.5 SUBMITTALS

- A. Calculations and Drawings.
1. Submit structural calculations and a separate drawing stamped and signed by the California Licensed Professional Engineer in good standing. The calculations and drawings shall include the following information as minimum:.

- a. Empty weight
 - b. Operating weight
 - c. Center of mass in plan
 - d. Center of mass in elevation
 - e. Seismic vertical, lateral, and overturning loads
 - f. Load combinations in accordance with applicable codes
 - g. Anchor bolt brand, type, size, embedment depth in concrete, grip distance, and locations, including specific drilling and special inspection requirement
 - h. Installation sequence if it requires specific sequence to fasten the anchorage
2. Coordination drawings to demonstrate interface with adjacent systems including location and space required for seismic bracing and anchorage.
 3. Furnish certification letter in the calculations stating the design of the equipment components and anchorage comply with the seismic design requirement per ASCE 7 13.2.2.a. and applicable local building codes.
- B. Installing contractor to submit following reports to Structural Engineer and Building Official
1. Bolt inspection reports for field installed bolts for structural components including the location of the test, date of the test, bolt diameter, and recorded torque.
 2. Reports covering other structural activities requiring inspection in accordance with the applicable local building codes.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Furnish all substructures and fasteners required to comply with the limitations given below. Use materials as specified in the various sections and as appropriate to the use.
- B. All exterior materials: Hot dipped galvanized or stainless steel.

PART 3 – EXECUTION

3.1 GUIDELINES & LIMITATIONS

- A. Coordinate with the Structural Engineer of Record for criteria.

END OF SECTION

SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide electrical materials, installation and testing for El Capitan High School – Stadium Upgrade.

1.2 DESCRIPTION

- A. This section describes requirements for wire and cable.

1.3 RELATED WORK

- A. Section 26 01 00 – General Requirements for Electrical Work.

1.4 REFERENCE STANDARDS

- A. NETA STD ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.

1.5 SUBMITTALS

- A. Provide submittals for items listed documenting compliance with specification requirements.
- B. Product Data:
 - 1. Electrical Materials: Manufacturer's current published catalog sheets, and samples of product as required.

PART 2 – PRODUCTS

2.1 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of CEC.
- B. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- C. Provide conductors and cables with lead content less than 300 parts per million.
- D. Provide new conductors and cables manufactured not more than one year prior to installation.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- F. Comply with NEMA WC 70.
- G. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

- H. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- I. Conductors and Cables Installed Exposed in accessible above ceiling space (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- J. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- K. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG. Compensate size for voltage drop as required by governing codes.
 - 2. Control Circuits: 14 AWG.
- L. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code: 208Y/120 V, 3 Phase, 4 Wire System:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - d. Neutral/Grounded: White.
 - e. Equipment Ground, All Systems: Green.

2.2 WIRE AND CABLE

- A. Conductor: Insulated copper, individual conductors, 98 percent conductivity, stranded.
 - 1. Power conductors, #12 AWG, minimum to 750 MCM, stranded.
 - 2. Control conductors #14 AWG, minimum to #10 AWG, stranded.
- B. Insulation:
 - 1. Rated 600 volts as follows:

2. THHN/THWN-2

Item	Size (AWG)	Insulation Type
Branch Circuits (except wet locations)	#12 to #4/0	THHN/THWN-2
Underground Branch Circuits	#12 to #4/0	XHHW-2 or THWN-2
Fixture Taps	#12	XHHW-2 or THHN/THWN-2
Feeders (except wet locations)	#12 to #4/0 to #750 MCM	THHN/THWN-2 USE-2, or XHHW-2
Underground Feeders	#12 to #750 MCM	XHHW-2
Grounding	All	THHN/THWN-2
Control Interconnect	#14 to #10	THHN/THWN-2
Control Cabinets	#14	THHN/THWN-2

2.3 WIRE CONNECTIONS

- A. Connect wire to binding post screw, stud, bolt or bus as follows:
1. #10 AWG and smaller conductors, compression type, nylon, self-insulated grip spade lugs, T & B "Sta-Kon", Buchanan "Termend", Panduit "Pan-Term", or equal.
 2. #8 AWG to #750 MCM copper conductors, solderless lug type connectors, with hex-head or allen type compression set screws with configuration to suit application, T & B "Locktite", Burndy "QA", OZ Type "XL" or "XLH", or equal.
- B. Conductor Taps: #8 through #4 copper conductors, split-bolt, Kearney.
- C. Splice wire as follows:
1. #10 AWG and smaller conductors, twist-on solder-less, insulated spring connectors, 3M "Scotchloks", T & B "Piggys" or equal.
 2. #8 AWG to #750 MCM copper conductors, two-way connectors, OZ type "XW", Burndy or equal.
 3. In underground pull-boxes, cast resin epoxy, Scotch.
- D. Size, install and tighten wire terminal and splice connectors in accordance with manufacturer's recommendations.

2.4 TAPE

- A. Wire Splices: Vinyl plastic electrical tape, 8.5-mil and 4.0-mil, Scotch 33.
- B. Conduit Wrapping: 10-mil vinyl wrapping tape, Manville, Minnesota Mining and Manufacturing Company.

2.5 WIRING ACCESSORIES

- A. Identify conductors with self-adhesive vinyl cloth markers, sized to fit the conductor insulation, with machine printed black marking, W.H. Brady, Thomas and Betts, or

equal.

PART 3 – EXECUTION

3.1 INSULATED CONDUCTORS AND CABLE

- A. Exercise extreme care when pulling conductors and cable into conduits to avoid kinking, twisting, nicking or scratching of the insulation or the placement of extreme stress on the conductors or cable. When required, utilize UL approved pulling compounds to assist in pulling conductors.
- B. Color code conductors by phase sequence A-B-C when looking into the front of the equipment from left-to-right, top-to-bottom or front-to-back. Provide conductors with the appropriate phase color or mark conductors with a minimum of 6 inches of phase tape on ends connected to terminals. Phase code conductors as listed:

Voltage	Phase A	Phase B	Phase C	Neutral	Ground
120/208	Black	Red	Blue	White	Green

- C. Identify all conductors with their respective circuit numbers at all boxes and terminals.
- D. For medium voltage cables, do not exceed manufacturer's recommendations for maximum allowable pulling force. Where wire and cable-pulling compound is used, use UL listed compounds only. In all cases, limit pulling tension to the following:
 - 1. Applied to Conductors: 0.008 pounds per circular mil of conductor cross sectional area.
 - 2. Applied to Nonmetallic Jacket: 1,000 pounds, but not exceeding pulling force specified above for conductor.
- E. Connections:
 - 1. Use twist-on solder-less connectors for splicing receptacle and lighting circuits #10 AWG wire size and smaller.
 - 2. Splice #12 and #10 AWG stranded conductors with compression connectors.
 - 3. Terminate conductors at motors with bolted connections, insulated with plastic tape.
 - 4. For conductor taps #8 through #4 AWG, provide split bolt service connectors.
 - 5. For splices larger than #10 AWG, insulate and smooth the splice with insulation putty, tape with one half-lapped layer of 8.5-mil vinyl plastic electrical tape and two half-lapped layers of 7.0-mil vinyl plastic electrical tape.
 - 6. Use cast resin epoxy splices for splices in underground pullboxes.

END OF SECTION.

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section describes requirements for grounding of the power and communications systems.

1.2 DESCRIPTION

- A. Provide all equipment and materials for a complete grounding system.
 - 1. Power System Grounding.
 - 2. Communications System Grounding.
 - 3. Electrical Equipment and Raceway Grounding and bonding.

1.3 RELATED REQUIREMENTS

- A. Section 26 01 00 – General Requirements for Electrical Work
- B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- C. Section 26 05 53 – Identification for Electrical Systems: Identification products and requirements.

1.4 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
- B. CEC – California Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NECA 1 – Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2016.
- D. National Electrical Manufacturers Association (NEMA).
- E. NETA STD ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.
- F. UL 467 – Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.5 SUBMITTALS

- A. Submit a complete set of marked-up record drawings to indicate installed location of system grounding electrode connections, and routing of grounding electrode conductor.

- B. Submit certified test results stating ground resistance from service neutral at service entrance and separately derived systems.

PART 2 – PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.

2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 05 19:
 - 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - i. Use bare copper conductors where installed underground in direct contact with earth.
 - ii. Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

2.3 ACCEPTABLE MANUFACTURERS

- A. Thomas and Betts Appleton, Raco, Oz Gedney, Blackburn, or approved equal.

2.4 MATERIALS

- A. Ground Rods: Copper encased steel, 5/8 inch diameter, minimum length - 8 feet.
- B. Ground Clamp: Water pipe connection, bronze two piece with serrated jaws, lug sized for grounding electrode conductor.
- C. Connectors, Compression Type: Bronze or Copper, pretreated with conductive paste, sized for conductor to which applied.
- D. Connectors, Exothermic Weld Type: Powder actuated weld. Bond made through exothermic reaction producing molten copper from premixed copper oxide and aluminum powder. Form bond in mold or crucible.

2.5 COMMUNICATIONS GROUNDING SYSTEM

- A. All intermediate distribution frame (IDF) and main distribution frame (MDF) rooms shall have a Telecommunication Ground Bus Bar installed. Refer to drawings for specific size and assembly.
- B. The telecommunication service entrance MDF, shall have a minimum of a #2 AWG conductor with green outer sheath installed to the Telecommunication Ground Bus Bar located in the room.
- C. Except where specifically indicated otherwise, all facility MDFs shall have a minimum of a #4 AWG conductor with green outer sheath installed to the Telecommunication Ground Bus Bar located in each room.
- D. Except where specifically indicated otherwise, all facility IDFs shall have a minimum of a #6 AWG conductor with green outer sheath installed to the Telecommunication Ground Bus Bar located in each room.

2.6 GENERAL BRANCH CIRCUITS GROUNDING

- A. All grounding conductor wire shall be insulated green copper conductors.
- B. All conduit bushings shall be grounding type.
- C. All grounding connections shall be made with solderless lugs and nonferrous hardware.

2.7 CONDUIT BANK GROUNDING

- A. Provide a size 4/0 AWG bare copper grounding conductor for each of the campus utility distribution conduit banks shown on drawings. Install this grounding conductor within the ground floor slab and parallel to the respective conduit bank.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with CEC or provide ground plates.
 - 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches (150 mm) below finished grade.
 - 2. Indoor Installations: Unless otherwise indicated, install with 4 inches (100 mm) of top of rod exposed.
- D. Ground Plate Electrodes: Unless otherwise indicated, install ground plate electrodes at a depth of not less than 30 inches (750 mm).
- E. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

- 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- F. Identify grounding and bonding system components in accordance with Section 26 0553.

3.3 FIELD QUALITY CONTROL

- A. Perform inspection in accordance with Section 01 4000.
- B. Inspect and test in accordance with NETA STD ATS except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.4 EXISTING GROUND SYSTEM

- A. Test and inspect existing building ground. Replace damaged and corroded parts and pieces. Also replace parts which do not conform to these specifications.
- B. Provide additional ground rod(s) if existing ground test exceeds 5 ohms.

3.5 GENERAL BRANCH CIRCUITS AND FEEDERS

- A. All conduit systems, equipment housings, material housings, junction boxes, cabinets, motors, ducts, wireways, cable trays, light fixtures, portable equipment and all other conductive surfaces shall be solidly grounded in accordance with the California Electrical Code to form a continuous, permanent and effective grounding system.
- B. Install a separate green grounding conductor in all conduits, including feeder, branch circuit, and flexible; both metallic and non-metallic. The conduit systems shall not be used as the system equipment grounds. Size all grounding conductors per CEC Article 250 unless a larger ground is indicated on the drawings.
- C. All panelboards, junction boxes, pullboxes, wireways and equipment enclosures shall be bonded to the conduit systems.
- D. All building expansion joints shall be bonded.
- E. Isolated ground receptacles shall have both an isolated ground conductor and a separate equipment grounding conductor.

3.6 MOTOR CIRCUITS

- A. All motor circuits shall have a ground wire pulled with the phase conductors. The ground wire shall be extended from the panel ground bus and shall be bonded at all junction boxes, pullboxes, disconnect switches, controllers, motor connection boxes, and motor frames. Each motor with a Variable Frequency Drive (VFD) controller shall have a dedicated grounding conductor. Ground these motors back through the VFD controller as recommended by the drive manufacturer to eliminate radio frequency interference. Also, the wiring between the VFD controller and the motor shall be in a dedicated conduit.

3.7 NOT USED

3.8 EQUIPMENT ROOM GROUND TERMINAL BAR

- A. Mount bar by anchors and bolts using 1-1/2 inch long segments of 1/2 inch rigid conduit as spacer between bar and wall. Use a minimum of two supports, 18 inches on center. Connect all grounding electrode system conductors, system enclosure ground bus, and other indicated electrode systems to the terminal bar. Each telecom/his room shall have a ground bar with a minimum of six lugs or screws. Interconnect telecom/his ground bars to building steel with No. 6 AWG insulated copper conductor.

3.9 FLEXIBLE RACEWAY GROUNDING

- A. Install a ground conductor inside all flexible raceways (e.g. flexible steel, liquid tight). Bond the conductor to the enclosure or ground bus in the nearest box or access on either side of the flexible section. Size conductor as specified, indicated or required by code, whichever is larger.

3.10 GENERAL GROUNDING REQUIREMENTS

- A. All ground connectors shall be bronze of the clamp type. All clamp accessories such as bolts, nuts, and washers shall also bronze to assure a permanent corrosion-resistant assembly. Connector shall be as manufactured by Burndy Engineering Company, IISCO Corporation, or equal. Make connections easily accessible for inspection, underground or concealed in floors or walls.
- B. All ground cable splices, joints, and connections to ground rods shall be made with an exothermic welding process which shall provide a weld with current-carrying capacity not less than that of the conductors welded. Soldered connections shall not be used.
- C. All ground wire shall be insulated, unless otherwise indicated on the Drawings, extra flexible stranded copper cables. Grounding cables installed in earth shall be laid slack.
- D. Neutrals throughout the system shall be solidly grounded.
- E. Lighting and power panelboards shall be grounded by connecting a grounding conductor to the grounding stud and to the incoming and outgoing feeder conduits grounding bushings. Each grounding-type bushing shall have the maximum ground

wire accommodation available in standard manufacturer for the particular conduit size. Connection to the bushing shall be with wire of this maximum size.

- F. The equipment for the fire protection alarm system shall have its grounding terminal connected to the ground lug on the panelboard serving the system by means of a #6 green coded insulated conductor, run in 3/4 inch steel conduit, utilizing a ground clamp.

END OF SECTION

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SECTION 26 05 34 – CONDUIT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section describes requirements for conduit raceways.

1.2 RELATED WORK

- A. Section 26 0100: General Requirements for Electrical Work.
- B. Section 26 0526: Grounding and Bonding.
- C. Section 26 0502: Supporting from Building Structure

1.3 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. C80.1 Specification for Rigid Steel Conduit, Zinc Coated
 - 2. C80.3 Specification for Electrical Metallic Tubing, Zinc Coated
- B. National Electrical Manufacturers Association (NEMA):
 - 1. TC 2 Electrical Plastic Tubing (EPT), Conduit (EPC-40 and EPC-80) and Fittings
- C. Underwriters Laboratories, Inc. (UL):
 - 1. 1242 Intermediate Metal Conduit
- D. Federal Specifications:
 - 1. WW-C-581E Conduit, Metal Electrical Conduit. Steel, Zinc Coated

1.4 SUBMITTALS

- A. Procedure: Submit under provisions of Section 01 3000 - Administrative Requirements and Section 01 6000 - Product Requirements.
- B. Provide submittals for items listed documenting compliance with specification requirements.
- C. Product Data:
 - 1. Electrical Materials: Manufacturer's current published catalog sheets.

PART 2 – PRODUCTS

2.1 RACEWAYS

A. Rigid Steel Conduit:

1. ANSI C80.1, minimum size 3/4 inch.
2. Threaded fittings, galvanized.
3. Locknuts, 3/4 inch to 1-1/2 inch, heavy nut steel.
4. Locknuts, 1-1/2 inch and larger, malleable iron.
5. Insulated bushings, malleable iron, plastic or nylon insert, OZ "IBC" series, Efcor "56" series, Appleton "GIB" series or equal.
6. Three-piece conduit couplings, malleable iron, T & B "Erickson", Appleton "EC" series, OZ "4" series, or equal.

B. Intermediate Metal Conduit (IMC):

1. Conform to UL 1242 and Federal Specification WW-C-581E, minimum size 3/4 inch.
2. Fittings: As specified for rigid steel conduit.

C. Electrical Metallic Tubing (EMT):

1. Galvanized rolled steel ANSI C80.3.
2. Fittings to 2 inch, rain-tight compression gland, steel, plated with zinc or cadmium, for wet locations and setscrew steel for dry locations.
3. Couplings, to 2 inch:
 - a. Compression type: OZ "6050S" series, T & B "5120" series, Efcor "760" series, or equal.
 - b. Setscrew type: OZ "5050S" series, Steel City "TK121" series, Efcor "730" series, or equal.
4. Connectors, insulated throat:
 - a. Compression type: OZ "7050 ST" series, T & B "5123" series, Efcor "750B" Series, or equal.
 - b. Setscrew type: OZ "4050 ST" series, Steel City "TC721" series, Efcor "720B" Series, or equal.
5. Couplings, 2-1/2 inch to 4 inch, set-screw, four screw, steel plated with zinc or cadmium, OZ "5250S" series, T & B "5042" series, Efcor "736" series, or equal.
6. Connectors, 2-1/2 inch to 4 inch, insulated throat, set-screw, two screw, plated with zinc or cadmium, Appleton "TW250 SI" series, Efcor "726B" series, or equal.

7. Adapter, EMT to rigid steel, zinc or cadmium plated malleable iron, OZ, T & B, Efcor, or equal.
 8. Maximum size, 2 inch, except for Telephone, 4 inch.
- D. Flexible Metal Conduit:
1. Fabricate from galvanized steel strip, minimum size 1/2 inch.
 2. Connectors, T & B "Tite Bite", with insulated throat, or equal.
 3. Length, no greater than 6 feet. Allow slack for movement of connected equipment.
- E. Liquid-tight Flexible Metal Conduit:
1. Fabricate from galvanized steel strip, jacketed with PVC, minimum size 1/2 inch.
 2. Straight connectors, cadmium plated steel or malleable iron, insulated throat and neoprene sealing ring, OZ "4Q-IT" series, T & B "5330" series, Efcor "11-B" series, or equal.
 3. Angle connectors, cadmium plated steel or malleable iron, insulated throat and neoprene sealing ring, OZ, T & B, Efcor, or equal, comparable to straight connectors.
 4. Hardware, cadmium plated steel.
 5. Length, no greater than 6 feet. Allow slack for movement of connected equipment.
- F. PVC Conduit:
1. Schedule 40, NEMA TC2, Type II underground installation.
 - a. Minimum size, 1 inch.
 - b. Elbows, Schedule 40, encased in concrete for sizes 2-inch and larger.
 - c. Extensions above grade, rigid steel (exposed), EMT (concealed indoors).
 - d. Adapters, PVC to rigid steel, threaded plastic.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

- C. Conduit Support:
1. Secure and support conduits in accordance with CEC and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Connections and Terminations:
1. Use suitable adapters where required to transition from one type of conduit to another.
 2. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 3. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- E. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- F. Conduit Movement Provisions: Where conduits are subject to thermal expansion, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. Where conduits are subject to seismic movement, provide 6 feet max. flex conduit with grounding fittings on each end bonded with #6 green wire. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection (seismic expansion joint).
- G. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- H. Provide grounding and bonding in accordance with Section 26 0526.
- I. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with CEC.

3.2 ABOVE GROUND RACEWAY SYSTEMS

- A. Install all wiring in raceways. Install raceway systems, including conduits, hangers and support channels parallel or perpendicular to structural members in accordance with Section 260529 Hangers and 260502 Support. Coordinate location of raceway systems with other Divisions prior to commencing installation.
- B. Rigid Steel Conduit: Suitable for use in all locations.
- C. Intermediate Metal Conduit: As specified for rigid steel.
- D. Electrical Metallic Tubing: Suitable for use in concealed dry locations, not in concrete, masonry, or underground, and suitable exposed, minimum 8 feet above finished floor.
- E. Flexible Metal Conduit: Suitable for connection of recessed lighting fixtures, motors or other devices requiring flexible connections in dry locations.
- F. Liquid-Tight Flexible Metal Conduit: Suitable for connection of motors and equipment in damp or wet locations.
- G. Conduit Supports:
1. Support all conduits at intervals per Chapter 3 of the CEC for the selected raceway type (not to exceed 10-feet).
 2. Support individual conduits with conduit hangers or clamp back and nest back, if required for entrance into the equipment.
 3. Support multiple conduits, 2 or more in parallel, with framing channel and pipe clamps.
 4. Spring steel fasteners may be used to fasten electrical metallic tubing to individual hanger wires, minimum #12 AWG, specifically used for hanging

conduit, nothing else.

H. Conduit Bends:

1. Provide no more than (3) 90-degree conduit bends or the equivalent number of smaller radius bends in any conduit run between boxes or equipment.
2. Length of run: 400-feet maximum less 100-feet for each equivalent 90 degree bend.
3. Fabricate bends and offsets with a hickey or conduit bender designed specifically for use with the type of conduit to be bent, or use factory made bend.
4. Radius of Bends: Conduits 2" inside diameter or less the inside bend radius shall be at least 6 times the diameter. Conduits greater than 2" diameter the inside bend radius shall be at least 10 times the conduit diameter.

I. Cap conduits during construction to prevent entrance of foreign material.

J. Provide conduit-sealing bushings at conduit penetrations through exterior walls to seal against fluid and gas pressure around the conduit.

K. Fit all conduits that enter the enclosure of a switchboard, distribution panel, or motor control center with an insulated grounding bushing.

L. Install pull ropes in all empty conduits, #12 AWG in conduits 1 inch and smaller and 3/16 inch polypropylene rope in conduits 1-1/4 inch and larger.

3.3 UNDERGROUND RACEWAY SYSTEMS

A. Install all wiring in raceways. Coordinate location of raceway systems with other Divisions prior to commencing installation. Provide excavation, clearances from other utilities, encasing, trenching, boring, backfill, compaction, patching, per Division 31 Site Preparation. Provide conduits per drawings.

B. Excavating and Backfilling:

1. Excavate and backfill as required for installation of electrical work. Maintain all warning signs, barricades, flares and lanterns as required by the Safety Orders and local ordinances.
2. Excavation: Dig trenches straight and true to line and grade, with bottom clear of any rock points. Support conduit for entire length on undisturbed original earth. Backfill: All backfill material shall be local material free of rubble, rubbish or vegetation. Trenches shall be backfilled and compacted to 90% of maximum dry density at optimum moisture content in layers not to exceed 6" when compacted.
3. Minimum Coverage (depth) - Per CEC Table 300.5
4. Area of Influence- Do not install conduits parallel to building footings in the area of influence. See structural drawings and specifications for the area of

influence and the methods that conduits can cross a footing.

5. Drain Slope- Underground conduit shall be installed such that a .125" per foot min. slope exists at all points of the run to allow drainage and prevent the accumulation of water. Provide a drain slope of greater than .125" per foot when extending conduit away from a building.
6. Provide underground warning tape along entire conduit length.

C. Cutting and Patching:

1. Provide necessary cutting and patching required to accomplish the work of Division underground 26. Restore all surfaces, roadways, sod, walks, curbs, walls, existing underground installation, etc., cut by installations to original condition in an acceptable manner.

D. Conduit Bends:

1. Provide no more than (3) 90-degree conduit bends or the equivalent number of smaller radius bends in any conduit run between boxes or equipment.
2. Length of run: 400-feet maximum less 100-feet for each equivalent 90 degree bend.
3. Fabricate bends and offsets with a hickey or conduit bender designed specifically for use with the type of conduit to be bent, or use factory made bend.
4. Radius of Bends: Conduits 2" inside diameter or less the inside bend radius shall be at least 6 times the diameter. Conduits greater than 2" diameter the inside bend radius shall be at least 10 times the conduit diameter.

- E. Rigid Steel Conduit: Suitable for use in all locations. Where used underground, wrap with no less than 2 layers of half-lapped 10 mil vinyl pipe wrapping tape, Manville, Minnesota Mining
- F. PVC Conduit: Suitable for use underground, with a minimum of 18 inches of cover. Also suitable for use in concrete slabs (for healthcare facilities, use Schedule 80 PVC). Fabricate field bends with an approved thermal bender and jig. Maintain separation between conduits using plastic spacers specifically designed for the purpose.
- G. Provide conduit-sealing bushings at conduit penetrations through exterior walls to seal against fluid and gas pressure around the conduit. Ducts shall be sealed to resist liquid and gas infiltration at all maintenance holes and building entrances.
- H. Install pull ropes in all empty conduits, #12 AWG in conduits 1 inch and smaller and 3/16 inch polypropylene rope in conduits 1-1/4 inch and larger.
- I. Fit PVC conduits that enter pullboxes and junction boxes with belled ends.

END OF SECTION.

SECTION 26 05 37 – BOXES

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide electrical materials, installation and testing for the El Capitan High School – Stadium Upgrade.

1.2 DESCRIPTION

- A. This section describes requirements for outlet boxes.

1.3 RELATED WORK

- A. Section 26 01 00 – General Requirements for Electrical Work.
- B. Section 26 27 26 – Wiring Devices: Wall plates.

1.4 REFERENCE STANDARDS

- A. NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2012 (ANSI/NEMA FB 1).
- B. NEMA OS 1 – Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2008 (Revised 2010) (ANSI/NEMA OS 1).
- C. NEMA OS 2 – Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; National Electrical Manufacturers Association; 2008.
- D. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2008.
- E. CEC – California Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 – Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 50E – Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 508A – Industrial Control Panels; Current Edition, Including All Revisions.
- I. UL 514A – Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.5 SUBMITTALS

- A. Procedure: Submit under provisions of Section 01 33 00.
- B. Provide submittals for items listed documenting compliance with specification

requirements.

- C. Product Data: Electrical Materials: Manufacturer's current published catalog sheets.

PART 2 – PRODUCTS

2.1 BOXES

- A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by CEC and product listing.
2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
4. Where box size is not indicated, size to comply with CEC but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use suitable concrete type boxes where flush-mounted in concrete.
4. Use suitable masonry type boxes where flush-mounted in masonry walls.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
 12. Wall Plates: Comply with Section 26 2726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- D. Cast Boxes: NEMA FB 1, Type FD, cast ferrous alloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

2.2 OUTLET BOXES

- A. Construction: Deep drawn or fabricated interlocked flat pieces with welded tabs, electro-galvanized sheet steel with electro-galvanized hardware. Do not use sectional boxes.
- B. Size: To accommodate the required number and sizes of conduits, wires, splices and devices but not smaller than the size indicated or specified.
- C. Plaster Ring: Provide flush with wall or ceiling finish, except where otherwise indicated or specified.
- D. Device Boxes: For single switches and receptacles, provide boxes not less than 4 inches square by 1-1/2 inches deep. For 2 devices, provide boxes not less than 4-11/16 inches square by 1-1/2 inches deep.
- E. Telecommunications Boxes: No less than 4-11/16 inches square by 2 inches deep.
- F. Special Mounting: In cabinets, tile, concrete block, brick, stone, wood or similar material, provide rectangular boxes with square corners and straight sides. For single devices, provide boxes 4 inches high by 2-1/2 inches wide by 3-3/8 inches deep. For 2 or more devices, provide multi-gang, non-sectional box with tile or masonry ring.
- G. Lighting Fixtures: 4-inch octagon by 2-1/8 inch deep, minimum. Fit boxes for surface or pendant mounted fixtures with 3/8-inch malleable iron fixture stud.
- H. Attach device boxes with adjustable bar type hangers screw fastened to two

stud/ceiling joists on both sides of box.

2.3 PULL AND JUNCTION BOXES

- A. General: For all pull and junction boxes over 300 cubic inches, provide code gauge, sheet steel boxes which meet NEMA 1 standards for panelboard and terminal cabinet box construction, with screw type covers.
- B. Ground Lug: Weld, before finish is applied, a grounding pad drilled for two bolted grounding lugs or two ground studs on the box interior.
- C. Finish: Apply rust inhibiting prime coat and 2 coats of baked enamel, standard factory gray.
- D. Hardware: Cadmium plated steel screws.

PART 3 – EXECUTION

3.1 BOXES AND CABINETS

- A. Place outlet boxes in a location as close to that shown on the plans as possible. Coordinate location of boxes with other Divisions.
- B. Install wall mounted outlet boxes so that the distance from the centerline of the box to finished floor is as listed or indicated:
 - 1. Receptacles, + 1 foot-6 inches
 - 2. Telephone, + 1 foot-6 inches
 - 3. Data, + 1 foot-6 inches
 - 4. Switches, + 4 feet-0 inches
- C. Install junction boxes with covers in concealed areas accessible after installation. Do not install junction boxes flush with finish walls or ceilings unless specifically approved by the Engineer.
- D. Attach surface boxes with:
 - 1. Steel or malleable iron expansion anchors in concrete or solid masonry.
 - 2. Wood screws in wood.
 - 3. Toggle bolts in hollow walls or masonry.
 - 4. Machine screws, bolts or welded studs in steel.
- E. Attach flush boxes with adjustable bar type hangers screw fastened to studs on both sides of the box.

END OF SECTION

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Extent of electrical identification work is as outlined by this specification.
- B. Types of electrical identification work specified in this section include the following:
 - 1. Buried cable warnings.
 - 2. Electrical power, control and communication conductors.
 - 3. Operational instructions and warnings.
 - 4. Danger signs.
 - 5. Equipment/system identification signs.

1.2 RELATED REQUIREMENTS

- A. Section 26 01 00 – General Requirements for Electrical Work.
- B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.3 REFERENCE STANDARDS

- A. ANSI Z535.2 – American National Standard for Environmental and Facility Safety Signs; 2007.
- B. ANSI Z535.4 – American National Standard for Product Safety Signs and Labels; 2007.
- C. NFPA 70E – Standard for Electrical Safety in the Workplace; National Fire Protection Association.
- D. UL 969 – Marking and Labeling Systems; Current Edition, Including All Revisions.

1.4 QUALITY ASSURANCE

- A. California Electrical Code (CEC) Compliance: Comply with CEC as applicable to installation of identifying labels and markers for wiring and equipment.
- B. Underwriters Laboratories, Inc. (UL) Compliance: Comply with applicable requirements of UL Standard 969, "Marking and Labeling Systems", pertaining to electrical identification systems.
- C. American National Standards Institute (ANSI) Compliance: Comply with applicable requirements of ANSI Standard A13.1, "Scheme for the Identification of Piping Systems".

- D. National Electrical Manufacturer's Association (NEMA) Compliance: Comply with applicable requirements of NEMA Standard No's WC-1 and WC-2 pertaining to identification of power and control conductors.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's data on electrical identification materials and products.
- B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.

PART 2 – PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Switchgear: Use identification nameplate to identify load(s) served for each branch device.
 - b. Panelboards:
 - i. Identify ampere rating.
 - ii. Identify voltage and phase.
 - iii. Identify power source and circuit number. Include location when not within sight of equipment.
 - iv. Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - v. Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - vi. For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - c. Enclosed switches, circuit breakers, and motor controllers:
 - i. Identify voltage and phase.
 - ii. Identify power source and circuit number. Include location when not within sight of equipment.

- iii. Identify load(s) served. Include location when not within sight of equipment.
- d. Enclosed Contactors:
 - i. Identify ampere rating.
 - ii. Identify voltage and phase.
 - iii. Identify configuration, e.g., E.O.E.H. (electrically operated, electrically held) or E.O.M.H. (electrically operated, mechanically held).
 - iv. Identify coil voltage.
 - v. Identify load(s) and associated circuits controlled. Include location.
- 2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 - b. Use identification nameplate at each piece of service equipment to identify the available fault current and the date calculations were performed.
- 3. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- 4. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
- 5. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
 - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches (76 mm) wide, painted in accordance with Section 09 91 00.
- 6. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
 - a. Minimum Size: 3.5 by 5 inches (89 mm by 127 mm).
 - b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury

or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

7. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.

B. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
2. Identification for Communications Conductors and Cables: Comply with Section 27 1005.
3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
4. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

C. Identification for Raceways: Use voltage markers or color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet (6.1 m).

1. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches (76 mm) wide.
 - a. Color Code:
 - i. Fire Alarm System: Red.
 - b. Field-Painting: Comply with Section 09 91 00.
 - c. Vinyl Color Coding Electrical Tape: Comply with Section 26 0519.

D. Identification for Boxes:

1. Use voltage markers to identify highest voltage present.
2. Use voltage markers or color coded boxes to identify systems other than normal power system.
 - a. Color-Coded Boxes: Field-painted in accordance with Section 09 91 00 per the same color code used for raceways.
 - i. Fire Alarm System: Red.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.

B. Identification Labels:

1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - a. Use only for indoor locations.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:

1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
2. Legend:
 - a. System designation where applicable:
 - i. Fire Alarm System: Identify with text "FIRE ALARM".
 - b. Equipment designation or other approved description.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
 - a. System Designation: 1 inch (25 mm).
 - b. Equipment Designation: 1/2 inch (13 mm).
5. Color:

- a. Normal Power System: White text on black background.
 - b. Fire Alarm System: White text on red background.
- D. Format for Control Device Identification:
- 1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
 - 2. Legend: Load controlled or other designation indicated.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch (5 mm).
 - 5. Color: Black text on clear background.
- E. Format for Fire Alarm Device Identification:
- 1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
 - 2. Legend: Designation indicated and device zone or address.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch (5 mm).
 - 5. Color: Red text on white background.

2.3 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch (3 mm).
- F. Color: Black text on white background unless otherwise indicated.

2.4 VOLTAGE MARKERS

- A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

- B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- C. Minimum Size:
 - 1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
 - 2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
 - 3. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).
- D. Legend:
 - 1. Markers for Voltage Identification: Highest voltage present.
 - 2. Markers for System Identification:
- E. Color: Black text on orange background unless otherwise indicated.

2.5 NOT USED

2.6 FLOOR MARKING TAPE

- A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlamine, 3 inches (76 mm) wide, with alternating black and white stripes.

2.7 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - 2. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

2.8 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide electrical identification products of one of the following (for each type marker):
1. Almetek,
 2. Brady, W.H. Company,
 3. Calipico Inc.,
 4. Cole-Flex Corporation,
 5. Direct Safety Company,
 6. George-Ingraham Corporation,
 7. Griffolyn Company,
 8. Ideal Industries, Inc.,
 9. LEM Products, Inc.,
 10. Markal Company,
 11. National Band and Tag Company,
 12. Panduit Corporation,
 13. Seton Name Plate Company,
 14. Tesa Corporation,
 15. Or equal.

2.9 ELECTRICAL IDENTIFICATION MATERIALS

- A. Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, provide single selection for each application.
- B. Color-Coded Plastic Tape:
1. Provide manufacturer's standard self-adhesive vinyl tape not less than 3 mils thick by 1-1/2 inches wide.
 - a. Colors: Unless otherwise indicated or required by governing regulations, provide orange tape.
- C. Underground-Type Plastic Line Marker:
1. Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried cable.
- D. Cable/Conductor Identification Bands:
1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type, either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification.
- E. Plasticized Tags:
1. Manufacturer's standard pre-printed or partially pre-printed accident-prevention and operational tags, of plasticized card stock with matte finish

suitable for writing, approximately 3-1/4 x 5-5/8 inches, with brass grommets and wire fasteners, and with appropriate pre-printed wording including large-size primary wording, e.g., DANGER, CAUTION, DO NOT OPERATE.

- F. Self-Adhesive Plastic Signs:
 - 1. Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application, e.g., 208V, EXHAUST FAN, RECTIFIER.
- G. Colors: Unless otherwise indicated, or required by governing regulations, provide white signs with black lettering.
- H. Baked Enamel Danger Signs:
 - 1. General: Provide manufacturer's standard DANGER signs of baked enamel finish on 20-gauge steel; of standard red, black and white graphics; 14 x 10 inches size except where 10 x 7 inches is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording, e.g., HIGH VOLTAGE, KEEP AWAY, BURIED CABLE, DO NOT TOUCH SWITCH.
- I. Engraved Plastic-Laminate Signs:
 - 1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black face and white core plies (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
 - 2. Thickness: 1/8 inch, except as otherwise indicated.
 - 3. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.

2.10 LETTERING AND GRAPHICS

- A. General: Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturer or as required for proper identification and operation/maintenance of electrical systems and equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

PART 3 – EXECUTION

3.1 APPLICATION AND INSTALLATION

- A. General Installation Requirements:
 - 1. Install electrical identification products as indicated, in accordance with manufacturer's written instructions, and requirements of CEC and OSHA.

2. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.
3. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

B. Conduit Identification:

1. Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by color-coded method, apply color-coded identification on electrical conduit in manner similar to piping identification. Except as otherwise indicated use white as coded color for conduit.

C. Box Identification:

1. After completion, using an indelible wide tip marker, indicate on the cover of each junction and pull box the designation of the circuits contained therein, i.e., A-1, 3, 5. Use a black marker for normal power circuits a red marker for critical circuits, an orange marker for life safety circuits, and a green marker for equipment circuits.
2. All junction and pull boxes for wiring systems above 600V shall be identified with high voltage warning labels installed every 20 linear feet in accordance with OSHA standards. All boxes shall also be painted red, see Section 09900 of the specifications.
3. All junction and pull boxes for the fire alarm system shall be painted red. All raceway for the fire alarm system shall be labeled "Fire Alarm" in red letters on intervals not to exceed ten feet.

D. Underground Cable Identification:

1. During back-filling/top-soiling of each exterior underground electrical, signal or communication conduits, install continuous underground-type plastic line marker, located directly over buried line at 6 to 8 inches below finished grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16 inches, install a single line marker.
2. Install line marker for every buried conduit.

E. Cable/Conductor Identification:

1. Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet where wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project's electrical work. Refer to Section 26 01 00 – General Requirements of Electrical Work of these specifications for color coding requirements.

F. Operational Identification and Warnings:

1. Wherever directed by the Owner's Representative, to ensure safe and efficient operation and maintenance of electrical systems, including prevention of misuse of electrical facilities equipment by unauthorized personnel, install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for intended purposes. Request a meeting with the Owner's Representative prior to substantial completion to coordinate warning requirements.

G. Danger Signs:

1. In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations identified by the Owner's Representative as constituting similar dangers for persons in or about project. Request a meeting with the Owner's Representative prior to substantial completion to coordinate danger sign requirements.
 - a. High Voltage: Install danger signs wherever it is possible, under any circumstances, for persons to come into contact with electrical power of voltages higher than 110-120 volts.
 - b. Critical Switches/Controls: Install danger signs on switches and similar controls, regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

H. Equipment/System Identification:

1. Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system including communication/control/signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2 inch high lettering, on 1-1/2 inch high sign (2 inch high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for each unit of the following categories of electrical work:
 - a. Electrical cabinets and enclosures.
 - b. Access panel/doors to electrical facilities.
 - c. Transformers.
 - d. Fire alarm control panel, battery cabinets, voice alarm system cabinets, and transponders.
2. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation

and maintenance of equipment. Secure to substrate with fasteners, except use adhesive where fasteners should not or cannot penetrate substrate. Identification of flush mounted cabinets and panelboards shall be on the inside of the device.

3. Panelboards, individually mounted circuit breakers, and each breaker in the switchboards, secondary unit substations, and distribution panels shall be identified with an engraved plastic laminate sign. Plastic nameplates shall be multicolored laminated plastic with faceplate and core as scheduled. Lettering shall be engraved minimum 1/4 inch high letters.
 - a. 208/120 volt normal power equipment shall be identified with green faceplate with white core.
 - b. 208/120 volt equipment branch power equipment shall be identified with blue faceplate with white core.
 - c. Equipment identification is to indicate the following:
 - 1) Equipment ID abbreviation.
 - 2) Voltage, phase, wires and frequency.
 - 3) Emergency or other system.
 - 4) Power source origination.
 - 5) Example:
 - a) Panel GLSH1
 - b) 208/120V, 3 phase, 4 wire
 - c) Fed by GLSD1
 - d. Submit complete schedule with the shop drawings listing all nameplates and information contained thereon.

END OF SECTION

SECTION 26 08 01 – ELECTRICAL ACCEPTANCE TESTING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The work required under this section of the specifications consists of the electrical acceptance testing and inspections for all electrical systems and equipment installed or affected by this project. The Contractor shall prepare and submit to the Engineer for review and approval acceptance test procedures and inspection forms in accordance with this specification. A complete functional acceptance test shall be performed on all electrical systems and equipment to prove they perform as intended under all modes of operation. Testing specified in other sections is in addition to testing specified herein. Also the testing will demonstrate the electrical system and equipment operation to the Owner. All labor, materials, rentals, permits and testing equipment or other which is required shall be provided by the Contractor.

1.2 GENERAL

- A. The Contractor shall prepare and submit to the Engineer for review and approval acceptance test procedures and inspection forms in accordance with this specification. Testing shall be performed by the Contractor, the manufacturer's representative, and/or a International Electrical Testing Association (NETA) testing company depending on the type of equipment or system being tested as follows:

1. CONTRACTOR

- a. Cables, Low-Voltage, 600-Volt Maximum
- b. Switches and Circuit Breakers, Air, Low-Voltage
- c. Fiber Optic Cable
- d. Lighting System
- e. Clock System
- f. Telecommunications System
- g. Grounding System
- h. Low Voltage (600 VAC maximum) Power Distribution System
- i. Instrument and Control System

2. MANUFACTURER'S REPRESENTATIVE

- a. Fire Alarm System

3. NETA

- a. NOT USED

- b. Ground Fault Protection System
 - c. Circuit Breakers
 - d. Metering Devices
- B. The Contractor shall prepare the test procedures and inspection forms and perform the specified testing and inspections, for the assigned equipment and systems above, as applicable to the equipment and systems installed or affected by the project. If the Contractor (including sub contractors) does not have the ability or qualifications to conduct the required tests then the Contractor will sub contract with a testing organization who does.
- C. The Contractor shall engage in and pay for the services of the Manufacturer's Representative approved testing organizations to provide testing and inspection of the applicable electrical equipment and systems as listed above and specified in this section. The testing organizations may be an independent division or authorized representative of the manufacturer of the assembled products being tested. The Manufacturer's Representative will conduct startup testing and will be part of integrated system testing. If an outside testing organization is approved, a representative of the manufacturer shall be under contract by the testing company. The representative shall be present during all testing to insure that the testing is performed properly and that any deficiencies discovered are promptly corrected. The Manufacturer's Representative will assist in the preparation and performance of other test procedures and inspections such as integrated system testing (e.g., loss of power/ generator/ats/ups/annunciator integrated system test)
- D. The Contractor shall engage in and pay for the services of a NETA Accredited Testing Company to provide testing and inspection applicable electrical equipment and systems as listed above and specified in this section. Also, the NETA testing contractor will conduct integrated system testing or other testing as required. NETA testing will be conducted per the current Standard for NETA Acceptance Testing Specification including test report preparation and submittals. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment. Technicians shall be certified in accordance with the current ANSI/NETA ETT, Standard for Certification of Electrical Testing Personnel. Each on-site crew leader shall hold a current certification, Level III or higher, in electrical testing. The testing organization shall provide the following: A written record of all tests and a final report; All field technical services, tooling, equipment, instrumentation, and technical supervision to perform such tests and inspections; Specific power requirements for test equipment; Notification to the owner's representative prior to commencement of any testing; A written record of all tests and a final report and a timely notification of any system, material, or workmanship that is found deficient based on the results of the acceptance tests. The NETA contractor will assist in the preparation and performance of other test procedures and inspections such as an acceptance testing of the integrated system (e.g., loss of power/generator/ATS/UPS/annunciator integrated system test)
- E. Submit all test reports to the Owners Representative at least two weeks prior to the project final inspection for review.

1.3 SAFETY AND PRECAUTIONS

- A. All parties involved must be cognizant of industry-standard safety procedures. This document does not contain any procedures including specific safety procedures. It is recognized that an overwhelming majority of the tests and inspections recommended in these specifications are potentially hazardous. Individuals performing these tests shall be qualified and capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved.

- B. Safety practices shall include, but are not limited to, the following requirements:
 - 1. All applicable provisions of the Occupational Safety and Health Act, particularly OSHA 29 CFR Part 1910 and 29 CFR Part 1926 including OSHA lockout procedures.
 - 2. ANSI/NFPA 70E, Standard for Electrical Safety in the Workplace.
 - 3. Applicable state and local safety operating procedures.
 - 4. Owner's safety practices.
 - 5. A safety lead person shall be identified prior to the commencement of work.
 - 6. A safety briefing shall be conducted prior to the commencement of work.
 - 7. All tests shall be performed with the apparatus de-energized and grounded except where otherwise specifically required to be ungrounded or energized for certain tests.
 - 8. The testing organization shall have a designated safety representative on the project to supervise operations with respect to safety.

1.4 QUALITY ASSURANCE

- A. The testing and inspection shall comply with all applicable sections of the following codes and standards:
 - 1. American National Standards Institute - ANSI
 - 2. American Society for Testing and Materials - ASTM
 - 3. Association of Edison Illuminating Companies - AEIC
 - 4. Institute of Electrical and Electronics Engineers - IEEE
 - 5. Insulated Power Cable Engineers Association - IPCEA
 - 6. International Electrical Testing Association - NETA Acceptance Testing Specifications
 - 7. California Electrical Code - CEC
 - 8. National Electrical Manufacturers Association - NEMA

9. National Fire Protection Association - NFPA
 10. State and Local Codes and Ordinances
- B. The inspection and testing shall comply with the project plans and specifications as well as with the manufacturer's drawings, instruction manuals, and other applicable data for the apparatus tested.
 - C. Review and Approval- All test reports, deficiencies and corrections, test results, shall be reviewed by the Engineer of Record.

1.5 DIVISION OF RESPONSIBILITY

- A. Perform routine insulation-resistance, continuity, and rotation tests for all distribution and utilization equipment prior to and in addition to tests performed by the testing firm specified herein.
- B. Supply a suitable and stable source of electrical power to each test site. The testing firm shall specify the specific power requirements.
- C. Notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.
- D. Supply a complete set of electrical plans, specifications, and any pertinent change orders to the testing firm prior to commencement of testing.
- E. Notify the Engineer and Owner's Representative prior to commencement of any testing.
- F. Any system, material or installation which is found defective on the basis of acceptance tests shall be reported to the Owner's Representative.
- G. The testing firm shall maintain a written record of all tests and, upon completion of project, shall assemble and certify a final test report for review and approval by the Engineer of Record.

1.6 ACCEPTANCE TEST PROCEDURES

- A. The Acceptance Test Procedure shall include the following sections:
 1. Purpose of Test
 2. References
 3. Test Participants- Name/Company/Telephone Number and hand signed Initials
 4. Equipment and Systems tested.
 5. Description of test.
 6. Acceptance Criteria

7. Initial Conditions/Prerequisites
 8. Test Equipment and Calibration date
 9. Test Procedure and Date of Test
 10. Test Results-verification of passing acceptance criteria.
 11. Deficiencies, Corrections and Re-test
 12. Verification Systems and Equipment are returned to Operational Status
 13. Conclusions and recommendations.
 14. Appendix, including test forms.
- B. Each piece of equipment shall be recorded in the test procedure listing the condition of the equipment as found and as left. Included shall be recommendations for any necessary repair or replacement parts. The test procedures shall indicate the name of the engineer who tested the equipment and the date of the test completion.
- C. Inspection Reports may be in situ test reports prepared by manufacturer representatives such as startup test reports by, for example the UPS or Generator manufacturers' startup representative. The inspection reports shall indicate the name of the person who inspected the equipment and the date of completion.
- D. The Acceptance Test Procedure shall be a step by step procedure to be followed verbatim and initialed after each step's performance. The test shall include the listed sections above. The procedure shall be prepared on 8.5" x 11" paper. See Attachment 1 as an example.

1.7 TESTING INSTRUMENT TRACEABILITY

- A. All applicable test instrumentation shall be currently calibrated within rated accuracy.
- B. The accuracy shall be traceable to the National Bureau of Standards in an unbroken chain.
- C. Instruments shall be calibrated in accordance with the following frequency schedule:
 1. Field instruments: 6 months maximum.
 2. Laboratory instruments: 12 months.
 3. Leased specialty equipment: 12 months
- D. Dated calibration labels shall be visible on all test equipment.

1.8 FINAL SETTINGS

- A. The Contractor shall be responsible for implementing all final settings and adjustments of equipment in accordance with manufacturer's and/or Engineer's

specified values. The Contractor shall be responsible to request any required setting values from the Engineer.

1.9 SUBMITTALS

- A. At least two weeks prior to conducting testing, submit Acceptance Test Procedures and Inspection Reports for review and approval by the Electrical Engineer of Record. This includes the prepared test report outlined above including all systems and equipment to be tested (with the test results, deficiencies, and conclusions sections blank). The Contractor shall be responsible to integrate the testing by the Contractor, Manufacturing Representatives, and NETA testing organization. The NETA testing organization shall prepare the Testing Documents per the current NETA Acceptance Testing Specification and assist the Contractor in preparing an Integrated System Test. The Manufacturing Representative testing organization shall prepare their regular start up test plan and assist the Contractor in preparing an Integrated System Test. After review and approval the test report shall be executed.
- B. At least two week prior to conduction testing, submit for review and approval by the Engineer the list of test participants and prove of their qualifications and demonstrate they have the necessary testing experience and training to conduct the test.
- C. Record copies of the completed test report shall be submitted no more than 30 days after completion of the testing and inspection.

1.10 FAILURE TO MEET TEST

- A. Any found defective on the basis of acceptance test shall be reported directly to the Engineer.
- B. Contractor shall replace the defective material or equipment and have test repeated until test proves satisfactory without additional cost to the Owner.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 EQUIPMENT TO BE TESTED AN INSPECTED

- A. The following equipment shall be tested in accordance with the scopes of work which follow and additional participation in other acceptance testing such as integrated system and functional testing. Acceptance test procedures and inspection reports shall be prepared, submitted and approved prior to performance of testing and inspections. The party responsible is identified in accordance with the following key: C = Contractor/Installer; M = Manufacturer; T = Testing Agency.

1. Molded Case Circuit Breakers - C
2. Fire Alarm System - M
3. Grounding System - C
4. Cables, Low Voltage, 600 Volts Maximum - C

5. Ground Fault Systems - C
6. Low Voltage Switchgear and Switchboards - T
7. Low Voltage Power Circuit Breakers and Insulated Case Circuit Breakers - T
8. Lighting Control System - C
9. Telecommunications Systems-C or M
10. Other Systems-C, M, T

3.2 INSPECTIONS

A. DRY TYPE TRANSFORMERS

1. Visual and Mechanical Inspection:
 - a. With case covers removed, inspect transformer core and coil assembly and enclosure interior. Cloth wipe and brush major insulating surfaces.
 - b. Check primary, secondary, and ground connections.
 - c. Check tap connections and tap changer.
 - d. Inspect all bolted connections. Torque wrench tighten or remake any questionable connections.
 - e. Inspect insulators, spacers, and windings.
 - f. Inspect for adequate electrical clearance.
 - g. Check base or support insulators, including vibration isolation supports.
 - h. Check accessory devices for condition and proper operation.
 - i. Verify that the transformers have been provided with adequate spacing for ventilation.

B. MOLDED CASE CIRCUIT BREAKERS

1. Visual and Mechanical Inspection:
 - a. Inspect cover and case, and check for broken or loose terminals.
 - b. Operate breaker to check operation.
 - c. Verify proper reporting of the events on the project equipment monitoring system
2. Electrical Tests (400 ampere frame and larger):

- a. Insulation Resistance Test: Megger main poles of breaker pole-to-pole, from each pole to ground, and across the open contacts of each pole.
- b. Contact Resistance Test: Ductor across main pole contacts with breaker closed and latched to check for good, low resistance contact.
- c. Test overcurrent trip device and calibrate. Where primary injection testing is specified, test each pole of the breaker individually. Data shall be compared with manufacturer's published data.
 - 1) All trip units shall be tested by primary injection.
 - 2) Static overcurrent trip devices shall be tested per manufacturer's instructions.
 - 3) Test for minimum pick-up current.
 - 4) Apply 300% of pick-up current and measure time necessary to trip breaker (long time delay).
 - 5) Where short time delay characteristics are provided, test short time pick-up and delay.
 - 6) Test instantaneous trip by passing current sufficiently high to trip breaker instantaneously.
 - 7) Where ground fault protection is provided, test ground fault pick-up and delay.
 - 8) Check reset characteristics of trip unit.
 - 9) Electrically test any auxiliary devices such as shunt trips, undervoltage trips, alarm switches, and auxiliary switches.

C. FIRE ALARM SYSTEM

1. Visual and Mechanical Inspection:
 - a. Inspect each device for physical damage.
 - b. Check for proper labeling of conductors.
 - c. Inspect all test switches for proper operation.
 - d. Inspect all system lamps and LED's for proper operation. Replace all non-operational equipment.
 - e. Check all cabinet doors latches and hinges for proper operation. Adjust, lubricate, and repair as required.

- f. Verify proper reporting of the events on the project equipment monitoring system.
2. Electrical Tests: Test each individual circuit at panel with equipment connected for proper operation. Entire system shall test free from opens, grounds, and short circuits. Verify control circuit integrity: Field tests to verify component compliance with specifications, adjusting, calibrating, and setting circuit breaker, relays, timers, etc. Testing will include, but not be limited to the following:
- a. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 - b. Close each sprinkler system control valve and verify proper supervisory alarm at the FACP.
 - c. Verify activation of all flow switches.
 - d. Open initiating device circuits and verify that the trouble signal actuates.
 - e. Open and short signaling line circuits and verify that the trouble signal actuates.
 - f. Open and short indicating appliance circuits and verify that trouble signal actuates.
 - g. Ground all circuits and verify response of trouble signals.
 - h. Check presence and audibility of all alarm notification devices.
 - i. Check installation, supervision, and operation of all intelligent smoke detectors.
 - j. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
 - k. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
 - l. Check the integrity of the software program with the system in complete operation. Verify that each message reported is correct with respect to the signal received. All possible operating conditions and system troubles shall be tested. Rewrite software as required.
 - m. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

- n. Close each sprinkler system control valve and verify proper supervisory alarm at the FACP.
- o. Verify activation of all flow switches.
- p. Open initiating device circuits and verify that the trouble signal actuates.
- q. Open and short signaling line circuits and verify that the trouble signal actuates.
- r. Open and short indicating appliance circuits and verify that trouble signal actuates.
- s. Ground all circuits and verify response of trouble signals.
- t. Check presence and audibility of all alarm notification devices.
- u. Check installation, supervision, and operation of all intelligent smoke detectors.
- v. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
- w. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
- x. Check the integrity of the software program with the system in complete operation. Verify that each message reported is correct with respect to the signal received. All possible operating conditions and system troubles shall be tested. Rewrite software as required.

D. GROUNDING SYSTEM

- 1. Visual and Mechanical Inspection:
 - a. Inspect wiring system outlet and junction boxes for proper grounding. Green grounding conductor shall be connected to outlet and junction boxes. Inspect a minimum of 5% of project boxes.
 - b. Verify connections of grounds for the secondary of separately derived grounding systems, i.e. at dry type transformers. Note type of connection, i.e. mechanical or exothermic.
 - c. Verify proper connection to all components of building service entrance grounding system. Note all system components which are interconnected and type of connection either mechanical or exothermic. Note depth of driven ground rods.

2. Electrical Tests (Small Systems):
 - a. Perform ground-impedance measurements utilizing the fall-of-potential method per ANSI/IEEE Standard 81 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System". Instrumentation utilized shall be specifically designed for ground impedance testing. Provide sufficient spacing so that plotted curves flatten in the 62% area of the distance between the item under test and the current electrode.
 - b. Equipment Grounds:
 - i. Utilize two-point method of IEEE Std. 81. Measure between equipment ground being tested and known low-impedance grounding electrode or system.
3. Electrical Tests (Large Systems):
 - a. When sufficient spacing of electrodes described above is impractical, perform ground-impedance measurements utilizing either the intersecting curves method or the slope method. (Ref. Nos. 40 and 41 in IEEE Std. 81.)
 - b. Test Values:
 - i. The main ground electrode system impedance-to-ground should be no greater than five (5) ohms. Equipment grounds, depending on size and length of grounding conductor, should be only fractionally higher than system ground.

E. CABLES - LOW-VOLTAGE - 600V MAXIMUM

1. Visual and Mechanical Inspection:
 - a. Inspect cables for physical damage and proper connection in accordance with single-line diagram.
 - b. Test cable mechanical connections to manufacturer's recommended values using a calibrated torque wrench.
 - c. Check cable color-coding with applicable specifications and National Electrical Code standards.
2. Electrical Tests:
 - a. Perform insulation-resistance test on each feeder on the riser diagram with respect to ground and adjacent conductors. Applied potential shall be 1000 volts dc for 1 minute.
 - b. Perform continuity test to insure proper cable connection.
 - c. Test Values:

- i. Evaluate results by comparison with cables of same length and type. Investigate any values less than 50 megohms.
 - ii. Provide a test report for each feeder which indicates the manufacturer's target values and actual test reading. Report shall indicated pass/fail for each feeder. Submit report to Owner's Representative for approval. Include test report in project maintenance manual.
- d. Feeder Cables:
- i. 600-volt feeder cables in the building and secondary service cables to the building shall be tested using a megohmmeter, to measure the insulation resistance of each conductor in the circuit.
 - ii. Disconnect all equipment switches, relays, buswork, transformers, etc.) from the cable being tested.
 - iii. Tests to be performed in a dry area.
 - iv. Clean and dry cable ends with a cloth moistened with a suitable solvent.
- e. e.Cable Values: Cable values shall be established and provided by the cable manufacturer. Provide target value insulation resistance (IR) in megohms, based on 1000 ft. at 60 Deg F.
- f. Temperature Correction Factor: For temperatures above or below 60°F, a correction factor may have to be applied to determine the true IR value. However, if the measured IR of the system is equal to or greater than the calculated value, a correction factor is not needed.
- g. Correct insulation deficiencies which show and insulation resistance of less than one megohm.
- h. Test conductors with power off and impress a voltage of not less than 500 volts D.C.
- i. Perform continuity tests on all conductors.
- F. GROUND-FAULT SYSTEMS (CEC 230-95)
- 1. Visual and Mechanical Inspection:
 - a. Inspect for physical damage and compliance with drawings and specifications.
 - b. Inspect neutral main bonding connection to assure:
 - i. Zero-sequence sensing system is grounded.

- ii. Ground-strap sensing systems are grounded through sensing device.
 - iii. Ground connection is made ahead of neutral disconnect link on zero-sequence sensing systems.
 - iv. Grounded conductor (neutral) is solidly grounded.
 - c. Inspect control power transformer to ensure adequate capacity for system.
 - d. Manually operate monitor panels (if present) for:
 - i. Trip test.
 - ii. No trip test.
 - iii. Nonautomatic reset.
 - e. Record proper operation and test sequence.
 - f. Set pickup and time-delay settings in accordance with the settings provided by the University's Representative.
 - g. Verify proper reporting of the events on the project equipment monitoring system.
- 2. Electrical Tests:
 - a. Measure system neutral insulation to ensure no shunt ground paths exist. Remove neutral-ground disconnect link. Measure neutral insulation resistance and replace link.
 - b. Determine the relay pickup current by current injection at the sensor and operate the circuit interrupting device.
 - c. Test the relay timing by injecting three hundred percent (300%) of pickup current, or as specified by manufacturer.
 - d. Test the system operation at fifty-seven percent (57%) rated control voltage, if applicable.
 - e. Test zone interlock systems by simultaneous sensor current injection and monitoring zone blocking function.
 - f. On multiple source, tie breaker, etc., systems, devise a simulation scheme that fully proves correct operation.
 - g. Test Parameters:
 - i. System neutral insulation shall be a minimum of one hundred (100) ohms, preferably one (1) megohm or greater.

- ii. Relay timing shall be in accordance with manufacturer's published time-current characteristic curves but in no case longer than one (1) second for fault currents equal to or greater than 3,000 amperes.
- iii. Relay pickup value shall be within +10% of setting and in no case greater than 1200A.

G. LOW VOLTAGE SWITCHBOARDS

- 1. Visual and Mechanical Inspection:
 - a. Verify that the enclosure interiors have been cleaned of accumulated dust, dirt, oil films, and other foreign materials.
 - b. Inspect all electrical and mechanical components for condition and any evidence of defects or failure.
 - c. Check for proper travel and alignment of any drawout or plug-in circuit breakers.
 - d. Check breaker connections to bus.
 - e. Inspect bolted connections. Torque wrench tighten or remake any questionable connections.
 - f. Inspect for missing or loose hardware or accessories.
 - g. Inspect ground bus connections.
 - h. Operate key and door interlock devices to assure proper operation.
 - i. Verify proper reporting of the events on the project equipment monitoring system.
- 2. Electrical Tests:
 - a. Insulation Resistance Test: Megger main secondary bus and feeder circuits phase-to-phase and phase-to-ground.
 - b. Energize any space heater circuits to insure proper operations.
 - c. Check phase rotation with a Biddle phase rotation meter.
 - d. Instruments and Meter Tests:
 - i. Inspect panel mounted instruments and meters. Clean and check for calibration accuracy. Make minor adjustments as necessary.

H. LOW VOLTAGE POWER CIRCUIT BREAKERS AND INSULATED CASE CIRCUIT BREAKERS

1. Visual and Mechanical Inspection:
 - a. Remove each draw-out type circuit breaker.
 - b. Inspect arc chutes of power circuit breakers.
 - c. Inspect circuit breaker for defects or damage.
 - d. Inspect and check contacts. Check alignment, over-travel, and pressure. Adjust if necessary.
 - e. Inspect finger clusters on line and load stabs of draw-out circuit breakers.
 - f. Check for proper mechanical operation. Lubricate where necessary.
 - g. Check auxiliary devices for proper operation.
 - h. Check breaker racking device (if applicable) for alignment and friction-free operation. Lubricate if necessary.
 - i. Verify proper reporting of the events on the project equipment monitoring system.

2. Electrical Tests:
 - a. Insulation Resistance Test: Megger main poles of breaker pole-to-pole, from each pole to ground, and across the open contacts of each pole.
 - b. Contact Resistance Test: Ductor across main pole contacts with breaker closed and latched to check for good, low resistance contact.
 - c. Test overcurrent trip device by primary injection and calibrate to settings provided. Static overcurrent trip devices shall be tested per the manufacturer's instructions. Test each pole of the breaker individually. Data shall be compared with manufacturer's published data.
 - i. Test for minimum pick-up current.
 - ii. Apply 300% of pick-up current and measure time necessary to trip breaker (long time delay).
 - iii. Where short time delay characteristics are provided, test short time pick-up and delay.
 - iv. Test instantaneous trip by passing current sufficiently high to trip breaker instantaneously.
 - v. Where ground fault protection is provided, test ground fault pick-up and delay.

- vi. Check reset characteristic of trip unit.
- d. Electrically test any auxiliary devices such as shunt trips, undervoltage trips, alarm contacts, and auxiliary contacts.

I. LIGHTING CONTROL SYSTEM

- 1. Visual and Mechanical Inspection:
 - a. Inspect each device for physical damage.
 - b. Check for proper labeling of conductors.
 - c. Inspect all system lamps and LED's for proper operation. Replace all non-operational equipment.
 - d. Check all cabinet doors, latches, and hinges for proper operation. Adjust, lubricate, and repair as required.
- 2. Electrical Tests:
 - a. Verify the absence of unwanted voltages between circuit conductors and ground that would constitute a hazard or prevent proper system operation.
 - b. Meggar test all conductors (other than those intentionally grounded) for isolation from ground.
 - c. Test all conductors (other than those intentionally connected together) for conductor-to-conductor isolation using as insulation testing device.
 - d. The control unit shall be tested to verify it is in the proper operating condition as detailed in the manufacturer's manual.
 - e. Each control circuit shall be tested to confirm proper operation of the circuit. Monitor the system with all building equipment energized, such as variable speed controllers, to verify the absence of control inhibiting electrical noise.

END OF SECTION.

SECTION 26 22 00 – LOW-VOLTAGE TRANSFORMERS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The General Conditions, Supplementary General Conditions, Special Conditions and Division 1 General Requirements apply to the work of this section.
- B. This section describes requirements for dry type transformer.
- C. This section describes requirements for dry type transformer K-rated.

1.2 RELATED WORK

- A. Section 26 01 00 – General Requirements for Electrical Work.

1.3 REFERENCE STANDARDS

- A. The Underwriters Laboratory, Inc. (UL).
- B. National Electrical Manufacturers Association (NEMA).
- C. IEEE C57.96 – Guide for Loading Dry-Type Distribution and Power Transformers; 1999 (R2004).
- D. NEMA ST 20 – Dry-Type Transformers for General Applications; National Electrical Manufacturers Association; 1992 (R1997).

1.4 QUALIFICATIONS

- A. The equipment manufacturer shall be ISO 9000, 9001 or 9002 certified.
- B. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- C. The transformers shall be suitable for and certified to meet all applicable seismic requirements of the International Building Code (IBC) for zone 4 application. Guidelines for the installation consistent with these requirements shall be provided by the transformer manufacturer and be based upon testing of representative equipment.
- D. The test response spectrum shall be based upon a 5 percent minimum damping factor, IBC: a peak of 0.75g, and a ZPA (zero period acceleration) of 0.38g. The tests shall fully envelope this response spectrum for all equipment natural frequencies up to at least 35Hz.

1.5 SUBMITTALS

- A. Submit manufacturers' data and shop drawings in accordance with Section 01 33 00.

- B. Manufacturers Data:
1. Dimension drawing and weight.
 2. Technical certification sheet.
 3. Conduit entry/exit locations.
 4. Transformer ratings including:
 - a. Primary and secondary kVA.
 - b. Voltage.
 - c. Taps.
 - d. Primary and secondary continuous current.
 - e. Basic Impulse level for equipment over 600-volts.
 - f. Impedance.
 - g. Insulation class and temperature rise.
 - h. Sound level.

PART 2 – PRODUCTS

2.1 ALL TRANSFORMERS

- A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- B. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:
1. Altitude: Less than 3,300 feet (1,000 m).
 2. Ambient Temperature: Not exceeding 86 degrees F (30 degrees C) average or 104 degrees F (40 degrees C) maximum measured during any 24 hour period.
- C. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.
- D. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.
- E. Basic Impulse Level: 10 kV.

- F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- G. Isolate core and coil from enclosure using vibration-absorbing mounts.
- H. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.

2.2 DRY TYPE POWER TRANSFORMERS

- A. General: Provide dry type power transformers, for lighting and general power applications, rated as indicated.
- B. Transformers shall be designed for continuous operation at rated kVA, for 24 hours a day, yearly operation, with normal life expectancy as defined in American National Standards Institute (ANSI) C57.96.
- C. Shipping: Provide lifting holes, accessible without removal of any of the enclosure components.
- D. Insulation, as listed:

Insulation Size	Temperature Class	Rating	Hot Spot Allowance
2kVA & below	NEMA B or better	80 degrees C rise	30 degrees C
3kVA thru 15 kVA	NEMA F or better	115 degrees C rise	30 degrees C
15kVA and above	NEMA H	150 degrees C rise	30 degrees C

- E. Base temperature rating and hot spot allowances in the above table on a 40 degrees C maximum ambient temperature and 30 degrees C average ambient temperature.
- F. Overload Capacity: 10 percent above full load rating continuously in an ambient not exceeding 40 degrees C.
- G. Case Temperature: Maintain no more than a 35 degrees C rise above a 40 degrees C ambient.
- H. Taps, as listed:

Transformer Rating	Phase	Taps
Through 10kVA	Single	None
15kVA thru 2kVA	Single	(2) 5 percent FCBN
6kVA thru 15 kVA	Three	(2) 5 percent FCBN
30kVA and larger	Single and Three	(2) 2-1/2 percent FCAN and (4) 2-1/2 percent FCBN where FCBN – Full Capacity Below Normal.

I. Sound levels, not to exceed listed values, as determined by NEMA standards:

Size	Sound Level in dB
Through 9kVA	40
10 through 50kVA	45
51 through 150kVA	50

J. Provide vibration isolating mounts to isolate the enclosure from the core and coil assembly.

K. Mounting, suitable as listed:

1. Single Phase Transformers: Wall
2. Three Phase Transformers, through 15kVA: Wall.
3. Three Phase Transformers, 15kVA and above: Floor or ceiling hung channel.

L. Provide conduit knockouts for line and load conduit entrance.

M. Enclosure:

1. Units rated 30kVA and below, the encapsulated enclosure construction shall be totally enclosed, non-ventilated, NEMA 3R, with lifting eyes.
2. Units rated 15kVA and above, the enclosure construction shall be ventilated, NEMA 2, drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt.
3. Outdoor units rated 15kVA or above, provide suitable weather-shields over ventilation openings.

N. Finish: Degrease, clean, phosphatize, prime and finish all interior and exterior surfaces with baked enamel, color ANSI 61 or standard factory grey.

O. Connect a grounding strap from the secondary neutral to a grounding lug on the enclosure.

P. Terminals: As specified in Section 26 01 00 – General Electrical.

Q. Subject transformers 25kVA above to listed production test at factory:

1. Ratio tests at the rated voltage connection and at all tap connections.
2. Polarity and phase relation tests on the rated voltage connection.
3. Applied potential tests.
4. Induced potential test.

- 5. No-load and excitation current at rated voltage on the rated voltage connection.
- R. Factory to perform the listed standard tests on unit of identical design:
 - 1. No-load losses.
 - 2. Total losses.
 - 3. Sound levels.
 - 4. Temperature rise.
 - 5. Impulse.
 - 6. Impedance.
 - 7. Induced potential.
 - 8. Applied potential.
- S. Submit certified test reports for production and standard tests.
- T. Manufacture: Cutler-Hammer, General Electric, Sorgel.

2.3 DRY TYPE POWER TRANSFORMERS (K-FACTOR RATED)

- A. General: Provide dry type power transformers, for lighting and general power applications, rated as indicated.
- B. Transformers shall be designed for continuous operation at rated kVA, for 24 hours a day, yearly operation, with normal life expectancy as defined in American National Standards Institute (ANSI) C57.96.
- C. The transformers shall be specifically designed to supply circuits with a harmonic profile equal to or less than a K-factor of 4 to 13 without exceeding 115 degree C temperature rise.
- D. Shipping: Provide lifting holes, accessible without removal of any of the enclosure components.
- E. Insulation, as listed:

Insulation Size	Temperature Class	Rating	Hot Spot Allowance
2kVA & below	NEMA B or better	80 degrees C rise	30 degrees C
3kVA thru 15 kVA	NEMA F or better	115 degrees C rise	30 degrees C
15kVA and above	NEMA H	150 degrees C rise	30 degrees C

- F. Base temperature rating and hot spot allowances in the above table on a 40 degrees C maximum ambient temperature and 30 degrees C average ambient temperature.
- G. Case Temperature: Maintain no more than a 35 degrees C rise above a 40 degrees C ambient.

1. Taps, as listed:

Transformer Rating	Phase	Taps
Through 10kVA	Single	None
15kVA thru 25kVA	Single	(2) 5 percent FCBN
6kVA thru 15kVA	Three	(2) 5 percent FCBN
30kVA and larger	Single and Three	(2) 2-1/2 percent FCAN and (4) 2-1/2 percent FCBN

- H. Sound levels, not to exceed listed values, as determined by NEMA standards:

Size	Sound Level in dB
Through 9kVA	40
10 through 50kVA	45
51 through 150kVA	50

- I. Non-linear ratings, to supply circuits with a harmonic profile equal or less than a K-factor of 13 as listed below without exceeding 115 degree C temperature rise:

Harmonic	K-13
Fund.	100%
3rd	70%
5th	42%
7th	5%
9th	3%
11th	3%
13th	1%
15th	.7%
17th	.6%

- J. Provide vibration isolating mounts to isolate the enclosure from the core and coil assembly.
- K. Mounting, suitable as listed:
 - 1. Three Phase Transformers, 15kVA and above: Floor or ceiling hung channel.
- L. Provide conduit knockouts for line and load conduit entrance.
- M. Finish: Degrease, clean, phosphatize, prime and finish all interior and exterior surfaces with baked enamel, color ANSI 61 or standard factory grey.
- N. Connect a grounding strap from the secondary neutral to a grounding lug on the enclosure.
- O. Terminals: As specified in Section 16100 - Basic Materials and Methods.
- P. Subject transformers 25kVA above to listed production test at factory:
- Q. Applied potential: 4kV.
 - 1. Induced potential: 2 times normal to 7200Hz.
 - 2. Ratio tests at the rated voltage connection and at all tap connections.
 - 3. Polarity and phase relation tests on the rated voltage connection.
 - 4. No-load and excitation current at rated voltage on the rated voltage connection.
- R. Perform the listed standard tests on unit of identical design:
 - 1. No-load losses.
 - 2. Total losses.
 - 3. Sound levels.
 - 4. Temperature rise.
- S. Impulse:
 - 1. Impedance.
 - 2. Induced potential.
 - 3. Applied potential.
- T. Submit certified test reports for production and standard tests.
- U. Manufacture: Cutler-Hammer, General Electric, Sorgel.

PART 3 – EXECUTION

3.1 DRY TYPE POWER TRANSFORMER

- A. Mount transformer on floor or wall as indicated.
- B. Provide one (1) vibration isolating mount, minimum 1 inch thick with 1 inch static deflection, for each mounting point on the transformer.
- C. Connect transformer with flexible metal conduit. Provide an insulated grounding bushing on conduit and bond to transformer case.

END OF SECTION.

SECTION 26 24 16 – PANELBOARDS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section describes requirements for branch circuit panelboards.

1.2 RELATED WORK

- A. Section 26 01 00 – General Requirements for Electrical Work.

1.3 REFERENCE STANDARDS

- A. National Electrical Manufacturers Association (NEMA).
 - 1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum); 2008.
- B. The Underwriters Laboratory, Inc. (UL).
 - 1. UL 50 – Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
 - 2. UL 50E – Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
 - 3. UL 67 – Panelboards; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. Submit manufacturers' data and shop drawings in accordance with Section 01 33 00.
- B. Manufacturers Data: Panelboards.
- C. Shop Drawings: Panelboards.

PART 2 – PRODUCTS

2.1 ALL PANELBOARDS

- A. Provide products listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature:
- C. Short Circuit Current Rating:

1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 3. Fronts:
 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.2 BRANCH CIRCUIT PANELBOARDS

- A. General: Provide bussed, circuit breaker or fusible switch type panelboards with main lugs or circuit breaker in flush or surface mounted enclosures as indicated.
- B. Construction:
1. Cabinets: Code gauge steel cabinets, deadfront panels, and doors. Fasten deadfront panels to cabinets with concealed trim fasteners. Conceal front door hinges.
 2. Dimensions: 20 inches wide by 6 inches deep.
 3. Locks: Flush door locks, keyed alike for all panelboards.
 4. Access: Door-in-Door (Not EZ-Trim).

5. Standards: Provide UL label where applicable and conform to No. 67 and 50 Underwriters Laboratories, Inc., and NEMA PB-1.

C. Bussing:

1. Phase Bus: Silver-plated copper, rated 1000 amperes per square inch cross sectional area maximum, braced for 100,000 rms amperes minimum.
2. Neutral Bus: Copper with lugs for connection of neutral conductors.
3. Ground Bus: Copper with terminals for equipment grounding conductors.
4. Terminals: As specified in Section 26 0519 - Building Wire and Cable.

- D. Finish: Degrease, clean, phosphatize, prime, and finish cabinets, deadfront panels, and doors with baked enamel, color ASA-61, or standard factory grey. Galvanized cabinets are acceptable for flush cabinets.

E. Nameplates:

1. Provide a nameplate identifying panelboard in accordance with 26 0100 - General Requirements for Electrical Work.
2. Provide a manufacturer's nameplate on the deadfront interior panel indicating panelboard type, voltage rating, current rating and manufacturer's name.

- F. Directory: Provide a directory card which fits into slots in the back of the panelboard. Protect directory with non-yellowing clear plastic.

- G. Manufacturer: Westinghouse (Pow-R-Line 2), General Electric, Square D.

H. Circuit Breakers:

1. Provide circuit breakers for miscellaneous branch circuits with frame sizes and ratings as shown on the plans.
2. Bolt-on, thermal magnetic, molded case, with inverse time current overload, and instantaneous magnetic trips, trip-free and trip-indicating all poles of multi-pole device shall operate simultaneously during open, close and trip operations. Provide circuit breakers indicated with the following ratings:

Panel Type	Circuit Breaker Frame Size	Trip Rating (Amperes)	Voltage (Ac Rating)	Symmetrical AC Interrupting Capacity
1	100/1 pole	15-100	120	10,000 Min
	100/2 & 3 poles	15 – 100	240	10,000 Min
	150/2 & 3 poles	110 - 150	240	18,000 Min
	225/3 poles	125 - 225	240	22,000 Min

- I. Manufacturer: Eaton Cutler-Hammer (Pow-R-Line 2), General Electric, Square D.

PART 3 – EXECUTION

3.1 BRANCH CIRCUIT PANELBOARDS

- A. Mount panelboard so that the top is 6 feet-6 inches above the finished floor.
- B. Neatly terminate conductors onto breaker, ground bus and neutral bus. Train conductors in an organized grouping with conductors fanning out at the circuit terminals, bundled in the wireways and laced with plastic ties.
- C. Identify all conductors with a circuit number and phase color.
- D. Type all panelboard directories.
- E. Provide a minimum of three (3) 3/4 inch empty conduits into accessible ceiling space.
- F. Provide insulated grounding bushings on all conduits which enter the cabinet and bond to ground bus.
- G. Install conduits in a vertical line, perpendicular to the cabinet.

END OF SECTION

SECTION 26 27 26 – WIRING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide electrical materials, installation and testing for the interior improvements in El Capitan High School – Stadium Upgrades.

1.2 DESCRIPTION

- A. This section describes requirements for wiring devices and connections.

1.3 RELATED WORK

- A. Section 26 01 00 – General Requirements for Electrical Work.
- B. Section 26 05 26 – Grounding.

1.4 REFERENCE STANDARDS

- A. NECA 1 – Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2000.
- B. NEMA WD 1 – General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2005).
- C. NEMA WD 6 – Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association; 2002.
- D. CEC – California Electrical Code; most recent edition.

1.5 SUBMITTALS

- A. Submit manufacturers' data and shop drawings in accordance with Section 01 33 00.
- B. Provide submittals for items listed documenting compliance with specification requirements.
- C. Product Data:
 - 1. Electrical Materials: Manufacturer's current published catalog sheets.

PART 2 – PRODUCTS

2.1 ALL WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.2 WIRING DEVICES

- A. Provide UL listed wiring devices, ivory or color selected by Engineer, with voltage

and current ratings specified and wire terminations designed to contain stranded conductors. Provide grounding type receptacles. Provide RED color for all wiring devices connected to the emergency power system.

- B. Provide 120 volt single and duplex receptacles which meet Federal Specification W-C-596 as listed:

- 1. SPECIFICATION GRADE - COMMERCIAL (DESIGNER)

	HUBBELL	PASS & SEYMOUR	LEVITON
NEMA 5-20R single	#2161	#26342	#16351
NEMA 5-20R duplex	#2162	#26342	#16352

- C. Provide receptacles other than 120 volt single and duplex as indicated on drawings.

- D. Provide 20 amp AC quiet type switches which meet federal specification W-C596 with voltage ratings to suit branch circuit requirements indicated and as listed:

	HUBBELL	PASS & SEYMOUR	LEVITON
Single Pole	1221	20AC	1221
Double pole	1222	5952	1222
Three Way	1223	20AC3	1223
Four Way	1224	5954	1224
SPST Momentary	1557	5935	1257

- E. Listed manufacturers establish a standard of quality. Substitutions will be considered in accordance with Section 26 01 00 – General Requirements for Electrical Work.
- F. Key Switches: Equivalent to listed switches, activated with removable key.
- G. Switch with Pilot Light: Leviton #5226, Bryant #6405, G.E. #7945, or equal.
- H. Wall Plates: Type 302 stainless steel, satin finish, minimum 0.040 inch thick, single or multiple gang.

PART 3 – EXECUTION

3.1 WIRING DEVICES

- A. Connect wiring devices to circuits indicated using side or back wiring terminals, designed to contain stranded wire.
- B. Connect green grounding pigtail from receptacles to outlet box with screw.
- C. Install wiring devices flush with the device plate fronts.
- D. Align plates plumb with wall, and cover opening, without use of "jumbo" plates.

END OF SECTION.

SECTION 26 50 00 – LIGHTING

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. Requirements of Divisions 00 and 01 and Section 26 05 00 apply to all the work of this Section.
- B. Contractor shall provide all materials, labor, and the means and methods to complete the installation of lighting fixtures as defined by the plans and these specifications.

1.2 REQUIREMENTS

- A. Other Divisions: Requirements of other divisions shall apply to this division as if repeated herein, and should work under this division require any carpentry, supports, excavation, concrete, etc., the appropriate division requirements shall apply. This includes work required for construction of proper stands, bases, and supports for electrical materials and equipment.
- B. Seismic Restraint Requirements: All electrical equipment and materials shall be braced against seismic forces in accordance with California Building Code, Chapter 16A. Provide lateral bracing as required. The field installation shall be subject to the review and approval of the DSA Structural Safety Engineer.
- C. Materials:
 - 1. When specific names are used in connection with materials, they are used as standards only, but this implies no right upon the part of the Contractor to use other materials or methods unless approved as equal in quality and utility by the Architect in writing.
 - 2. Materials and components shall conform to Industry Standard, including:

NEMA	National Electrical Manufacturer's Association
ANSI	American National Standards Institute
ASTM	ASTM International
ICEA	Insulated Cable Engineer's Association
ISO	International Organization for Standardization
 - 3. Samples of fixtures shall be submitted for review if requested.
- D. Shop Drawings, Submittals, and Substitutions: Refer to Section 26 05 00 for detailed submittal requirements.
- E. Guarantee: Acceptance of the contract for this work includes this guarantee: The Contractor guarantees that he has performed the work in accordance with the contract documents. Contractor also agrees to replace or repair, as new, any defective work, materials, or part which may appear within two years of final payment if in the opinion of the Architect or the Owner, the defect is due to workmanship or material.

- F. Warranties, guarantees, certificates, etc. that are furnished and are available for equipment and materials furnished and installed under this section shall be properly filled out as of the date of final payment and shall be delivered to the Engineer.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Furnish fixtures as indicated in Lighting Fixture Schedule on drawings, including hangers, frames, supports, etc., complete, and ready for operation. Accessories such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.
- B. Fixtures mounted against combustible material shall be approved for such installation.
- C. Fixture voltage shall be verified with branch circuiting requirements.
- D. Equipment Identification:
 - 1. Manufacturer's Nameplate: Each item of equipment must have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.2 INTERIOR LIGHTING

- A. Fixture lens shall be Pattern 12 having overall minimum thickness of 0.125" with not over .084 cone penetration. Lenses shall be 100% virgin acrylic with a maximum of 10% regrind.
- B. Doors of fixtures shall be equipped with stainless steel spring-loaded latches.
- C. Recessed Fixtures:
 - 1. Recessed fixtures installed in fire rated ceiling shall have housing approved by the State Fire Marshal. Housing shall be provided under specification division covering ceilings. Details for approval will be submitted by Contractor responsible for ceilings. This Contractor is required to coordinate manufacturer's fixture clearance requirements.
 - 2. Provide plaster frame assemblies for recessed fixtures installed in plaster ceilings. Frames are to be of same manufacturer as lighting fixtures.
 - 3. All recessed fixture trim type and mounting methods shall be compatible with respective ceiling installation. Ceiling construction shall be verified, and fixture submittals shall reflect proper trim type. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR to ensure proper fixture/ceiling mating.

D. Luminaires:

1. Luminaires shall have a color temperature of 3500 K minimum and a CRI of 80.
2. Luminaires must have a minimum L70 lumen maintenance value of 50,000 hours.
3. Luminaire Warranty: Provide a written five-year on-site replacement warranty for material, fixture finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.
 - a. Include finish warranty. Finish warranty to include failure and substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
 - b. Material warranty must include:
 - 1) All drivers.
 - 2) Replacement when more than 10% of LED sources in any lightbar or sub-assembly are defective or non-starting.

E. LED Drivers:

1. Operable at input voltage of 120-277 V at 60 Hz.
2. RoHS compliant.
3. Integral thermal protection that reduces or eliminates the output power in case temperature exceeds a value detrimental to the driver.
4. UL listed for dry or damp locations typical of interior installations.
5. All fixtures shall be fully-dimmable using 0-10 V control unless noted otherwise.
6. Dimmable drivers shall be 0-10 V type. Dimmable LED drivers shall be capable of dimming without LED strobing or flicker across their full dimming range.
7. Drivers shall be rated for the ambient temperatures in which they are located. Fixtures located in areas with direct sunlight or above normal ambient temperatures shall have drivers rated at 65° C minimum.
8. Drivers shall be electronic type, labeled as compliant with radio frequency interference requirements of FCC Title 47, Part 15, and comply with NEMA SSL 1. LED drivers shall have a sound rating of A, have a minimum efficiency of 85% over full dimming range and be rated for a THD of less than 20% at all input voltages.

2.3 EXTERIOR LIGHTING

- A. Exterior fixtures shall be provided with factory applied custom color as selected by Architect. Architect, upon request by Contractor, will furnish color information.
- B. LED Drivers:
 - 1. Drivers shall be rated for the ambient temperatures in which they are located. Fixtures shall be equipped with drivers rated for reliable starting to -20° F.

PART 3 – EXECUTION

3.1 GENERAL

- A. Install fixtures as indicated on drawings, including hangers, frames, supports, etc., complete, and ready for operation.
- B. Contractor shall submit detail of proposed methods of support for approval at time of fixture submittal. All supports for fixtures shall be provided by this Contractor.
- C. Fixtures, lamps, trim, and diffusers shall be clean at final acceptance.

3.2 INTERIOR LIGHTING

- A. Fixtures Installed at Suspended Ceilings:
 - 1. Fixture installation shall not compromise ceiling performance. Ceiling panels shall not be used to support light fixtures.
 - 2. Fixtures installed in lay-in panel ceilings shall be secured to the T-bar system with two 1/8" diameter zinc-plated self-drilling Tek screws at each end. Pointed sheet metal screws are not acceptable. Drill fixture and T-bar runner as required. Locate such that screws do not interfere with door operation.
 - 3. Fixtures weighing 10 pounds or less, both surface and recessed, shall be supported with a minimum of one slack #12 AWG galvanized carbon steel safety wire connected from the fixture housing to the structure above.
 - 4. Fixtures that weigh more than 10 pounds but less than or equal to 56 pounds shall have a minimum of two slack #12 AWG galvanized carbon steel safety wires connected from the fixture housing at diagonal corners and anchored to the structure above.
 - 5. Fixtures that weigh more than 56 pounds shall be independently supported by a minimum of four taut #12 AWG galvanized carbon steel safety wires attached to the fixture housing (one at each corner) and the structure above.
 - 6. Where fixtures are installed end-to-end, and hanger tabs of butting fixtures are in contact with each other, one wire may be shared by butting fixtures.
 - 7. Fixtures mounted from suspended ceilings shall have their outlets and anchors supported by rods or strut assemblies. All such hanger wires, rods,

and struts shall be supported from structural members and shall be attached directly to fixture. Fixture support methods shall be approved by Architect.

8. Recessed fixtures installed at insulated suspended ceilings shall have additional #12 AWG galvanized carbon steel wires installed horizontally to support insulation to leave a minimum 4" air space above fixture. Provide greater air space if required by fixture manufacturer.
 9. Recessed fixtures shall be connected with flexible conduit not over 6' long, to a junction box in the wiring system. Branch circuit conduit shall not be attached to fixture. Fixture shall be removable. Flex connections may be made using UL labeled manufactured whips, 3/8" diameter minimum. Connectors shall be threaded and attach to fixture or box with a locknut. Snap-in connectors are prohibited. Minimum wire size shall be #16 AWG.
- B. All suspended fixtures shall require seismic restraints unless fixtures can swing 45° freely in all directions without contacting obstructions.
- C. Ceiling spacers shall not be used when fixtures are not approved for mounting against combustible material. Material upon which fixtures are mounted shall be of incombustible type and arranged satisfactory to the Architect.

END OF SECTION.

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DIVISION 27 – COMMUNICATIONS

27 20 00 – Data Communications

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SECTION 27 20 00 – DATA COMMUNICATIONS

PART 1 – GENERAL

1.1 INTRODUCTION

A. Scope of Document:

1. The purpose of this document is to provide infrastructure design and installation guidelines for the Merced Unified School District telecommunications and data communication systems centers. The owner of these facilities will be referred to herein as “MUHSD”. These guidelines are both to encourage standardization of data all communication configurations and layouts as well as to provide basic information necessary to cabling contractors and installation firms wishing to bid for installation work within these facilities. These installers shall be referred within this document as “Contractor”.
2. The documentation includes: Product specifications, minimum product performance, structured cabling design considerations and installation guidelines and makes reference to current, accepted low-voltage cabling Standards.
3. In all instances where Standards are cited, it is assumed Installer will have familiarity with and implicitly follow the recommendations of the most current version of the Standard referenced at the time of installation. Compliance with most current Standards is the sole responsibility of the Contractor.
4. Anywhere cabling Standards conflict with National or local electrical or safety codes, Contractor shall defer to NEC and any applicable local codes or ordinances, or default to the most stringent requirements listed by either. Knowledge and execution of applicable codes is the sole responsibility of the Contractor. Any code violations shall be remedied at the Contractor's expense.

B. Scope of Work:

1. Contractor shall provide all labor, materials, tools and equipment required for the complete installation of work called for in the Construction Documents unless explicitly instructed otherwise by MUHSD. All deviations from this must be by written instruction from MUHSD.
2. Contractor shall be solely responsible for all parts, labor, testing, documentation and all other associated processes and physical apparatus necessary to turn-over the completed system fully warranted and operational for acceptance by MUHSD.
3. Contractor shall provide performance verification testing of all installed links using up-to-date and industry accepted test equipment appropriate to the types of links being tested. All testers used shall be factory calibrated within one year of use with references set daily prior to testing.

4. Contractor shall provide valid test data in electronic format and hard copy indicating passing of all installed links according to applicable Standards cited under “Regulatory Requirements” section of this document. MUHSD reserves the right to require more stringent test requirements than those cited in the Standards. Such requirements will be requested in writing prior to installation.
 5. Final acceptance of the installation shall be in writing by MUHSD.
 6. Contractor shall provide all equipment brands and models are specified within this document.
- C. Clarification of specifications and bid documents:
1. Quantities of telecommunications equipment, typical installation details, cable routing conventions and support structure types will be provided as an attachment to this document if applicable.
 2. If bid documents on specific projects appear to be in conflict, Contractor shall obtain formal clarification in writing from MUHSD to resolve the conflict.

PART 2 – REGULATORY REQUIREMENTS

2.1 INDUSTRY STANDARDS

- A. The following industry standards are the basis for the structured cabling system described in this document.
1. ANSI/TIA/EIA
 2. TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard
 3. TIA/EIA-568-B.1 General Requirements
 4. TIA/EIA-568-B.2 Balanced Twisted Pair Cabling Components Standard
 5. TIA/EIA-568-B.3 Optical Fiber Cabling Components Standard
 6. TIA/EIA – 942 Telecommunications Infrastructure for Data Centers
 7. TIA/EIA-569-A Commercial Building Standard for Telecom Pathways and Spaces
 8. TIA/EIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 9. J-STD-607-A Commercial Building Grounding/Bonding Requirements
 10. NFPA
 11. NFPA 70 National Electric Code (NEC)
 12. CSA

13. C22.1-06 Canadian Electric Code (CEC)
 14. ISO/IEC
 15. ISO 11801 Generic Cabling for Customer Premises
- B. If there is a conflict between applicable documents, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.
- C. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project.

2.2 QUALITY ASSURANCE

- A. Cabling System Warranty: A Cable Products Warranty shall provide a complete warranty to guarantee a high performance cabling systems that meet application requirements. The guarantee shall include all cable installed in the structured cabling system. The Cable shall be warranted for a period of at least 25 years.
- B. PANDUIT System Warranty: A **CERTIFICATION PLUS** System Warranty shall provide a complete system warranty to guarantee end-to-end high performance cabling systems that meet application requirements. The guarantee shall include copper connectivity components. The system shall be warranted for a period of at least 25 years.
- C. Product Guarantee:
1. All *General Cable GenSpeed* products have a 25-year guarantee. When installed per TIA or ISO/IEC standards, the *General Cable GenSpeed* Cabling System will operate the application(s) for which the system was designed to support.
 2. In order to qualify for the guarantee, the structured cabling system must be installed per the following:
 - a. Meet all TIA/EIA commercial building wiring standards
 - b. Panduit will provide a single source solution for the end-to-end installation
 - c. Panduit Products must be installed per Panduit instruction sheets by a BICSI certified Installer with minimum agreement of Panduit Certified Installer by Panduit Corp.
 3. Installer: Company specializing in installing products specified in this section with minimum three years documented experience, and with service facilities within 300 miles of project. The Electrical/Telecommunications contractor must be Panduit Corp. approved for cabling and fiber solutions – a qualified BICSI trained installer who also is certified to install Warrantee-able solution by Panduit Corp. A copy of certification documents for each must be submitted with the quote in order

for such quote to be valid.

4. The Electrical/Telecommunications contractor is responsible for workmanship and installation practices in accordance with the Panduit cabling solutions Certified Program. Manufacturer (Panduit) will extend a 25-year Static, Dynamic and Applications Warranty to the end user once the Electrical/Telecommunications contractor fulfills all requirements under the Panduit Cabling Solutions Certified Program. At least 30 percent of the installation and termination crew must be certified by Panduit with a Technicians Level of Training. Also, Panduit must certify 10 percent of the installation and termination crew for Optical Fiber Training.
5. Note: All Networks shall be installed per applicable standards and manufacturer's guidelines.
6. If any *General cable* product fails to perform as stated above, *PANDUIT* will provide new components at no charge.
7. THIS GUARANTEE IS MADE IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE ARE SPECIFICALLY EXCLUDED. Neither seller nor manufacturer shall be liable for any other injury, loss or damage, whether direct or consequential.

PART 3 – QUALITY ASSURANCE

3.1 DIVISION OF WORK

- A. Contractor Qualifications: Any contractor offering a proposal for an MUHSD project must meet the minimum requirements listed below. Contractors shall also provide written, hard copy documentation of these qualifications with their proposals.
 1. Be a Panduit Corp. PCI (Panduit Certified Installer) Design and Installation Contractor.
 2. Have on staff an RCDD or equivalent, with equivalency being at the sole discretion of Panduit Corp.
 3. Have a minimum of 15 years in the communications structured cabling business.
 4. Have design and installation of communications structured cabling systems as their primary line of business.
- B. System Performance Warranty: Contractor shall provide a Panduit CERTIFICATION PLUS System Warranty on all installed copper and fiber permanent links. Such warranty shall provide a complete system warranty to guarantee high end-to-end performance for all applications designed to operate over the class of cabling installed. The guarantee shall include all connectivity components and cable within the permanent link and cover the system for duration of 25 years. If any PanGen product fails to perform as stated above, PANDUIT or General Cable will provide new components at no charge.

C. Approved Products:

1. Approved UTP 4-pair Cable: General Cable
2. Approved Optical Fiber Cable manufacturer: General Cable
3. Approved UTP connector product manufacturer: Panduit
4. Approved Fiber Optic cabinet product manufacturer: Panduit
5. Approved Fiber Optic connectors/splices/couplers: Panduit
6. Approved Rack and Cabinet manufacturer: Panduit
7. Approved Patch Panel manufacturer: Panduit
8. Approved UTP Patch Cord manufacture: Panduit

PART 4 – PRODUCTS

4.1 PRODUCTS

A. Equivalent Products:

1. General Cable shall manufacture all data/telecommunication and fiber optic cable Panduit shall manufacture all products, including but not limited to cable management, faceplates, copper modules, patch panels, racks, 110 blocks, patch cords, labels, grounding lugs and fiber connectivity products for the purpose of this document.
2. Panduit Corp. shall manufacture all data/telecommunication and fiber optic cable.

B. Substitutions – (no exceptions):

1. This is a performance-based single source solution. Therefore, substitutions are highly discouraged. Substitutions must follow the same rigid standards for quality and termination style as those described in section 2.3 and 2.5.
2. Any Contractor wishing to offer structured cabling products other than those specified herein shall submit a request for product substitution in writing no less than 30 days in advance of bid. Written requests for substitution shall be accompanied by all drawings, specification sheets and engineering documents, as well as third party laboratory performance test results proving equivalency in performance and manufacturing style.
3. This written documentation shall be accompanied by samples of the substitution product offered for evaluation. Equal product acceptance must be received in writing.
4. Contractor shall be responsible and assume all costs for removal and replacement of any substituted product installed without prior written

approval. Such costs shall include, but not limited to labor, materials as well as any penalties, fees or costs incurred for late completion.

C. Documentation:

1. Installation documentation must include "as built" drawings. These drawings shall be supplied to the District Office no later than two weeks after completion of the DATACOM installation. Each wall plate shall have a mechanically produced label for visible identification of port number. Hand-written identification will not be acceptable. Each outlet will need to be documented on the "as built".
2. Any deviation from the manufacturer's specifications and guidelines must be noted and submitted by the vendor in writing.

D. Standards & Codes Compliance:

1. Equipment, devices, apparatus, systems and installation provided shall be entirely suitable and safe for each intended application and be in full compliance with applicable standards, requirements, rules, regulations, codes, statutes, ordinances, etc. of municipal, county, state and federal governments.
2. The installation must meet all industry standards and practices. Included but not limited to the following:
 - a. Electronics industries Association / Telecommunications Industries Association (EIA/TIA) 568B.
 - b. Building Industry Consulting Service International (BiCSi) Telecommunications Distribution Methods Manual.
 - c. Electrical and Cabling materials and components shall be U.L. approved.
 - d. All work must comply with current OSHA regulations and with the National Electrical Code.
 - e. All materials, equipment, parts and pieces shall be new. No used, rebuilt, or refurbished material, equipment, parts and pieces shall be accepted.

E. Installation:

1. All cabling must be installed to the latest EIA/TIA 568B standards. All cabling must be installed with proper stress relief and tie down EIA/TIA-TSB 40.
2. All conduit installation must meet all state and local codes.
3. Debris, boxes, leftover cables and trash must be removed from construction site upon completion of work.

4. Unless otherwise noted, all exposed wiring in furnished rooms shall be installed in wire mold surface raceway. No exposed cabling in classrooms.
5. Pull conductors together where more than one is being installed in a raceway or conduit.
6. Use pulling lubricant or compound, where necessary, pulling compound must be water based pulling lubricant that will not deteriorate cable or conduit.
7. No splicing of Data cable is allowed.
8. All wire must meet or exceed national Electrical Code for PVC and Plenum wire. All wire and cable to be furnished and installed by Contractor.
9. All cabling shall be pulled in the highest point possible in the interstitial space above the accessible ceiling space. No cabling is allowed to rest on any ceiling tile or suspension system.
10. If more than one cable is run parallel with another, they must be hung every 5 ft. for support by drive rings or some sort of wire management. The cables must be secured with tie-wraps to the structure every 30 feet.
11. All cable / cabling shall be kept 30 inches away from any heat source; i.e. steam valves, etc. All cables / cabling shall be kept away from moveable mechanical equipment: i.e., dampers, valves, pneumatic tubes, etc. -- thirty (30) inches.
12. Data wiring must be at least: Five (5) inches from power lines 2kVA or less, Twelve (12) inches from fluorescent lighting and power lines 2 and 5kVA, Thirty-six (36) inches from power lines greater than 5kVA, Forty (40) inches from transformers and motors.
13. Where High Voltage is present in interstitial space, cables shall be kept away from the conduits as far as possible. Where possible, cables must cross AC power at 90-degree angles.
14. Fire and smoke partition and wall penetrations must be sleeved with conduit.
15. Cables shall be pulled free of sharp bends or kinks. Cables shall not be pulled across sharp edges. Cables shall not be forced or jammed between metal parts, assemblies, etc.
16. Cables shall not be pulled across access doors and pull box covers. Access to all equipment and systems must be maintained.
17. Termination of cables shall be of a high level of workmanship and satisfy Cat. 6A specifications for termination.
18. All UTP cable runs shall be less than 310 ft. and rated by the manufacturer to be certified for the latest compliance standard.

F. Copper Cable: For Data Applications

1. Recommended design shall include:
 - a. Minimum one Four-pair 100 ohm, 23 AWG, UTP cable—Category 6A for data
 - b. Maximum cable length is 90 meter
 - c. All cable shall meet or exceed the following specifications

2. The General Cable Mosaic Crossblock Twisted Pair Copper Cable (Cat 6A) shall be used for the horizontal cabling subsystem. These requirements are for cables of unshielded 23 AWG bare copper conductors, insulated with thermoplastic, twisted into pairs and enclosed in a thermoplastic jacket. Mosaic Crossblock™ is a thin tape made up of individual metallic blocks separated by an insulating layer. Since there is no metal-to-metal contact, there is no path for current to flow longitudinally, and thus, no need for grounding. The Flex-Separator™ optimizes internal pair geometry to yield superior electrical performance and maintain flexibility. This unique cross-web stabilizes each pair to create a smaller, round cable profile. The finished cable shall exceed the following requirements of the EIA-568-B.2. and ISO 11801 edition 2.0 for class cable requirements. All cable shall conform to the requirements for communications circuits defined by the National Electrical Code (Article 800) and the Canadian Building Code. Cable listed to NEC Article 800-51(a) will be used for “Plenum” installations and carry labeling of CMP. Cable listed to NEC Article 800-51(b) shall be installed in vertical runs penetrating more than one floor and carry the labeling of CMR.

3. A test report is provided indicating the Master reel number, the date of the test, and test results for RL, Attenuation, Crosstalk. Power Sum may be listed as Pass/Fail. Characteristic impedance shall be shown for each pair.

Part Number	Category	Colors
7131849	General Mosaic Riser	White
7133850	General Mosaic Plenum	White

- G. Copper Voice Cable: Category 6 UTP cable shall meet ANSI/TIA/EIA-568-B.2-1 and IEC 61156-5 Category 6 component standards. The conductors shall be 24 AWG copper insulated with HDPE polymer. The copper conductors shall be twisted in pairs, separated by a cross divider and covered by a low smoke zero halogen or flame retardant PVC jacket.

Part Number	Description	Colors
7131800	Genspeed 6	Blue

H. Copper Outside Plant:

Part Number	Description	Colors
7136100	Genspeed 6 OSP	NA

I. Fiber Optic Cable:

1. Fiber Cable: When using optical fiber cables, any length of horizontal cables, work area cables, patch cords, and equipment cables is acceptable so long as the total of the combined lengths does not exceed 100m (328 ft.). When installing per TSB72, the maximum cable length may not exceed 300m (984 ft.).
2. Fiber Optic Hardware:
 - a. MUHSD fiber cable requirement is General cable part numbers:
 - b. **AQ0061ANU.BK** Singlemode fiber (For Additional constructions and part numbers, please contact local General Cable Representative)

J. Termination Hardware (Data Jacks):

1. Category 6A Enhanced Unshielded Twisted Pair (UTP): Four-pair Category 6A UTP cabling shall be terminated onto a four-pair Category 6A module. All modules shall be terminated using the T568B (B) wiring scheme. The eight-position module shall exceed the connector requirements of the TIA/EIA Category 6A standard. The jack termination to 4-pair, 100 ohm solid unshielded twisted pair cable shall be accomplished by use of a forward motion termination cap and shall not require the use of a punchdown or insertion tool.

Part Number	Style	Category	Colors
CJ6X88TGI**	RJ45	6A	Grey

**indicates color

Category 6 Unshielded Twisted Pair

Part Number	Style	Category	Colors
CJ688TGBU**	RJ45	6	Blue

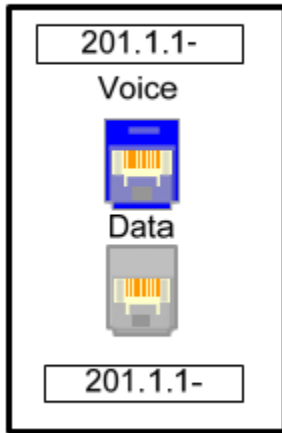
**indicates color

K. Faceplates:

1. The faceplate shall be ivory and labeled above each jack; numbers shall coincide with patch panel numbers.
2. Provide dust covers for each blank outlet.

L. Typical MUHSD Faceplate:

Typical MUHSD Faceplate



M. Equipment Racks:

1. Hoffman Swingout rack; the part number are as follows:
 - a. E19SWM20U24 Description 42” Wall mounted swingout rack

N. Patch Panels and Wire Management:

1. Category 6A Enhanced Unshielded Twisted Pair (UTP): Four-pair Category 6A UTP cabling shall be terminated onto a four-pair Category 6A module. All modules shall be terminated using the T568B (B) wiring scheme. The eight-position module shall exceed the connector requirements of the TIA/EIA Category 6A standard. The jack termination to 4-pair, 100 ohm solid unshielded twisted pair cable shall be accomplished by use of a forward motion termination cap and shall not require the use of a punchdown or insertion tool.

Part Number	Style	Category	Colors
CJ6X88TGIG	RJ45	6A	Grey

**indicates color

2. Copper Patch Cords:

Part Number	Length (ft)	Length (M)
UTP6X3BU	3	0.91
UTP6X5YL	5	1.52
UTP6X7	7	2.13

** Designates color

3. Standard MiniCom Patch Panels:

Part Number	Description
CPP24FMWBLY	Flat 24 port in 1 RU
CPP48FMWBLY	Flat 48 port in 2 RU

O. Patch Cords: Data

1. *TX6A™ PLUS* Patch Cords shall be used between the cabinets and all copper termination locations within the data center. The patch cords shall be factory terminated with modular plugs featuring a one-piece, tangle-free latch design and black strain-relief boots to support easy moves, adds and changes. They shall be constructed with Category 6A 23-AWG stranded UTP cable. Each patch cord shall be 100% performance tested at the factory in a channel test to the Category 6A standard. The patch cords shall come in standard lengths of three, five, seven, ten, fourteen, and twenty feet and six colors of Black, Blue, Green, Red, Yellow and Off White.

Part Number	Length (ft)	Length (M)
UTP6X3BU	3	0.91
UTP6X5YL	5	1.52
UTP6X7	7	2.13

** Designates color

P. Patch Cords: Voice. For use with VoIP Phones

Part Number	Length (ft)
UTPSP3Y	3

- Q. Wireless Access Points: Cisco Meraki MR46. Verify with District IT prior to ordering.
- R. Network Switch: Cisco Meraki MS390-48UX. Verify with District IT prior to ordering.
- S. Surveillance Camera: Meraki MV72x. Verify with District IT prior to ordering.

PART 5 – CABLING RACKS, CABINETS AND MANAGERS

5.1 CABLING

- A. Wall Mount Rack: Hoffman Part number: E19SWM20U20
- B. Overhead/Underfloor Cable Routing: Contractor shall be responsible for sizing all pathways such that newly installed cable represents not more than a 35% fill as per manufacturer's directions. Overfilled pathways are the sole responsibility of the Contractor who shall remove and reinstall at Contractor's expense.
- C. Overhead Cable Routing – Metal Ladder Rack: Overhead cable distribution overhead shall be done using a layered system comprised of steel ladder rack in combination with a plastic trough system. The metal ladder rack shall be Hoffman ladder rack. Part number LSS_BLK 12", 18" & 24" straight length.
- D. Fiber Optic Patch Cords: The modular connectors and patch cords will be chosen to match the horizontal cabling medium and rating. The same manufacturer shall provide the modular connectors and patch cords. The total patch cord length at the work area is not to exceed 3 meters (10 ft). Exception: When implementing an open office cabling system as specified under TIA/EIA TSB-75 (see section 3.4).
- E. Fiber Optics:
 - 1. Optical Fiber Cable: Panduit Corp. FSDP5xxxY
 - 2. Efficient packaging of higher fiber counts
 - 3. Lightweight and easy to handle during installation
 - 4. Cable design and flexible buffer tubes allow for quick breakout and ease of routing
 - 5. High quality buffering offers ease of stripping while maintaining optical performance
 - 6. Sheath markings provide positive identification and length verification
 - 7. Extends life cycle and reduces cost of ownership
 - 8. Low attenuation designs increase network reliability and performance
 - 9. Multimode/singlemode hybrid designs extend life cycle and reduce cost of ownership

10. Indoor/outdoor designs meet specific application requirements Higher fiber count cable provides application flexibility
11. The PANDUIT MINI-COM® Network Cabling System shall be used for the Work Area subsystem, including all modular connectors. The network cabling system shall be comprised of PANDUIT Fiber Optic modular work area adapters in support of high-speed networks and applications designed for implementation on multimode (both
12. 62.5/125 and 50/125 m) glass fiber cabling. All outlets shall utilize interchangeable and individual connector modules that mount side by side to facilitate quick and easy moves, adds, and changes. Approved components of the Fiber Termination Hardware for the Work Area Subsystem shall include but are not limited to:
 - a. SC, and LC Style Connectors
13. Panduit Optical Fiber Patch Cords shall match existing on the site. They shall come in standard lengths.

F. Fiber Optic Termination Hardware: The hardware shall match existing on the site.

PART 6 – TESTING AND ACCEPTANCE

6.1 TESTING

A. General:

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B-1 Section 11. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the PANDUIT® CERTIFICATION PLUSSM System Warranty guidelines and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

B. Copper Channel Testing: All twisted-pair copper cable links shall be tested for compliance to the requirements in ANSI/TIA/EIA/568-B.2 Section 11 for the appropriate Category of cabling installed.

C. Fiber Testing:

1. All installed fiber shall be tested in accordance with ANSI/TIA/EIA-568-B.2 section 11.

2. For horizontal cabling system using multimode optical fiber, attenuation shall be measured in one direction at either 850 nanometer (nm) or 1300 nm using an LED light source and power meter.
3. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for single mode) in Both directions.
4. Test setup and performance shall be conducted in accordance with ANSI/TIA/EIA-526-14 Standard, Method B.
5. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
6. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.

D. System Documentation:

1. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Engineer/End User for approval. Documentation shall include the items detailed in the subsections below.
2. Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor shall provide copies of the original test results.
3. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.
4. Test Results documentation shall be provided in electronic format within three weeks after the completion of the project. The media shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will

also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

5. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-B. The appropriate level III tester shall be used to verify Category 6 cabling systems.
6. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. Alternately, the telecommunications contractor may furnish this information in electronic form. The media shall contain the electronic equivalent of the test results as defined by the specification along with the software necessary to view and evaluate the test reports.
7. 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 documented.
8. The As-Built drawings are to include cable routes and outlet locations. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD rel. 14) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.
9. The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (AutoCAD rel. 14) form.

E. Grounding and Bonding:

1. A Telecommunications Grounding Busbar (TGB) shall be located in each telecommunications space. The TGB will be grounded/earthed to the Telecommunications Main Grounding Busbar (TMGB).
2. The TMGB shall be bonded to building steel and grounded/earthed to the electrical service ground according to J-STD-607-A guidelines. Each TGB shall be bonded to building steel and the electrical panel serving equipment in the telecommunications space.
3. The gauge of the connecting ground/earth cable, known as the Telecommunications Bonding Backbone (TBB) will follow J-STD-607-A guidelines, as is shown in the table below.

Sizing of the TBB	
TBB Length in Linear meters (feet)	TBB Size (AWG)
Less than 4 (13)	6
4-6 (14-20)	4

4. Route the TBB to TGB in as straight a path as possible. The TBB should be installed as a continuous conductor, avoiding splices where possible. Use PANDUIT part number series HTWC to tap into the TBB where necessary. When more than one TBB is used, bond them together using the TGBs on the top floor and every third floor in between with a conductor known as a grounding equalizer (GE). Use the J-STD-607-A guidelines for sizing of the TBB when sizing the GE (shown in the table above).

F. Components, Kits and Hardware:

1. PANDUIT® STRUCTUREDGROUND™ Grounding System (STRUCTUREDEARTH™ Earthing System) kits, components, and hardware shall be used to construct the grounding/earthing system.
2. Use PANDUIT GB4 series BICSI/J-STD-607-A telecommunications grounding busbars for the TMGB, which is ideally located at the AC service entrance. Use a PANDUIT GB2 series busbar for the TGB in each of the other telecommunications/equipment spaces throughout the building. Use PANDUIT LCC-W series lugs when connecting conductors to the TMGB and TGB

G. Construction of the Grounding/Earthing System:

1. Avoid routing grounding/earthing conductors in metal conduits. If the grounding/earthing conductor must be routed through a metal conduit, bond each end of the conduit to the grounding/earthing conductor. Use PANDUIT GPL series grounding clamps to bond to the conduit, a PANDUIT HTWC HTAP with clear cover to bond to the grounding/earthing conductor, and a #6 AWG copper conductor to connect the GPL grounding clamp to the HTWC HTAP.
2. In telecommunications spaces with a small number of racks or cabinets, it may be most convenient to bond the grounding/earthing jumper cable directly to the TGB.

H. The Need for Labeling:

1. Proper labeling is crucial to the successful management of data center infrastructure.
2. Labeling in the data center provides two very important benefits - determining locations of components and defining the system connections. This determining and defining allow quick, clear communication required to

accurately install, maintain, and repair critical infrastructure components resulting in efficient and reliable data center performance.

I. Cabinet/Rack Labeling:

1. The floor tile designations are used to identify each cabinet or rack in the data center. The cabinet/rack location is based on which floor tile the right front corner of the cabinet/rack rests upon. Cabinets and racks should have location labels applied to the top and bottom of both the front and rear of the device. These labels should be visible whether doors are closed or opened on the cabinets.



2. A typical cabinet/rack label would have the following scheme:
 - a. **THIS IDENTIFIER WOULD DEFINE THAT THE CABINET/RACK IS LOCATED WITH ITS RIGHT FRONT CORNER AT THE INTERSECTION OF ROW AB AND COLUMN 04.**
3. Cable/Rack Label Recommendation

Printer Type	Laser/Inkjet	LS8	Desktop Thermal
Label Area	2.00 x 1.00	2.00 x 1.00	2.00 x 1.00
Label P/N	C200X100YJJ	C200X100YPC	C200X100YPT

J. Panel Labeling:

1. Once the cabinet/rack identifiers are established then the various panels in the cabinet/rack should be identified. The designation for the panel positions in a cabinet/rack can be either an alphabetic designation or a two-digit number that represent the rack unit number (RU) where the top-left mounting screw lands in the cabinet/rack. Using the RU method provides the data center manager with greater flexibility since it allows for panels and equipment to be added or removed later and not disrupt the designation of panel identifiers.



2. A typical panel label would have the following scheme:

a. **201.1.1-...201.1.2 etc...**

3. Panel Label Recommendation:

Printer Type	Laser/Inkjet	LS8	Desktop Thermal
Label P/N	C100X050YJJ	C100X050YJC	C100X050YJT

K. Port Labeling:

1. Now that cabinets/racks and panels in each rack are identified the next task is to establish identifiers for each port on a panel. Port identifiers are very important in that they will define the connectivity of cabling within the data center infrastructure. Many patch panels come from the factory with numbers already screen-printed above the ports. If this is the case then there is no need to relabel those patch panels. If the patch panels are not pre-printed with port numbers then labels will need to be created to identify the port numbers. The numbering sequence should proceed from left to right and top to bottom for all ports on a patch panel.
2. The number of digits used for all numbers on a patch panel should be consistent with the total number of ports on that patch panel.
3. For example, a 48-port patch panel should be labeled 01 through 48 and a 144-port patch panel should be labeled 001 through 144.



4. A typical port label for MUHSD would have the following scheme:

a. 201.1.1....201.1.2 etc...

L. Port Label Recommendations:

Printer Type	Laser/Inkjet				
Cable Type	Copper	Copper	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Non-Adhesive	Non-Adhesive	Adhesive
Number of Ports	4	6	4	6	n/a
Label P/N	C261X030 FJJ	C379X030 FJJ	C261X035 Y1J	C390X030 Y1J	C350X100YJJ

Printer Type	LS8				
Cable Type	Copper	Copper	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Non-Adhesive	Non-Adhesive	Adhesive
Number of Ports	4	6	4	6	n/a
Label P/N	C252X030 FJC	C379X030 FJC	C261X035 Y1C	C390X030 Y1C	T100X000YPC -BK

Printer Type	Desktop Thermal		
Cable Type	Copper	Copper	Fiber
Label Style	Adhesive	Adhesive	Adhesive
Number of Ports	4	6	n/a
Label P/N	C252X030YPT	C379X030YPT	C350X100YJT

M. Patch Panel Connectivity:

1. Patch Panel connectivity is considered the most important area of infrastructure labeling in that it defines the critical connections between ports on patch panels and equipment. This information defines the connections between the near-end ports and the far-end ports. This labeling can define the connection of a range of ports on a panel or just define the connection for two individual ports.



2. A typical patch panel connectivity label would have the following scheme:
 - a. 201.1.1-....201.1.2 etc....
3. Recommended Patch Panel Connectivity Labels

Printer Type	Laser/Inkjet		
Media	Copper	Copper	Fiber
Ports	4 or less	more than 4	n/a
Label P/N	C252X030FJJ	C379X030FJJ	C350X100YJJ

Printer Type	LS8		
Media	Copper	Copper	Fiber
Ports	4 or less	more than 4	n/a
Label P/N	C252X030FJC	C379X030FJC	T100X000VJC-BK

Printer Type	Desktop Thermal		
Media	Copper	Copper	Fiber
Ports	4 or less	more than 4	n/a
Label P/N	C252X030YPT	C379X030YPT	C350X100YJT

N. Labeling for other Systems: In addition to the data, connections there are many other systems in a data center that require labeling.

O. Grounding and Bonding:

1. Labeling of the grounding and bonding system involves the identification of the main grounding busbar, grounding busbars, conductors connecting busbars, conductors connecting devices to busbars, and equalizing conductors.
2. The typical scheme for the main grounding busbar would be:
 - a. **1-B301-TMGB**
3. This identifier can be decoded to define that this is the main telecommunications grounding busbar located on floor 1 in space B301.
4. The typical scheme for a grounding busbar would be:
 - a. **2-R201-TGB**

5. This identifier can be decoded to define that this is the telecommunications grounding busbar on floor 2 in space R201. Recommended Telecommunications Grounding Busbar Labels

Printer Type	Laser/Inkjet	LS8	Desktop Thermal
Label P/N	C400X200YJJ	C200X100YPC	C400X200YPT

6. The typical scheme for the busbar connections would be:

a. **1-B301-TMGB/2-R201-TGB**

7. This identifier can be decoded to define that this is the conductor that connects the main telecommunications grounding busbar located on floor 1 in space B301 to the telecommunications grounding busbar on floor 2 in space R201.

8. Recommended Busbar Connections Labels

Printer Type	Laser/Inkjet				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075YA J	S100X125YA J	S100X225YA J	S100X400YA J	S100X650YA J

Printer Type	LS8				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VA C	S100X125VA C	S100X225VA C	S100X400VA C	S100X650VA C

Printer Type	Desktop Thermal				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VA T	S100X125VA T	S100X225VA T	S100X400VA T	S100X650VA T

P. Power Cables:

1. Labeling of the power system involves the labeling of the cables feeding power outlet units (POU) with information defining the source of power to the POU. This information would include the distribution panel and the circuit that feeds the POU.
2. A typical scheme for the power labeling would be:
3. **AB03A-PP21-15**
4. This identifier can be decoded to define that this is the power cable that connects POU A located in rack/cabinet AB03 to circuit breaker 15 in power panel 21.
5. **Recommended Power Cable Labels**

Printer Type	Laser/Inkjet				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075YA J	S100X125YA J	S100X225YA J	S100X400YA J	S100X650YA J

Printer Type	LS8				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VAC	S100X125VAC	S100X225VAC	S100X400VAC	S100X650VAC

Printer Type	Desktop Thermal				
Cable Diameter	18-14 AWG	12-10 AWG	8-4 AWG	2-1 AWG	1/0-250 MCM
Marker Type	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating	Self-Laminating
Label P/N	S100X075VAT	S100X125VAT	S100X225VAT	S100X400VAT	S100X650VAT

END OF SECTION

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 15 00 – Integrated Access Control Hardware Devices
28 31 00 – Fire Alarm Integrated Safety System

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SECTION 28 15 00 – INTEGRATED ACCESS CONTROL HARDWARE DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes access control door hardware for the following:
1. Swinging doors.
 2. Other doors to the extent indicated.
- B. Section includes, but is not necessarily limited to, the following for the integrated access control security and site management system:
1. Electrified and Integrated Access Control Card Key Door Hardware
- C. Related Sections include the following:
1. Section 08 11 13 – Hollow Metal Doors and Frames.
 2. Section 08 71 00 – Finish Hardware.
 3. Division 26 – Electrical, for connections to electrical power system and for low-voltage wiring work.
 4. Section 27 20 00 – Data Communication for connections to the LAN.
 5. Section 28 31 00 – Fire Alarm System, for connections to building fire alarm system.
- D. References:
1. CBC – California Building Code.
 2. CEC – California Electrical Code.
 3. NFPA 80 – Fire Doors and Windows.
 4. NFPA 101 – Life Safety Code.
 5. NFPA 105 – Installation of Smoke Door Assemblies.
- E. Products installed, but not provided under this Section include the following. Coordination to remain a requirement of this Section.

1. Security or High Security keyed cylinders, including provisions for temporary construction keying, for mechanical override at access control locking hardware to be furnished under Section 08 71 00 – Finish Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. System Operational Descriptions: Complete system operational narratives for the integrated access-controlled openings defining the owner's prescribed requirements for the opening functionality. Narratives include, but are not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions, and interfaces with other building control systems.
- C. Shop Drawings: Details of electrified integrated locking hardware and access control firmware, indicating the following:
 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication and control of the access control system electrified hardware and firmware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access-controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 2. Electrical Coordination: Coordinate with related Electrical Sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Proof of Certification: Upon request provide a copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary access control components.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete access control and site management installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and telephone number of the supplier/integrator providing the installation and the nearest service representatives for each item of equipment included in the system. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
 1. As-Built Drawings: During system installation, the Contractor to maintain a separate hard copy set of drawings, elevation diagrams, and wiring diagrams of the access control system to be used for record drawings. This set to be

kept up to date by the Contractor with all changes and additions to the access control system accurately recorded.

- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum of five (5) years of documented experience in providing access control and security systems equipment and software similar to that indicated for this Project and that have a proven record of successful in-service performance.
 - 1. Software and access control systems components to have been previously and thoroughly tested together with proven installations similar in size and functionality to the design requirements indicated for this Project.
- B. Supplier Qualifications: Supplier/Dealers, verifiably authorized and in good standing with the primary product manufacturers, with a minimum of three (3) years of experience supplying integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance.
 - 1. ASSA ABLOY access control products are required to be supplied only through designated “Authorized Channel Partners.”
 - a. List Qualified ACP Companies
- C. System Integrator Qualifications: Systems Integrators, verifiably factory trained and certified by the primary product manufacturers, with a minimum of three (3) years documented experience installing complete integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance. Qualifications include, but are not necessarily limited, to the following:
 - 1. References: Provide a list of references for similar projects including contact name, phone number, name and type of project.
 - 2. Professional Staffing: Firms to have a dedicated access control systems integration department with full time, experienced professionals on staff experienced in providing on site consulting services for both electrified door hardware and integrated access control systems installations.
 - 3. Factory Training: Installation and service technicians are to be competent factory trained and certified personnel capable of maintaining the system.
 - 4. Service Center: Firms to have a service center capable of providing training, in-stock parts, and emergency maintenance and repairs at the Project site with 24-hour/7-days a week maximum response time.
- D. Installer Qualifications: Certified technicians, verifiably authorized with the primary product manufacturers for installation of IP-Enabled, Wireless, and Power-over-

Ethernet Access Control products in accordance with documented instructions and NFPA 80.

1. ASSA ABLOY access control products are required to be installed only through designated "Preferred Installers" with Intertek Qualified Hardware Installer certification.
 2. Installation technicians are authorized by Intertek to apply supplemental serialized labels to Warnock-Hersey fire-rated openings modified after access control hardware has been installed.
- E. Source Limitations: Obtain the access control door hardware, system firmware and application software specified in this Section from a single source, qualified supplier/integrator unless otherwise indicated.
1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 2. Provide integrated access control door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
1. Comply with NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1.
 3. Comply with NFPA 101 "Life Safety Code" for doors in a means of egress.
 4. Comply with NFPA 80 "Fire Doors and Windows" for fire labeled opening assemblies.
 5. The installed access control system shall conform to all local jurisdiction requirements.
- G. Keying Conference: Reference Section 08 71 00 – Finish Hardware – Addendum # 1.
- H. Pre-Submittal Conference: Conduct conference in compliance with requirements in Section 01 31 19 – Project Meetings with attendance by representatives of Supplier/Dealer, Systems Integrator, and Contractor to review proper methods and procedures for receiving, handling, and installing the access control system hardware. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedules.

1. Inspect and discuss Division 26 electrical roughing-in and similar preparatory work performed by other trades.
2. Review and verify sequence of operation descriptions for each unique access-controlled opening.
3. Review and finalize construction schedule and verify availability of materials.
4. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store electronic access control hardware, software or related accessories at Project site without prior authorization.
 1. Access control firmware and software: Where approved and directed, inventory upon receipt and store electronic access control equipment in a secure, temperature and humidity controlled environment in original manufacturer's sealed containers.
- B. Tag each item or package separately with identification related to the final Access Control Door Schedule, and include basic installation instructions with each item or package.
- C. Deliver permanent keys, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner established at the "Pre-Submittal Conference".

1.6 COORDINATION

- A. Coordinate quantity and arrangement of assemblies with ceiling space configuration and with components occupying ceiling space, including structural members, pipes, air-distribution components, raceways, cable trays, recessed lighting fixtures, and other items.
- B. Access Control System Electrical Coordination: Coordinate the layout and installation of scheduled electrified door hardware, and related access control equipment, with required connections to source power junction boxes, power supplies, detection and monitoring hardware and fire alarm system.
 1. Door Hardware Interface: The card key access control system to interface and be connected to electronic door control hardware (electromechanical locks, electric strikes, magnetic locks, door position switches, other monitoring contacts, and related auxiliary control devices) as described under Section 08 71 00 – Finish Hardware – Addendum # 1. Coordinate the installation and configuration of specified door hardware being monitored or controlled with the controls, software and access control hardware specified in this Section.
- C. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing electrified door hardware and access control system components. Check Shop Drawings of other

work to confirm that adequate provisions are made for locating and installing access control system hardware to comply with indicated requirements.

- D. Door and Frame Preparation: Related Division 08 Sections for doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of the installed access control system hardware and software that fails in materials or workmanship, including all related parts and labor, within specified warranty period after final testing and acceptance by the Owner. Failures include, but are not limited to, the following:
1. Structural failures including excessive deflection, cracking, or breakage.
 2. Faulty operation of the hardware.
 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods (Electrified Access Control Door Hardware):
1. Two years for Electrified, Wiegand Output, and IP-Enabled Access Control Door Hardware.
- E. Maintenance Support and Extended Service Agreement: Submit for Owner's consideration an optional extended Service Agreement for the installed access control system, including support for software related issues. The extended Service Agreement is considered elective and is without manufacturer's requirement stipulating mandatory coverage for owner and/or vendor system support.
1. A published copy of this agreement to be included with the submittal package
 2. Support for the installed access control system components is provided through the vendor under a 24 hour technical assistance program.
 3. Access control and management system components are to be available on a one-day turn around time frame from the manufacturer.

4. Primary systems manufacturer to offer and provide remote modem or internet access for direct factory support to the vendor. The factory level support to include diagnostics and troubleshooting support on systems related issues at no additional cost to the owner.
- F. Access Control Software Upgrades: Version upgrades and "fix" releases to the access control system software are available at no extra charge as long as the version of software provided under this specification remains the current manufacturer's version or for up to (2) years after a new version release.
1. Major access control software revisions that provide new functionality to the product provided free of charge for up to one (1) year from the date of substantial completion.
 2. Access control system software is to be upgradable as may be required or as necessary, to expand and manage the owner's site or sites. Upgrades are to be offered at a published flat fee for the primary system software, with single license modules included in the primary fee structure. System upgrades offered at a costing structure based upon the original number of licensed modules issued, or on those to be purchased at a future date, are not allowed.
 3. As part of the submittal package, provide a list of available software upgrades and/or expansions modules. List to identify related costs for upgrades, or expansions to the original system, up to the next qualifying operational level.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of the installed access control system hardware and components.
- B. Maintenance Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance by skilled employees of the Systems Integrator. Include repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

1.9 SCOPE OF WORK

- A. On-Line Electronic Access Control System: Furnish and install at the indicated locations the specified electrified and integrated door hardware and access control firmware and software for a completely operational access control and security site management system. System includes, but is not necessarily limited, to the following:
1. Electrified integrated card reader locks and exit hardware, permanent and temporary override cylinders, network control processors, reader controller panels, I/O monitor/control interfaces, door position switches, remote card readers, keypads, and display terminals, access cards and credentials, system application software, special tools, operating manuals, and required

cabling and accessories as detailed below and listed in the Access Control Hardware Sets at the end of Part 3.

- a. Provide the appropriate number of reader controller panels and I/O monitoring/control expansion interfaces as needed to handle the number of card readers, locking devices, door status devices, and identified alarm inputs specified in this section, and as shown on the security drawings.
 - b. Provide manufacturer approved integrated card reader locks, exit hardware, and remote mounted card readers, keypads, and display terminals that are functionally compatible with the specified access control equipment interfaces.
2. Access control system equipment to be installed in an enclosure box compatible with the specified components. This enclosure to include, but is not necessarily limited to, the network control processor, I/O monitor/control interface panels, power supplies, terminal strips, wire ducts, keyed lock cylinder, integrated outlet for A/C power, and standoffs.
- a. Enclosure box to be located in the designated IT/Telecom room(s) with connection to local area network for communication back to the central server host.
3. Owner to provide the following:
- a. Central server host computer, client workstations, and hardware peripherals to be from an approved, major line computer manufacturer. Specific information detailing compliance with system requirements to be included in the project submittal package as specified.
 - b. Owner will be responsible for ensuring that each computer hardware component includes the required interfaces, expansion boards, and peripherals that will be necessary to allow the system to operate as described within this specification and as indicated on the drawings.
 - c. Power Sourcing and Network Switches: Quantity as required to accommodate installed access control (and video surveillance) devices.
 - d. Network Control Processor Connections:
 - i. LAN/Ethernet communication ports (jacks) and network interface cards as needed, CAT5e cabling from network router/switch to network control processor, outlet and cover plates and/or patch cables required for network connection within each designated IT/Telecom room.
 - ii. Required static IP addresses.

4. Power Supplies, including battery back up and separately fused surge protection, required for the electrified door hardware and access control equipment.
5. Installation, final configuration and commissioning of electrified door and access control system hardware, communication firmware, power supplies and related accessories.
6. System application software including installation, programming, and end user training of the access control system demonstrating operating, repair, and maintenance procedures. Include no fewer than 8 hours of on-site central server training for designated personnel (facilities maintenance, security, IT, administration) by a factory certified representative.
7. Provide manufacturer required power controllers, interface boards, and programming that may be required for approved electric latch retraction exit devices supplied under Section 08 71 00 – Finish Hardware – Addendum # 1.
8. Electrical contractor, Division 26, to provide the following:
 - a. Source power wiring (120VAC) as required for the electrified locking and access control hardware, equipment, accessories and power supplies. This includes quad outlets as required on a dedicated circuit in the designated IT/Telecom room(s) and the related conduit, stub-in, junction boxes and connectors required for the source power delivery and connections.
 - b. Provide required conduit, stub-in, junction and back boxes for both the electrified locking hardware and access control equipment at each of the access controlled or monitored openings per plan drawings and specs. Supply and install conduit between each of the aforementioned devices and between the electrical junction boxes, power supplies and access control equipment located on or above the door opening.
 - i. At wall mounted remote readers, provide conduit on the secured side of the door, 36" from the finish floor and 6" from the edge of the frame, to the related power supplies and access control equipment.
 - ii. At electrical hardware power transfers provide conduit on the secured side of the opening from the power transfer, thru-wire hinge, or serviceable panel location on the frame jamb to the related power supplies and access control equipment.
 - c. Electrical Contractor to provide all 120VAC cabling connections and terminations from the electrical junction boxes to these electrical devices.
9. Access Control System Integrator to provide the following: Low voltage wiring (12/24VDC) and communication cabling (RS-232/RS-485) from network control processors to reader controllers, I/O monitor/control interface panels,

electrified and integrated locking hardware, remote card readers, keypads, or display terminals, monitoring and signaling switches, and power supplies. Work includes related connectors, final terminations, and hook-ups required for a complete and functional access-controlled opening in accordance with applicable codes and specified system operational narratives.

10. Full and seamless integration of the site intrusion alarm service if applicable, with the installed site access control system software.
11. Final connections to fire alarm system, if required, by electrical and fire alarm system contractors.
12. Provide permits, submittals and approvals required by the authority having jurisdiction, prior to commencing with work.
13. Provide manufacturer required power controllers, interface boards, and programming that may be required for approved electric latch retraction exit devices supplied under Section 08 71 00 – Finish Hardware – Addendum # 1.
14. Electrical contractor (Division 26) to provide the following:
 - a. Provide required conduit, stub-in, junction and back boxes for both the electrified locking hardware and access control equipment at each of the access controlled or monitored openings per plan drawings and specs. Supply and install conduit between each of the aforementioned devices and between the electrical junction boxes, power supplies and access control equipment located on or above the door opening.
 - i. At off-line remote readers, provide conduit on the secured side of the door, 36" from the finish floor and 6" from the edge of the frame, to the related power supplies and access control equipment.
 - ii. At electrified hardware power transfers provide conduit on the secured side of the opening from the power transfer, thru-wire hinge, or serviceable panel location on the frame jamb to the related power supplies and access control equipment.
 - b. Electrical Contractor to provide all 120VAC cabling connections and terminations from the electrical junction boxes to these electrical devices.
15. Access Control System Supplier to provide the following: Low voltage wiring (12/24VDC) for the electrified locking hardware, remote card readers, monitoring and signaling switches, and power supplies. Work includes related connectors, final terminations and hook-ups required for a complete and functional access controlled opening in accordance with applicable codes and specified system operational narratives.
16. Typical System Requirements (Owner Provided): Central server host computer, client workstations, and hardware peripherals to be from an

approved, major line computer manufacturer. Specific information detailing compliance with system requirements to be included in the project submittal package as specified.

PART 2 – PRODUCTS

2.1 POWER OVER ETHERNET ACCESS CONTROL

- A. IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Cylindrical Lock: IP enabled, PoE ANSI/BHMA A156.2 Grade 1 bored lockset with integrated credential reader and request-to-exit signaling in one complete unit. Motor driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated cylinder override.
1. Completely intelligent and integrated locking unit with Ethernet power and communication connection capability directly from the locking unit back to the central system host server without additional access control interfaces or components (excluding PoE Endspan and Midspan devices) via an existing or newly installed IEEE 802.3af PoE enabled network.
 2. Open architecture design supports wired integration with third party access control systems applications via software development kit (SDK). Real-time software accessible alarms for forced door, unknown card and door held open, with inside lever handle (request-to-exit), battery status, tampering, and door position (open/closed status) monitoring.
 3. 2,400 users and 10,000 event transaction history (audit trail). Distributed intelligence allows stand-alone operation in absence of network communication allowing for system operational redundancy.
 4. Provide a network and lock configuration CD tool kit for initial lock setup and programming via a USB connection.
 5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 6. Integrated reader supports the following credentials:
 - a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
 - b. 13.56 MHz contactless credentials: HID iClass, HID iClass SE, HID iClass Seos, SIO on MIFARE Classic, SIO on MIFARE DESFire EV1, MIFARE Classic, DESfire EV1, NFC-enabled mobile phones, Bluetooth Smart-enabled mobile phones.
 7. Optional push-button keypad for PIN only usage or dual authentication requirements.
 8. Communication between access control system and device is protected by AES 128 bit encryption via the SDK. Programmable for time zones, holidays, and automatic unlocking.

9. Power and communication from one Ethernet (CAT5e or higher) cable. Compliant with 802.3af Class 1 device specifications requiring 3.84 watts for Power over Ethernet.
 10. Supports real-time system lockdown capabilities.
 11. High security mechanical key provides emergency override retraction of latchbolt without need for electronic activation.
 12. Ethernet system framework, network cabling, mounting boxes, PoE end-span/mid-span, electrical hard wiring, grounding, and connections are required for complete system functionality. All system components are by others and are specified elsewhere.
 - a. Power Requirement: PoE Class 2, maximum 7 watts.
 - b. Network Cabling Requirements: Cat5e or higher meeting or exceeding ANSI/TIA/EIA-568-C. 24 AWG Plenum rated.
 - c. Bonding and Grounding: Meet or exceed TIA-607-B requirements. Connect device ground cable to building electrical earth ground.
 - d. Network Surface Mount Box: Meet or exceed ANSI/TIA/EIA-568-C requirements. Cat5e or higher (RJ45).
 13. Manufacturers:
 - a. Sargent Manufacturing (SA) – IN220-10 Line Series.
 - b. No Substitution.
- B. IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Exit Hardware: IP enabled, PoE ANSI/BHMA A156.3 Grade 1 rim and mortise exit device hardware with integrated credential reader, touchbar monitoring, and request-to-exit signaling in one complete unit. Motor driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or fire exit hardware for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override trim.
1. Completely intelligent and integrated locking unit with Ethernet power and communication connection capability directly from the locking unit back to the central system host server without additional access control interfaces or components (excluding PoE Endspan and Midspan devices) via an existing or newly installed IEEE 802.3af PoE enabled network.
 2. Open architecture design supports wired integration with third party access control systems applications via software development kit (SDK). Real-time software accessible alarms for forced door, unknown card and door held open, with push rail (request-to-exit), battery status, tampering, and door position (open/closed status) monitoring.

3. 2,400 users and 10,000 event transaction history (audit trail). Distributed intelligence allows stand alone operation in absence of network communication allowing for system operational redundancy.
4. Provide a network and lock configuration CD tool kit for initial lock setup and programming via a USB connection.
5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
6. Integrated reader supports the following credentials:
 - a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
 - b. 13.56 MHz contactless credentials: HID iClass, HID iClass SE, HID iClass Seos, SIO on MIFARE Classic, SIO on MIFARE DESFire EV1, MIFARE Classic, DESfire EV1, NFC-enabled mobile phones, Bluetooth Smart-enabled mobile phones.
7. Optional push-button keypad for PIN only usage or dual authentication requirements.
8. Communication between access control system and device is protected by AES 128 bit encryption via the SDK. Programmable for time zones, holidays, and automatic unlocking.
9. Power and communication from one Ethernet (CAT5e or higher) cable. Compliant with 802.3af Class 1 device specifications requiring 3.84 watts for Power over Ethernet.
10. Supports real-time system lockdown capabilities.
11. High security mechanical key provides emergency override retraction of latchbolt without need for electronic activation.
12. Ethernet system framework, network cabling, mounting boxes, PoE end-span/mid-span, electrical hard wiring, grounding, and connections are required for complete system functionality. All system components are by others and are specified elsewhere.
 - a. Power Requirement: PoE Class 2, maximum 7 watts.
 - b. Network Cabling Requirements: Cat5e or higher meeting or exceeding ANSI/TIA/EIA-568-C. 24 AWG Plenum rated.
 - c. Bonding and Grounding: Meet or exceed TIA-607-B requirements. Connect device ground cable to building electrical earth ground.
 - d. Network Surface Mount Box: Meet or exceed ANSI/TIA/EIA-568-C requirements. Cat5e or higher (RJ45).

13. Manufacturers:

- a. Sargent Manufacturing (SA) – IN220 - 80 Series.
- b. No Substitution.

2.2 CABLES AND WIRING

- A. Comply with Section 27 20 00 – Data / Voice Structured Cabling System and Data Communication.
- B. Data Line Supervision: System to include alarm initiation capability in response to opening, closing, shorting, or grounding of data transmission lines.
- C. Install appropriate number of conductor pairs, in the wire gage (AWG) recommended by manufacturer, corresponding to the electronic locking functions specified, amperage drawn and distances covered between the power supplies, power transfer devices, electrified hardware and access control equipment.

2.3 ACCESS CONTROL HARDWARE FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying temporary protective coverings before shipping.
- C. Where specified, finishes on integrated card key locksets or exit hardware to incorporate an FDA recognized antimicrobial coating (i.e., MicroShield™) listed for use on equipment as a suppressant to the growth and spread of a broad range of bacteria, algae, fungus, mold and mildew.
- D. BHMA Designations: Comply with base material and finish as specified.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of the installed access control system.
- B. Examine roughing-in for electrical source power to verify actual locations of wiring connections before electrified and integrated access control door hardware installation.
- C. Examine roughing-in for LAN and control cable conduit systems to PCs, controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
- D. Notify architect of any discrepancies or conflicts between the specifications, drawings and scheduled access-controlled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Doors and frames at scheduled access-controlled openings to be properly prepared to receive specified electrified and access control hardware and connections without additional in-field modifications.

3.3 INSTALLATION

- A. Install each item of electronic integrated door hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
- B. Mounting Heights: Mount electronic integrated door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
- C. Boxed Power Supplies: Verify locations.
 - 1. Configuration: Provide the least number of power supplies required to adequately serve doors with access control hardware and equipment.
- D. Final connect the system control switches (integrated card key locking hardware, remote readers, keypads, display terminals, biometrics), and monitoring, and signaling equipment to the related Controller devices at each opening to properly operate the electrified door and access control hardware according to system operational narratives.
- E. Retrofitting: Install each door hardware and access control item to comply with manufacturer's published templates and 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 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- F. System Application Software: Install, and test application(s) software and databases for the complete and proper operation of systems involved. Assign software license(s) to Owner.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Section 01 77 00 – Project Closeout. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
- B. Commissioning and Testing Schedule: Prior to final acceptance of the access control system installation, the following testing and documentation to be performed and provided to the Owner.
1. Inspection: Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
 2. Pre-testing: Program and adjust the system and pretest all components, wiring, and functions to verify they conform to specified requirements. Provide testing reports indicating devices tested, pass/fail status, and actions taken to resolve problem(s) on failed tests.
 3. Acceptance Test Schedule: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
 4. Provide “as designed” drawings showing each device and wiring connection and electronic enclosure legends indicating cabling in and out.
 5. Provide a complete set of operating instructions for access control hardware devices and a complete software user manual. The documentation includes module reference guides for each electronic enclosure.

3.5 ADJUSTING

- A. Adjust and check each operating item of integrated access control door hardware, and each door opening to ensure proper secured operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by access control system installation.
- B. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure access control door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Engage an authorized systems manufacturer representative to train Owner's maintenance personnel to adjust, operate, and maintain electronic integrated door hardware and the access control system.

3.8 ACCESS CONTROL HARDWARE SETS

- A. The access control system hardware sets listed below represent the design intent and direction of the owner, architect, and security consultant (as applicable). They are intended as a guideline only and should not be considered a detailed opening schedule. Discrepancies, conflicting, and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted

items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. Refer to Section 08 71 00 – Finish Hardware, for hardware sets.

END OF SECTION.

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SECTION 28 31 00 – FIRE ALARM INTEGRATED SAFETY SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. Drawings and conditions of the contract, including but not limited to General Conditions, and the Special Conditions listed below, apply to work of this section.
1. Supplementary Instructions to Bidders.
 2. Supplementary Conditions.
 3. Summary of the Work.
 4. Project Coordination.
 5. Cutting and Patching.
 6. Definitions and Standards.
 7. Submittals.
 8. Schedules and Reports.
 9. Temporary Facilities.
 10. Security Regulations.
 11. Safety and Health.
 12. Products.
 13. Project Closeout.
 14. Section 26 01 00 – General Requirements of Electrical Work and Section 26 05 34 – Conduit.

1.2 PROJECT/WORK IDENTIFICATION

- A. Project Name and Location: El Capitan High School Stadium Upgrades – Merced CA
- B. Contract documents indicate the work of the contract, related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the contract documents include, but are not necessarily limited to, the following:
1. Existing site conditions and restrictions.
 2. Other work prior to work of contract.
 3. Alterations and coordination with existing work.

4. Other work to be performed concurrently by Owner.
5. Other work to be performed concurrently by separate contractors.
6. Other work subsequent to work of Contract.
7. Requirements for occupancy by Owner prior to completion of work of contract.

1.3 SUMMARY – FIRE

- A. This performance specification provides the minimum requirements for the Life Safety System. The system shall include, but not limited to all equipment, materials, labor, documentation and services necessary to furnish and install a complete, operational system to include but not limited to the following functions:
 1. Smoke and fire detection.
 2. Sprinkler suppression system monitoring and control.
 3. Off-premise notification.
 4. Smoke control.
 5. Releasing Service

1.4 PROJECT REPRESENTATIVES

- A. All contacts with the Project Building shall be directed to the Owner's Representative, hereafter referred to as the Architect.

1.5 INTERPRETATION

- A. No interpretations of the meaning of the bid documents will be made to any bidder orally. Each request for such interpretation shall be made to the engineer in writing, addressed to the Architect of Record.
- B. Written requests for interpretation will be received until 10 days prior to bid date.

1.6 MANUFACTURER

- A. Acceptable fire alarm system manufacturers include:
 1. Wheelock for new voice evacuation system, Simplex for initiation and notification devices, and System Sensor for notification devices. Existing networked fire alarm control panels are Simplex 4100 ES
 2. All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system and smoke control system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of

the complete system.

3. The contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

1.7 ALTERNATES – FIRE

- A. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed and will accommodate the future requirements and operations of the building owner. All specified operational features must be met without exception.
- B. The authorized representative of the manufacturer of the major equipment shall be responsible for the satisfactory installation of the complete system.
- C. All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling system, access control, and smoke control. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- D. All control panel assemblies and connected field appliances shall be provided by the same system supplier and shall be designed and tested to ensure that the system operates as specified. The system shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, as described in this specification.
- E. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.
- F. The equipment to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
- G. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
- H. The supplier shall furnish evidence that the proposed or alternate system performance is equal or superior to the system operation stated in the specification. Such evidence shall be submitted to and accepted by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
- I. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written and the supplier feels the proposed system will accomplish the intent of the

paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point by point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.

- J. The acceptability of any alternate proposed system shall be the sole decision of the Owner or his authorized representative.

1.8 REFERENCES

A. Definitions and abbreviations – general:

1. ADA: Americans with Disabilities Act.
2. AFF: Above Finished Floor.
3. AHJ: Authority Having Jurisdiction.
4. Approved: Unless otherwise stated, materials, equipment or submittals approved by the Authority or AHJ.
5. Circuit: Wire path from a group of devices or appliances to a control panel or transponder.
6. CPU: The central computer of a multiplex fire alarm or voice command control system.
7. CRC: Card Reader Controller
8. CRT: Cathode Ray Tube.
9. FACP: Fire Alarm Control Panel.
10. FCC: Fire Command Center.
11. FSCP: Firefighter's Smoke Control Panel
12. HVAC: Heating Ventilating and Air Conditioning.
13. IDC: Initiating Device Circuit.
14. LED: Light Emitting Diode.
15. LCD: Liquid Crystal Display.
16. NFPA: National Fire Protection Association.
17. NAC: Notification Appliance Circuit.
18. NCP: Local Network Control Panel.
19. PTR: Printer.
20. RCP Remote Control Panel
21. SLC: Signaling Line Circuit.
22. Style 1: As defined by NFPA 72, Class B.
23. Style 4: As defined by NFPA 72, Class B.
24. Style 6: As defined by NFPA 72, Class A.
25. Style 7: As defined by NFPA 72, Class A.
26. Style B: As defined in NFPA 72, Class B.
27. Style D: As defined in NFPA 72, Class A.
28. Style Y: As defined in NFPA 72, Class B.
29. UL or ULI: Underwriters Laboratories, Inc.
30. UL Listed: Materials or equipment listed and included in the most recent edition of the UL Fire Protection Equipment Directory.
31. Zone: Combination of one or more circuits or devices in a defined building area, i.e. 3 horn circuits on a floor combined to form a single zone.

1.9 CODES – GENERAL

- A. All work and materials shall conform to all applicable Federal, State and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the Engineer for resolution. National standards shall prevail unless local codes are more stringent. The bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the Engineer.
- B. System components proposed in this specification shall be ULI listed to operate together as a system. The supplier shall provide evidence, with his submittal, of listings of all proposed equipment and combinations of equipment. The supplier shall be responsible for filing of all documents, paying all fees (including, but not limited to plan checking and permit) and securing all permits, inspections and approvals. Upon receipt of approved drawings from the authority having jurisdiction, the supplier shall immediately forward two sets of drawings to the Owner. These drawings shall either be stamped approved or a copy of the letter stating approval shall be included.
- C. CODES – FIRE
1. The equipment and installation shall comply with the current provisions of the following codes and standards:
 - a. CEC – 2022 California Electric Code®
 - b. NFPA 72 – 2022 National Fire Alarm Code®
 - c. NFPA 90A – 2018 Air Conditioning Systems
 - d. NFPA 92A – 2015 Smoke Control Systems
 - e. NFPA 92B – 2015 Smoke Management Systems in Malls, Atria, and Large Areas
 - f. NFPA 101 – 2015 Life Safety Code®
 - g. UL 864 – Control Units for Fire Protective Signaling Systems.
 - h. UL 268 – Smoke Detectors for Fire Protective Signaling Systems.
 - i. UL 268A – Smoke Detectors for Duct Applications.
 - j. UL 217 – Single and Multiple Station Smoke Alarms
 - k. UL 521 – Heat Detectors for Fire Protective Signaling Systems.
 - l. UL 228 – Door Closers-Holders, With or Without Integral Smoke Detectors.
 - m. UL 464 – Audible Signaling Appliances.
 - n. UL 38 – Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems
 - o. UL 346 – Waterflow Indicators for Fire Protective Signaling Systems.
 - p. UL 1971 – Signaling Devices for the Hearing-Impaired.
 - q. UL 1481 – Power Supplies for Fire Protective Signaling Systems.
 - r. UL 1711 – Amplifiers for Fire Protective Signaling Systems.
 - s. UL 1635 – Digital Alarm Communicator System Units
 - t. Department of State Architect
 - u. California State Fire Marshall
 - v. Federal Codes and Regulations
 - w. Americans with Disabilities Act (ADA)
 - x. Factory Mutual (FM) approval
 - y. International Standards Organization (ISO)
 - z. ISO-9000

- aa. ISO-9001
- bb. Electromagnetic Compatibility Requirements

1.10 SYSTEM DESCRIPTION

- A. General – Fire: The Contractor shall furnish all labor, services and materials necessary to furnish and install a complete, functional fire alarm system(s). The System(s) shall comply in respects with all pertinent codes, rules, regulations and laws of the Authority, and local jurisdiction. The System shall comply in all respects with the requirements of the specifications, manufacturer's recommendations and Underwriters Laboratories Inc. (ULI) listings.
- B. It is further intended that upon completion of this work, the Owner be provided with:
 - 1. Complete information and drawings describing and depicting the entire system(s) as installed, including all information necessary for maintaining, troubleshooting, and/or expanding the system(s) at a future date.
 - 2. Complete documentation of system(s) testing.
 - 3. Certification that the entire system(s) has/have been inspected and tested, is/are installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is/are in proper working order. Fire Alarm System shall be tested only when the system is 100% complete. Contractor shall use "Fire Alarm System Certification and Description" as required by Section 1-6.2 of NFPA 72 - 2022 edition.
 - 4. Manufacturer supplied training to allow district personnel to access and program Fire Alarm system.

1.11 DESCRIPTION – FIRE

- A. Provide and install an addition to existing fire detection and alarm system. Add new voice evacuation system panel.

1.12 SEQUENCE OF OPERATIONS

- A. General:
 - 1. Upon the alarm activation of any area smoke detector, heat detector, manual pull station, the following functions shall automatically occur:
 - 2. The internal audible device shall sound at the control panel or command center.
 - 3. The LCD display shall indicate all applicable information associated with the alarm condition including; zone, device type, device location and time/date.
 - 4. All system activity/events shall be documented on the system printer.
 - 5. Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.

6. Activate notification audible. Notification upon activation of a carbon monoxide detector shall be descriptively annunciated such that audible notification for fire alarm is different than notification for carbon monoxide alarm.
7. Activate visual strobes notification appliances. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
8. Transmit signal to the central station with point identification.
9. Activate automatic smoke control sequences.
10. All automatic events programmed to the alarm point shall be executed and the associated outputs activate
11. All self-closing fire/smoke doors held open shall be released.
12. Transmit alarm text messages to "alpha-numerical" display pagers.

B. Supervisory Operation:

1. Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
2. The internal audible device shall sound at the control panel or command center.
3. The LCD display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
4. All system activity/events shall be documented on the system printer.
5. Any remote or local annunciator LCD/LED's associated with the supervisory zone shall be illuminated.
6. Transmit signal to the central station with point identification.

C. Trouble Operation:

1. Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
2. The internal audible device shall sound at the control panel or command center.
3. The LCD keypad display shall indicate all applicable information associated with the trouble condition including; zone, device type, device location and time/date.
4. All system activity/events shall be documented on the system printer.

5. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.
6. Transmit signal to the central station with point identification.

D. Monitor Activation:

1. Upon activation of any device connected to a monitor circuit, the following functions shall automatically occur:
2. The internal audible device shall sound at the control panel or command center.
3. The LCD display shall indicate all applicable information associated with the status condition including; zone, device type, device location and time/date.
4. All system activity/events shall be documented on the system printer.
5. Any remote or local annunciator LCD/LED's associated with the status zone shall be illuminated.

1.13 SYSTEM CONFIGURATION

- A. General: All Life Safety System equipment shall be arranged and programmed to provide the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
- B. Power Supply: Standby power supply shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for 5 minutes in the alarm mode at 100% load. The system shall include a charging circuit to automatically maintain the electrical charge of the battery. The system shall automatically adjust the charging of the battery to compensate for temperature.
- C. Display: The main display interface shall show the first and most recent highest priority system events without any operator intervention. All system events shall be directed to one of four message queues. Messages of different types shall never intermix to eliminate operator confusion. A "Details" switch shall provide additional information about any device highlighted by the operator.
- D. Initiating Device Circuits: Initiating device circuits monitoring manual fire alarm stations, smoke and heat detectors, duct detectors, carbon monoxide detectors, shall be Class B (Style "A" or "B").
- E. Notification Appliance Circuits: All notification appliance circuits shall be Class B (Style "Y"). All notification appliance circuits shall have a minimum circuit output rating of: 2 amps @ 24 vdc. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.

F. Signaling Line Circuits:

1. When a signaling line circuit covers more than one fire/smoke compartment, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments. The signaling line circuit connecting network panel/nodes, annunciators, command centers, shall be Class A (style 7). The media shall be copper except where fiber optic cable is specified on the drawings.
2. The signaling line circuit connecting to addressable/analog devices including, detectors, monitor modules, control modules, isolation modules, intrusion detection modules and notification circuit modules shall be Class B (style 4).
3. The signaling line circuit connecting to the audio communications (pre-amp signal), amplifiers, and nodes shall be Class B (style 4). The circuit shall be power limited.
4. The signaling line circuit connecting to the two-way communications circuit (riser) shall be Class B (style 4).
5. DACT – existing.

1.14 SUBMITTALS

A. Project:

1. The contractor shall purchase no equipment for the system specified herein until the owner has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The contractor shall submit three (3) complete sets of documentation within 30 calendar days after award of purchase order.
2. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the contract documents. In addition the Contractor shall provide specific notation on each shop drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.
3. All drawings and diagrams shall include the contractor's title block, complete with drawing title, contractor's name, and address, date including revisions, and preparer and reviewer's initials

- B. Product Data: Data sheets with the printed logo or trademark of the manufacturer for all equipment. Indicated in the documentation will be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Architect/Engineer.

- C. Shop Drawings: A complete set of shop drawings shall be supplied. The shop drawings shall be reproduced electronically in digital format. This package shall include but not be limited to:
1. Control panel wiring and interconnection schematics.
 2. Complete point-to-point wiring diagrams.
 3. Riser diagrams.
 4. Complete floor plan drawing locating all system devices and 1/4' = 1'-0 scale plan and elevation of all equipment in the Fire Command Station. Including showing the placement of each individual item of fire alarm, security, and access control equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.
 5. Detailed system operational description. Any Specification differences and deviations shall be clearly noted and marked.
 6. Complete system bill of material.
 7. All drawings shall be reviewed and signed off by an individual having a minimum of a NICET certification in fire protection engineering technology, subfield of fire alarm systems.
- D. Samples: A sample of each smoke detector, intelligent modules, horn, strobes, card reader controller, card reader, and door locking mechanism shall be provided to the contractor for their familiarization.
- E. Quality Assurance /Control Submittals:
1. Installer's Certification:
 - a. The engineered systems distributor must be licensed in the state of project location and have been incorporated in the business in that state for a minimum of 5 years.
 - b. Submit a copy of the system supplier's training certification issued by the manufacturer of the integrated life safety system, and a copy of the installing technician's NICET certification.
- F. System Calculations: Complete calculations shall be provided which show the electrical load on the following system components:
1. Each system power supply, including stand alone booster supplies.
 2. Each standby power supply (batteries).
 3. Each notification appliance circuit.
 4. Each auxiliary control circuit that draws power from any system power supply.

G. Close Out:

1. Two (2) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance. The close out submittals shall include:
 - a. Project specific operating manuals covering the installed integrated life safety system. The manual shall contain a detailed narrative description of the system architecture, inputs, notification signaling, auxiliary functions, annunciation, sequence of operations, expansion capability, application considerations and limitations. Manufacturer's data sheets and installation manuals/instructions for all equipment supplied. A generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement.
2. As-Built drawings consisting of: a scaled plan of each building showing the placement of each individual item of the Integrated Life Safety System equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway. All drawings must reflect point to point wiring, device address and programmed characteristics as verified in the presence of the engineer and/or the end user unless device addressing is electronically generated, and automatically graphically self-documented by the system. Supply one set of asbuilt drawings, to be installed in lockable print holder (tube style) located at Main FACP, on site.
3. All drawings shall be provided in standard .DXF format. A vellum plot of each sheet shall also be provided.
4. The application program listing for the system as installed at the time of acceptance by the building owner and/or local AHJ (disk, hard copy printout, and all required passwords).
5. Provide the name, address and telephone of the authorized factory representative.
6. A filled out Record of Completion per NFPA 72, 2022 edition 7.8.2.
7. Provide a detailed test report of the final commissioning of the Fire Alarm System. Report shall include the number of devices installed within each building.

1.15 QUALITY ASSURANCE

A. Qualifications of Contractor – Fire:

1. The contractor shall have successfully installed similar system fire detection, evacuation voice and visual signaling control components on a previous project of comparable size and complexity. The owner reserves the right to reject any control components for which evidence of a successful prior installation performed by the contractor cannot be provided.
2. The contractor shall have in-house engineering and project management capability consistent with the requirements of this project. Qualified and

approved representatives of the system manufacturer shall perform the detailed engineering design of central and remote control equipment. Qualified and approved representatives of the system manufacturer shall produce all panel and equipment drawings and submittals, operating manuals. The contractor is responsible for retaining qualified and approved representative(s) of those system manufacturers specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.

B. Pre-installation requirements:

1. The provider shall submit a detailed project plan that will describe in detail how the provider will approach the project, from inception to finalization. The plan must include at a minimum the following information:
 - a. Project Staging
 - b. Project Management
 - c. Equipment Schedules
 - d. Installation Timelines
 - e. Other Trade Requirements
 - f. Final Acceptance Testing
 - g. Personnel Resumes
 - h. Progress Report Sample
2. All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the manufacturer's riser/connection diagram and details for all specific system installation/termination/wiring data.

C. Start and Completion Dates: The starting and completion dates for this work will be established at the pre-bid meeting.

1.16 DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall be responsible for all receiving, handling, and storage of his materials at the job site.
- B. Use of loading docks, service driveways, and freight elevators shall be coordinated with the Owner.

1.17 PROJECT CONDITIONS

- A. It shall be the Contractor's responsibility to inspect the job site and become familiar

with the conditions under which the work will be performed. Inspection of the building may be made by appointment with the Owner. Contractors are requested to inspect the building prior to the pre-bid meeting.

- B. A pre-bid meeting will be held to familiarize the Contractors with the project. Failure to attend the pre-bid meeting may be considered cause for rejection of the Contractor's bid. The minutes of this meeting will be distributed to all attendees and shall constitute an addendum to these specifications.
- C. The Contractor shall be responsible for prior coordination of all work and demolition with the Owner.

1.18 WARRANTY AND MAINTENANCE

- A. Spare Parts – Fire: The Contractor shall supply the following spare parts:
 - 1. Automatic detection devices: Two (2) percent of the installed quantity of each type.
 - 2. Manual fire alarm stations: Two (2) percent of the installed quantity of each type.
 - 3. Audible and visible devices: One (1) percent of the installed quantity of each type, but no less than two (2) devices.
 - 4. Keys: A minimum of three (3) sets of keys shall be provided and appropriately identified.
- B. Warranty:
 - 1. The contractor shall warranty all materials, installation and workmanship for one (1) year from date of acceptance, unless otherwise specified. A copy of the manufacturer's warranty shall be provided with closeout documentation and included with the operation and installation manuals.
 - 2. The System Supplier shall maintain a service organization with adequate spare parts stock within 25 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor.

1.19 TRAINING

- A. The System Supplier shall schedule and present a minimum of 8 hours of documented formalized instruction for the building owner, detailing the proper operation of the installed System.
- B. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
- C. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.

- D. Instruction shall be made available to the Local Municipal Fire Department if requested by the Local Authority Having Jurisdiction.

PART 2 – PRODUCTS

2.1 MANUFACTURER – FIRE

- A. The manufacturer of the system equipment shall be regularly involved in the design, manufacture, and distribution of all products specified in this document. These processes shall be monitored under a quality assurance program that meets the ISO 9000 requirements.
- B. All System components shall be the cataloged products of a single supplier. All products shall be listed by the manufacturer for their intended purpose.
- C. All control panel assemblies and connected field appliances shall be both designed and manufactured by the same company, and shall be tested and cross-listed as to ensure that a fully functioning is designed and installed. The system supplied under this specification shall be a microprocessor-based direct wired, multi-priority peer-to-peer networked system. The system shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, and modules as described in this specification.

2.2 PANEL COMPONENTS & FUNCTIONS

- A. General – Fire: The control panel is existing – Simplex 4100ES.

2.3 FIELD MOUNTED SYSTEM COMPONENTS

- A. Fire Initiating Devices: Analog Addressable Smoke – General
 1. Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. In addition to the five sensitivity levels the detector shall provide a pre-alarm sensitivity setting, which shall be settable in 5% increments of the detector's alarm sensitivity value.
 2. An alternate alarm sensitivity level shall be provided for each detector, which can be set to any of the five (5) sensitivity settings manually or automatically using a time of day event. In addition to the five alternate sensitivity levels the detector shall provide an alternate pre-alarm sensitivity setting, which shall be settable in 5% increments of the detector's alternate alarm sensitivity value.
 3. The detector shall be able to differentiate between a long drift above the prealarm threshold and fast rise above the threshold.
 4. The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal that 75% to 99% compensation has been used. The detector shall provide a dirty fault signal that 100% or greater

compensation has been used.

5. The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

B. Heat Detectors: Fixed Temperature and Fixed Temperature/ROR Heat Detector

1. Rated at 140 degrees F, for ordinary areas where normal ceiling temperature does not exceed 100 degrees F, or rated 190 degrees F, for up to 150 degrees F, ceiling temperatures.
2. Detectors shall use restorable elements.
3. Quantity and spacing:
 - a. Smooth ceilings: In accord with UL rating.
 - b. Non-smooth ceilings: In accord with CSFM's requirements.
 - c. High hazard areas: As indicated.
4. Layout is based on 30 feet spacing for fixed-type and 50 feet spacing for combination type for smooth ceiling.
5. Provide in areas required by NFPA 72E or as directed by an Owner's Representative.
6. Detector means of testing detector at detector and from CPU.
7. Detector with a flashing status indicating LED for visual supervision. When detector is actuated, flashing LED will latch on steady and at full brilliance.
8. Base capable of accepting analog output sensor.

2.4 NOTIFICATION APPLIANCES

- A. Low Profile Horn: Provide low profile wall mount horns at the locations shown on the drawings. The horn shall provide an 84 dBA sound output at 10 ft. when measured in reverberation room per UL-464. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. The horn shall mount in a North American 1-gang box.
- B. Low Profile Horn-Strobes: Provide low profile wall mount horn/strobes at the locations shown on the drawings. The horn/strobe shall provide an audible output of 84 dBA at 10 ft. when measured in reverberation room per UL-464. Strobes shall provide synchronized flash outputs. The strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd & 110cd devices. The horn shall have a selectable steady or synchronized

temporal output. In and out screw terminals shall be provided for wiring. Low profile horn/strobes shall mount in a North American 1-gang box.

- C. Low Profile Strobes: Provide low profile wall mounted strobes at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Strobes shall provide synchronized flash outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd, or 110cd devices. Low profile strobes shall mount in a North American 1-gang box.
- D. General:
1. All appliances which are supplied for the requirements of this specification shall be UL Listed for Fire Protective Service and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA (AG)), and shall be UL 1971 Listed.
 2. All appliances shall be of the same manufacturer as the fire alarm control panel specified to ensure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.
 3. Any appliances that do not meet the above requirements and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purpose intended. All strobes shall be provided with lens markings oriented for wall mounting.
 4. All notification appliances shall be red unless noted otherwise on the drawings.

2.5 INITIATION & CONTROL MODULES

- A. Monitor Module: Provide addressable control monitor circuit modules at the locations shown on the drawings.
- B. Notification Appliance Circuits: Provide addressable notification appliance circuit modules at the locations shown on the drawings. The module shall provide one (1) supervised Class B notification circuit. The module shall provide polarized audible / visual selection for 24Vdc @ 2amps, audio outputs at 25Vrms @ 50 watts or 70 Vrms @ 35 watts.

2.6 MISCELLANEOUS COMPONENTS

- A. Remote Diagnostic Software: The system shall have the ability to upload its status and sensitivity remotely using either a direct connection or dial-up modem to an owner supplied personal computer. The remote diagnostic software shall be capable of generating sensitivity and system status reports. The utility shall supply data for trend analysis reports using an owner supplied spreadsheet program. The Remote Diagnostic software shall be Windows® based and capable of receiving data from multiple installed life safety systems. The software shall be capable of generating off-

line reports to minimize phone line charges. Use of the remote diagnostic software shall not compromise the functionality of the site-installed software.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install Sequence:

1. Installation of the systems shall be conducted in stages and phased such that circuits and equipment are installed in the following order:
2. Riser conduits, AC power conduits and control cabinets.
3. Fire command center, remote control panel(s), control component(s), annunciator(s), remote CRT terminal(s), and printer(s). Provide temporary mounting of fire command center in <location.>
4. Conduits and wiring for complete notification circuits and appliance installation throughout facility.
5. Pre-test the audible and visual notification appliance circuits.
 - a. Install all new detection devices.
 - b. Terminations between field devices and the associated control equipment.
 - c. The detection system shall be switched over and end of each day the system shall be operational. At no time will the system be placed out of service overnight.
 - d. Complete the interface to the building automation system.
 - e. Complete contractor pre-test of system.
 - f. Complete system testing.

B. General: All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place. Detectors shall not be supported solely by suspended ceilings. Fasteners and supports shall be sized to support the required load.

C. Conductors:

1. The requirement of this section apply to all system conductors, including all signaling line, initiating device, notification appliance, auxiliary function, remote signaling, AC and DC power and grounding/shield drain circuits, and any other wiring installed by the Contractor pursuant to the requirements of these Specifications.
2. All circuits shall be rated power limited in accordance with NEC Article 760.

3. Installed in conduit or enclosed raceway.
4. The existing cable/wiring may be re-used providing they meet the manufacturer's published wiring requirements.
5. All new system conductors shall be of the type(s) specified herein.
6. All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.
7. All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.
8. All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.
9. All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 7 strands shall be permitted for No. 16 and No. 18 conductors, and a maximum of 19 strands shall be permitted for No. 14 and larger conductors.
10. All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.
11. All visual notification appliance circuits shall be 14 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.

D. Conductors and Raceway:

1. Except as otherwise required by, the installation of all system circuits shall conform to the requirements of Article 760 and raceway installation to the applicable sections of Chapter 3 of NFPA 70 – 2020 as amended by 2022 CEC code, National Electrical Code, chapter 12, section 12.2.3, chapter 24, section 24.4.8.5.1 of NFPA 72, and as defined by the manufacturer's UL listing.
2. The entire system shall be installed in a skillful manner in accordance with approved manufacturer's installation manuals, shop drawings and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type required by the CEC and approved by local authorities having jurisdiction for the purpose.
3. Any shorts, opens, or grounds found on new or existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.
4. The contractor shall neatly tie-wrap all field-wiring conductors in the gutter spaces of the control panels and secure the wiring away from all circuit boards and control equipment components. All field-wiring circuits shall be

neatly and legibly labeled in the control panel. No wiring except home runs from life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures. No wiring splices shall be permitted in a control panel enclosure.

5. All penetration of floor slabs and firewalls shall be fire stopped in accordance with all local fire codes.

E. Conduit Raceway:

1. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
2. The requirements of this section apply to all system conduits, raceways, electrical enclosures, junction boxes, pull boxes and device back boxes.
3. All system conduits shall be of the sizes and types specified.
4. All system conduits shall be EMT, 3/4 -inch minimum, except for flexible metallic conduit used for whips to devices only, maximum length 6 feet, 3/4-inch diameter, minimum.
5. All system conduits shall be installed in accordance with Electrical Specifications, Division 26.
6. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
7. Provide all new conduit raceway and conduit riser.
8. Existing conduit raceway system may be re-used where possible.
9. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or by fire damage, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.
10. All conduits, except flexible conduit whips to devices, shall be solidly attached to building structural members, ceiling slabs or permanent walls. Conduits shall not be attached to existing conduit, duct work, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, notification, or auxiliary function devices.
11. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back boxes shall be readily accessible for inspection, testing, service and maintenance.

F. Identification and Labels:

1. Label each remote Fire Alarm Power Supply with a printed label that contains the following information:
 - a. Fire alarm power supply number
 - b. Supply power feed designation
2. Label wires at each device with the designated zone and device number.
3. Submit and affix in a clear folder, to the inside door of the control panel, a plot plan of the site that will identify the following:
 - a. Location of each fire Alarm Control Panel
 - b. Location of supply power for each control panel
 - c. General location of the designated zone as per the FACP programming

3.2 FIELD QUALITY CONTROL

- A. All intelligent analog addressable devices shall be tested for current address, sensitivity, and user defined message.
- B. All wiring shall be tested for continuity, shorts, and grounds before the system is activated.
- C. All test equipment, instruments, tools and labor required to conduct the tests shall be made available by the installing contractor.
- D. The system including all its sequence of operations shall be demonstrated to the Owner, his representative, and the local fire inspector. In the event the system does not operate properly, the test shall be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the Owner, his representatives and the fire inspector.
- E. A final 100% test & inspection shall be performed by a factory trained representative of the system manufacturer only when the system is 100% complete. At the final 100% test and inspection, the representative shall demonstrate that the system functions properly in accordance with these specifications. The representative shall provide technical supervision and participate during all of the testing for the system.
- F. All fire alarm testing shall be in accordance with National Fire Alarm Code, NFPA 72 – 2022, Chapter 7.
- G. A letter from the Contractor certifying that the system is installed entirely in accordance with the system manufacturer's recommendations and within the limitations of the required listings and approvals, that all system hardware and software has been visually inspected and functionally tested by a manufacturer's certified representative, and that the system is in proper working order.

END OF SECTION.

DIVISION 31 – EARTHWORK

31 05 13 – Soils for Earthwork

31 10 00 – Site Clearing

31 20 00 – Earthwork

31 20 05 – Trenching

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SECTION 31 05 13 – SOILS FOR EARTHWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Excavated (and re-used) materials and imported materials
- B. Related Sections:
 - 1. Section 31 10 00 – Site Clearing.
 - 2. Section 31 20 00 – Earthwork.
 - 3. Section 31 20 05 – Trenching.
 - 4. Appendix, Geotechnical Report.

1.3 SUBMITTALS

- A. Samples: Submit, in air-tight containers, 10 lb. sample of Type S3 and S4 fill to inspector.
- B. Materials Source: Submit location of imported materials source. Provide materials from same source throughout the work. Change of source requires approval.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

- A. Soil Types:
 - 1. Soil Type S1: Excavated and reused material, graded, free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
 - 2. Soil Type S2: Excavated and reused material, graded, free of roots, lumps greater than one inch, rocks larger than 1/2 inch, debris, weeds and foreign matter.
 - 3. Soil Type S3: Imported topsoil, friable loam; reasonably free of roots, rocks larger than 1/2 inch, debris, weeds, and foreign matter.
 - 4. Soil Type S4: Imported borrow, suitable for purposes intended, free of vegetable matter and other unsatisfactory material, meeting the following characteristics.

- a. Maximum Particle Size (inches): 3 inches.
- b. Percentage Passing #200 Sieve: 20% to 60%.
- c. Plasticity Index: < 12
- d. Expansion Index: < 20
- e. R-Value (in paved areas): >50
- f. Corrosion Potential:
 - i. Soluble Sulfates: < 0.1%
 - ii. Soluble Chlorides: 200 ppm
 - iii. Soil Resistivity: < 5,000 ohm-cm

- 5. Soil Type S5: Imported sand. Natural river or bank sand (sand equivalent greater than 30), washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

2.2 SOURCE QUALITY CONTROL

- A. Inspection of imported soil shall be performed by field representative of Owner's Geotechnical Engineer.

PART 3 – EXECUTION

3.1 STOCKPILING

- A. Stockpile imported material on site at location designated by project inspector.
- B. Stockpile imported material in sufficient quantities to meet project schedule and requirements.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water.

END OF SECTION.

SECTION 31 10 00 – SITE CLEARING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above and below-grade site improvements.
6. Disconnecting, capping or sealing, and removing site utilities.

B. Related Sections:

1. Section 01 50 13 – Construction Waste Management and Disposal for management of waste materials.
2. Section 02 41 19 – Selective Demolition for removal partial removal of buildings or structures.
3. Section 31 20 00 – Earthwork.
4. Appendix; Geotechnical Report.

1.3 REFERENCES

- A. Geotechnical report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Geotechnical Investigation and Geologic-Seismic Hazards Evaluation Report” (Technicon report number 220876.00)
- B. Geotechnical supplemental report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Supplemental Pavement Design Recommendations” (Technicon report number 220876.002)
- C. Additional addendums and reports may exist; contractor shall obtain all documents prior to construction.

1.4 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
 - 1. Tree protection shall be defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.5 MATERIALS OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 SUBMITTALS

- A. Existing Conditions: Digital photographic documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
 - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises at location directed by Architect.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control and plant-protection measures are in place.
- F. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 PREPARATION

- A. Comply with requirements of referenced Geotechnical Report for site clearing operations.
- B. Protect and maintain benchmarks and survey control points from disturbance during construction.
- C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.
- D. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Identify trees to remain by wrapping a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- E. Protect trees, plant growth, and vegetation not specifically designated for removal.
- F. Verify that existing plant life to be removed has been authorized for removal.
- G. Examine site and compare individual work areas with the Drawings and Specifications.
- H. Thoroughly investigate and verify conditions under which the work is to be performed.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Comply with Storm Water Pollution Prevention Plan (SWPPP) and requirements of authorities having jurisdiction.
- B. Provide temporary erosion and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- C. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- D. Inspect, maintain, and repair erosion and sedimentation-control measures during construction until permanent vegetation has been established.
- E. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

- A. Utilities to Remain: Locate, identify, and protect utilities that are to remain from damage.
- B. Interrupting Existing Utilities: 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 Architect not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Utility Termination: Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place. Arrange with utility companies to shut off affected utilities and notify Owner not less than 48 hours in advance of utility termination.

1. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

- A. Clear only limited areas required for execution of work at proposed improvement location.
- B. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Grind down stumps and remove roots, obstructions, and debris to a depth of not less than 24 inches below the bottom of the lowest structure footing or 2 feet below finished subgrade whichever depth is lower. Root systems deeper than indicated above shall be excavated to allow no roots larger than 1 inches in diameter.
 3. Use only hand methods for grubbing within protection zones.
 4. Chip removed tree branches and dispose of off-site.
- C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 1. Place fill material in horizontal layers not exceeding a loose depth of 6 inches, and compact each layer to a density of minimum 90 percent of maximum density.

3.5 TOPSOIL EXCAVATIONS

- A. Remove sod, grass, and similar vegetation before stripping topsoil.
- B. Strip topsoil to depth of at least 3 inches and as indicated in the geotechnical report in a manner to prevent intermingling with underlying subsoil or other waste materials.
 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 1. Limit height of topsoil stockpiles to 72 inches.
 2. Do not stockpile topsoil within protection zones.
 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 SITE IMPROVEMENTS

- A. Remove existing above and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated. Remove paving only where authorized and necessary to execute the Work.
 - 1. Neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Remove concrete slabs, paving, walks, gutters, and curbs to nearest joint locations.
 - 3. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION.

SECTION 31 20 00 – EARTHWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
2. Over excavation of building pad and pavement area.
3. Excavating soil and other material for surface improvements.
4. Placing fill.
5. Compaction of existing ground and fill.
6. Preparation of subgrade for other improvements.
7. Grading of soil.

B. Related Sections:

1. Section 31 10 00 – Site Clearing
2. Section 31 20 05 – Trenching.
3. Appendix, Geotechnical Report.

1.3 REFERENCES

- A. ASTM D 1557.
- B. Geotechnical report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Geotechnical Investigation and Geologic-Seismic Hazards Evaluation Report” (Technicon report number 220876.00)
- C. Geotechnical supplemental report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Supplemental Pavement Design Recommendations” (Technicon report number 220876.002)
- D. Additional addendums and reports may exist; contractor shall obtain all documents prior to construction.

1.4 DEFINITION

- A. Fill: Soil material or controlled low-strength material used to fill an excavation or raise existing grades.
- B. Borrow Soil: Satisfactory soil imported from off-site for use as fill.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
- D. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- E. Subgrade: Uppermost surface of an excavation.
- F. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Material Test Reports: Classification according to ASTM D2487 for each borrow soil material proposed for fill and backfill.

1.6 QUALITY ASSURANCE

- A. Preexcavation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- B. Do not commence earth moving operations until temporary erosion and sedimentation control measures required by authorities having jurisdiction are in place.
- C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- D. Do not commence earth moving operations until protection measures are in place.
- E. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.

3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
1. Any borrow soil materials proposed to be brought on-site are subject to inspection and testing by Owner's geotechnical testing agency to verify they are in compliance with referenced standards. Owner shall determine if testing of materials is required prior to any material being brought onto the site. Testing of materials may take up to two weeks to verify compliance with standards.
- B. Soil Types:
1. Refer to Section 310513 "Soils for Earthwork".
- C. Soil for Fills:
1. Fill in Turf or Planting Areas: Excavated soils that have been graded and cleansed of excessive organics, debris, rocks, and lumps.
 2. Fill in Turf or Other Planting Areas: Type S2 or S3.
 3. Fill in Non-planting Areas: Type S1, S2 or S4. A geotechnical testing agency shall verify that the existing soils are suitable for fill operations.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine the project site prior to submitting his bid to familiarize himself with the conditions of the site and the conditions in which he will be required to work.
- B. Contractor shall thoroughly examine contract documents prior to bid.

1. Documents do not necessarily indicate a balanced site.
2. Contractor shall be responsible for importing materials from an off-site location or exporting excess material to an off-site location.

3.2 PREPARATION

- A. Site clearing specified in Division 31 Section “Site Clearing” shall be performed prior to beginning earthwork.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations. Coordinate excavations near existing utilities with utility companies.
- C. Protect and maintain erosion and sedimentation controls during earth moving operations.
- D. Identify required lines, levels, contours and datum.
- E. Locate, identify, and protect existing above and below grade utilities from damage.
- F. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- G. Employ equipment and methods appropriate to the work site.
- H. Protect excavated areas from drainage inflow and provide drainage to all excavated areas.

3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.4 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated satisfactory soil and materials borrow soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Stockpile soil materials away from edge of excavations. Do not store within drip line of trees to remain.

3.5 EXCAVATION

- A. Earthwork shall comply with requirements and recommendations in referenced Geotechnical Report.

1. A representative from the Owner’s geotechnical testing agency shall be present during earthwork operations.
- B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- C. Excavations at Edges of Tree and Plant-Protection Zones: Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots.
 1. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Where authorized to cut roots, cut roots with a saw.
- D. Excavation for Structures: Over excavation under proposed structures shall be performed per the Geotechnical Report.
- E. Excavation for Pavements and Flatwork: Over excavation under proposed pavements and flatwork shall be performed per the Geotechnical Report.

3.6 SUBGRADE INSPECTION

- A. If representative of Owner’s geotechnical testing agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- B. Proof-roll subgrade below building slabs, pavements, and walks with equipment of type, size, and weight recommended by representative of Owner’s geotechnical testing agency 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. 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.

3.7 FILLING AND COMPACTING

- A. After excavation and just prior to filling, the bottom of excavations shall be scarified to a depth of 12 inches, moisture conditioned to at least the optimum moisture content, and compacted to a minimum of 90 percent of maximum density based on ASTM Method D 1557. The top 12 inches in all proposed traffic or parking lot areas should be recompacted to 95 percent relative compaction.
- B. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to at least the optimum moisture content.

- C. Fills shall be placed in lifts less than 8 inches in loose thickness, moisture conditioned to at least the optimum moisture content, and compacted to values indicated.
- D. Place soil fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- E. Compact soil materials to not less than the following percentages of maximum dry unit weight according ASTM D 1557:
 - 1. Upper 12 inches under pavements: per geotechnical recommendations.
 - 2. Under structures, building slabs, steps: per geotechnical recommendations.
 - 3. Under turf or unpaved areas: per geotechnical recommendations.
 - 4. Under sidewalks and patios (no vehicular traffic): per geotechnical recommendations.

3.8 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated on Drawings.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances.
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1/2 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
 - 1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.

B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the concrete construction to determine if they are of the quality specified.

C. Contractor Responsibilities:

1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
2. To facilitate testing and inspection, the Contractor shall:
 - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
 - b. Provide access to the Work for the designated Testing and Inspection Agency.
 - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
 - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage of test specimens on the project site.
3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Testing and Inspection Services:

1. Testing and inspections shall be performed by the designated Testing and Inspection Agency.
2. Testing and inspections shall be in accordance with the 2019 California Building Code, Section 1705A.6 and Table 1705A.6, DSA Testing and Inspections form DSA 103, and Structural Drawings Special Inspection Criteria.

E. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

F. Compaction testing will be performed in accordance with ASTM D 1557 (Method A).

G. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.

3.10 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact
- C. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.11 CLEANING AND DISPOSAL OF SURPLUS MATERIALS

- A. Rake Clean.
- B. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Adjacent roadways shall be kept clean during the progress of this work.

END OF SECTION.

SECTION 31 20 05 – TRENCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Sections:

1. Section 01 50 00 – Temporary Facilities for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
2. Division 22, 23, 26, 27, 28, and 33 Sections as applicable for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
3. Section 31 05 13 – Soils for Earthwork.
4. Section 31 20 00 – Earthwork.

1.3 REFERENCES

- A. Geotechnical report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Geotechnical Investigation and Geologic-Seismic Hazards Evaluation Report” (Technicon report number 220876.00)
- B. Geotechnical supplemental report prepared by Technicon Engineering Services titled “Proposed Stadium Improvements – El Capitan High School – 100 Farmland – Merced, California – Supplemental Pavement Design Recommendations” (Technicon report number 220876.002)
- C. Additional addendums and reports may exist; contractor shall obtain all documents prior to construction.

1.4 DEFINITIONS

- A. Utility: Any buried or above ground piping, conduit, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required.

1. Warning tapes.

1.6 PRODUCT CONDITIONS

- A. Existing Utilities: A diligent attempt has been made to indicate on the Drawings the locations of utilities which may affect the Work. Utility locations are based on information provided by the Owner and limited above grade site observation. The locations of indicated utilities shall be considered approximate only until exposed by the Contractor.
 1. Maintain existing utilities in constant service during construction of the Work.
 2. Utility Locator Service: Notify utility locator service for area where Project is located before beginning trenching operations.
- B. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during trenching operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- C. Do not commence trenching operations until temporary erosion and sedimentation control measures are in place.
- D. Do not commence earth moving operations until plant and landscape protection measures are in place.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations. The acceptance of borrowed soil materials shall be subject to review and approval by the architect.
- B. Satisfactory Soils:
 1. Refer to Section 31 05 13 – Soils for Earthwork.
 2. Refer to City/County Standards.
- C. Sand: ASTM C33; fine aggregate.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.

1. Detectable Warning Tape: Provided detectable warning tape for underground utilities that would otherwise not be detectable by above ground utility locating methods. Detectable warning tape shall include metallic core encased in a protective jacket for corrosion protection and be detectable by a metal detector when tape is buried up to 30 inches deep.
2. Colors: Warning tape shall be colored as follows:
 - a. Red: Electric.
 - b. Yellow: Gas.
 - c. Orange: Telephone and other communications.
 - d. Blue: Water systems.
 - e. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Comply with requirements of referenced Geotechnical Report for site trenching and backfilling operations.
- B. Comply with the City/County Trench Excavation and Backfill Requirements
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by trenching operations.
- D. Locate, identify, and mark existing underground utilities.
- E. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- F. Protect and maintain erosion and sedimentation controls during trenching operations.
- G. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.
- H. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.
- I. Prevent surface water and ground water from entering excavations and from flooding Project site and surrounding area. Protect excavations from softening and damage by rain or water accumulation.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.2 EXCAVATION FOR UTILITY TRENCHES

- A. Provide protection for all open excavations, backfill trenches on same day in which excavation occurs to avoid leaving excavations open overnight.
- B. Excavate trenches to lines, depths, and widths required for installation of utilities.
- C. Cut trenches just wide enough to enable installation of utilities and proper backfill, and to allow inspection.
- D. Employ equipment and methods appropriate to the work site. Small mechanical excavators may be used only in areas where there is sufficient space so as not to damage adjacent improvements, and where the locations of all existing utilities have been determined.
- E. Use hand excavation methods to locate and expose existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated on the ground by utility locating service or Owner.
- F. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw.
- G. Excavate trenches to provide not less than the minimum cover required.
- H. Do not interfere with 45 degree bearing splay of foundations.
- I. Hand trim excavations for bell and spigot pipe joints. Remove loose matter.
- J. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- K. Excavate trenches, pits or holes bottoming in hardpan to a minimum of 6 inches below the grade for the bottom of the pipe and any couplings, and then backfill to the pipe grade with satisfactory soil material, thoroughly compacted. No additional payment will be made for such over-excavation and refill.
- L. In trenches where a firm foundation is not encountered, such as soft, spongy, or otherwise unsuitable material, remove the material to a minimum of 12 inches below the bottom of the proposed pipe or structure, or to a depth determined by the Geotechnical Engineer, and backfill the space with satisfactory soil material containing sufficient moisture to produce maximum compaction. No additional payment will be made for such additional excavation or backfill.
- M. Stockpile excavated material to be returned to trench adjacent to trench in location which will not be detrimental to existing improvements, trees, or pedestrian or vehicular traffic. Cover to prevent windblown dust. Remove unsuitable or excess material not being used, from site.

- N. In areas of sandy soils, shoring and sloping back the trench sidewalls may be required.

3.3 BACKFILL FOR UTILITY TRENCHES

- A. Prior to placing backfill in excavations, complete the following:
1. Survey locations of underground utilities for Record Documents.
 2. Test and inspect underground utilities.
 3. Remove trash and debris.
 4. Remove temporary shoring and bracing.
- B. Backfilling and Compaction: Carefully place and compact backfill of satisfactory soil materials as follows.
1. Install bedding per pipe manufacturer recommendations.
 2. Initial Backfill: Place initial backfill of satisfactory soil free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit. Carefully compact initial backfill to 90% maximum density evenly on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit.
 3. Subsequent Backfill: Place backfill of satisfactory soil material in layers not more than 12 inches in loose depth and carefully compact.
 4. Final Backfill: Place final backfill in thickness required, but not more than 12 inches, to achieve final subgrade elevation after compaction and as required for grading.
 5. Compaction: Compact soil using hand operated tampers or lightweight power operated tamping equipment that will not damage or displace installed utilities. Compact each layer of backfill to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - a. Turf or Unpaved Areas: 90%.
 - b. Areas under Paving: 95%.
- C. Trenches under Roadways: Provide 4-inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- D. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
- E. Soil Moisture Control: Uniformly moisten or aerate soil materials before compaction to at least at least the optimum moisture content.

1. Do not over moisten or flood trenches to move or settle soil materials.
 2. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 3. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
- F. Grading: Uniformly grade areas to be smooth and flush with adjacent grade free of irregular or abrupt surface changes. Provide final grading in turf or landscaped areas where no further grading will occur.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test each fill or backfill layer. Proceed with subsequent Work only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D1557. Tests will be performed at the following locations and frequencies:
1. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- D. When testing agency reports that backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.5 PROTECTION

- A. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION.

DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 12 16 – Asphalt Paving
- 32 13 13 – Concrete Paving and Walks
- 32 13 73 – Concrete Paving Joint Sealants
- 32 17 00 – Paving Specialties
- 32 18 25 – BSS 300 Embedded Sandwich Track System – CMAS Materials
- 32 18 27 – BSS 300 Embedded Polyurethane Sandwich Track System
Synthetic Track Surfacing System– Installation Only
- 32 31 13 – Chain-Link Fencing and Gates
- 32 31 19 – Ornamental Metal Fencing and Gates
- 32 80 00 – Irrigation
- 32 90 00 – Landscaping

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SECTION 32 12 16 – ASPHALT PAVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. SSCDOT – Standard Specifications, State of California, Department of Transportation (Caltrans) latest edition, except references to method of payment, and references to any state furnished materials General Conditions, including without limitation, Site Access, Conditions, and Regulations.

1.2 SUMMARY

- A. Drug-Free Schools and Safety Requirements:
 - 1. Hot-mix asphalt patching.
 - 2. Hot-mix asphalt paving.
- B. Related Sections:
 - 1. Section 31 20 00 – Earthwork.
 - 2. Section 32 17 00 – Paving Specialties for pavement markings, wheel stops, and site signage.

1.3 DEFINITION

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 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. Material Certificates: For each paving material, from manufacturer.
- C. Material Test Reports: For each paving material.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the California Department of Transportation.

- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Section 39 of the Caltrans Specifications.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.
- C. All improvements within property owned by a City, County, or State Entity shall be in accordance with the Standards and Specifications of the authority having jurisdiction.

1.6 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 50 deg F.
 - 2. Tack Coat: Minimum surface temperature of 50 deg F.
 - 3. Slurry Coat: Comply with weather limitations in ASTM D3910.
 - 4. Asphalt Base Course: Minimum surface temperature of 50 deg F and rising at time of placement.
 - 5. Asphalt Surface Course: Minimum surface temperature of 50 deg F at time of placement.

PART 2 – PRODUCTS

2.1 AGGREGATES

- A. Aggregates: The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements. All aggregates shall be clean and free from decomposed materials, organic materials, and other deleterious substances.
 - 1. Aggregates for base course shall conform to Section 26 of the State Standard Specifications, Class 2 for 3/4 inch maximum size gradation.
 - 2. Aggregates for asphaltic concrete shall conform to Type A as outlined in Section 39 of the State Standard Specifications. Aggregate grading shall be 3/4 inch maximum, coarse for 1-1/2 inches or greater in total new pavement thickness.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: PG 64-10 in accordance with Section 92 of the Caltrans Specifications.
- B. Asphalt Cement: ASTM D 946 for penetration-graded material.
- C. Prime Coat: Asphalt emulsion prime coat complying with Section 94 of the Caltrans Specifications. Prime coat is not required unless specifically noted on the Drawings.

- D. Tack Coat: Asphaltic emulsion for use as tack coat shall be of the penetration type conforming to the requirements of Section 94 of the Caltrans Specifications.
- E. Water: Potable.

2.3 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.

2.4 MIXES

- A. Hot-Mix Asphalt: Asphalt concrete shall be Type A and shall conform to the provisions of Section 39 of the Caltrans Specifications. The asphalt binder shall be steam refined paving asphalt classified as PG 64-10 in accordance with Section 92 of the Caltrans Specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Geotechnical Engineer shall verify that subgrade is stable and in suitable condition to begin paving.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Subgrade preparation shall be as specified in Division 31 Section “Earthwork.”
- B. Prior to construction of base course and asphaltic concrete, clean previously constructed subgrade or subbase of all foreign substances. The surfaces shall be inspected for the specified compaction and trueness to line and grade.
- C. Base Course: Aggregate base shall be placed in accordance with requirements of Section 26 of the State Standard Specifications and to the thickness shown. The materials shall be graded and compacted in maximum 4-inch layers to at least 95 percent of maximum density (ASTM D1557).
 - 1. The base course shall be maintained until the asphaltic pavement is in place. Maintenance shall include drainage, rolling, shaping, and watering as necessary to maintain the course in proper condition. Sufficient moisture shall be maintained at the surface to prevent a dusty condition by light sprinkling with water. Areas of completed base course that are damaged by freezing shall be conditioned, reshaped and recompactd in accordance with the requirements of this specification, without additional cost to the Owner.
- D. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared base course is ready to receive

paving.

- E. 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.
- F. Prime Coat: Prime Coat is only required if indicated on Drawings. It shall be the Contractor's option to apply Prime Coat if not indicated on the Drawings. 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.
- G. 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. Tack coat will not be required over surfaces of existing pavement unless indicated on the Drawings. Where indicated it shall be applied uniformly to existing pavement surfaces 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.

3.3 HOT-MIX ASPHALT SPREADING, LAYING, AND COMPACTING

- A. Spreading and laying operations shall conform to the requirements of Sections 39-5 and 39-6 of the Caltrans Specifications. Where the total depth of paving exceeds 0.20 feet, the top layer of asphalt concrete shall not exceed 0.20 feet in compacted thickness. The aggregate for this layer and all lower layers shall be 3/4" maximum aggregate (medium). The next lower layer shall not exceed 0.25 feet in compacted thickness. Any lower layers shall not exceed 0.25 feet in compacted thickness. For total asphalt concrete thickness of 3 inches or greater, the minimum layer thicknesses shall be 1.5 inches compacted. Total asphalt concrete thicknesses of 3 inches may be placed in one layer at Contractor's option. No asphalt concrete paving shall be placed when the atmospheric temperature is below 50 degrees Fahrenheit. Compaction operations shall conform to the requirements of Section 39-6.03 of the Caltrans Specifications.
- 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.

- D. All utility boxes and/or manholes shall be set flush with finished grade after placing final lift of asphalt paving, unless noted otherwise.

3.4 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 1/2 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 inch.
 - 2. Surface Course: 1/4 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.5 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving 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.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.6 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.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner shall engage a qualified testing agency to perform tests and inspections. Agency shall be qualified according to ASTM D3666 for testing indicated.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D979.
 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041, and compacted according to job-mix specifications.
 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D1188 or ASTM D2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2726.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements. Additional construction, testing, and replacement costs resulting from damaged or improperly installed infrastructure shall be paid for by the Contractor.

3.8 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.

SECTION 32 13 13 – CONCRETE PAVING AND WALKS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. SSCDOT – Standard Specifications, State of California, Department of Transportation (Caltrans) latest edition, except references to method of payment, and references to any state furnished materials.

1.2 SUMMARY

- A. Section Includes: Concrete paving for the following:
 - 1. Parking lots.
 - 2. Curbs, gutters, and walks.
- B. Related Sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete for general building applications of concrete.
 - 2. Section 31 20 00 – Earthwork.

1.3 DEFINITIONS

- A. Cementitious Materials: Type II gray Portland Cement conforming to the specifications of ASTM C150-02a and the requirements of Caltrans Specification Section 90 for “Type II Modified” Portland Cement.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Test Reports: For each of the following:
 - 1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- D. Delivery Tags: Delivery tags for all concrete.

1.5 QUALITY ASSURANCE

- A. All improvements within property owned by a City, County, or State Entity shall be in accordance with the Standards and Specifications of the authority having jurisdiction.
- B. Installer Qualifications: A qualified installer who employs on Project personnel who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills required for work performed under this Section. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents design.
- C. Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301 – Specifications for Structural Concrete, Sections 1 through 5.
 - 2. ACI 318 – Building Code Requirements for Structural Concrete with amendments per 2022 California Building Code, Chapter 19A, Section 1905A.
 - 3. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.

1.6 REGULATORY REQUIREMENTS FOR PEDESTRIAN PAVING

- A. Concrete paving for accessible pedestrian routes for persons with disabilities shall comply with the following per 2022 California Building Code (CBC) requirements:
 - 1. Changes in Level: 1/4 inch maximum vertical change in level; changes greater than 1/4 inch to not more than 1/2 inch shall be beveled with a slope not exceeding 1:2 vertical to horizontal; offsets exceeding 1/2 inch shall be by a ramp (CBC 11B-303).
 - 2. Cross Slope of Walks and Ramps: 1/4:12 maximum (CBC 11B-403.3).
 - 3. Slope of Pedestrian Pavements: 1/4:12 maximum in any direction where there is no defined direction of travel (CBC 11B-403.3).
 - 4. Slope of Door and Ramp Landings: 1/4:12 maximum in any direction (CBC 11B-404.2.4.4 and 11B-405.7.1). Changes in level are not permitted within door and ramp landings.

5. Slope of Parking Stalls and Access Aisles for Persons with Disabilities: 1/4:12 maximum in any direction (CBC 11B-502.4). Changes in level are not permitted within accessible parking stalls and access aisles.
6. Slope of walks in the direction of travel: 1:20 (5%) maximum (CBC 11B-403.3).
7. Slope of Ramps in the Direction of Travel: 1:12 (8.33%) maximum (CBC 11B-405.2).
8. Width of Walks and Ramps: 48 inches minimum clear width (CBC 11B-403.5.1 and 11B-405.5).

PART 2 – PRODUCTS

2.1 FORMS MATERIALS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: Type II gray Portland Cement conforming to the specifications of ASTM C150-02a and the requirements of Caltrans Specification Section 90 for “Type II Modified” Portland Cement.
- B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.

2.4 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.
- C. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. It shall be the Contractor's responsibility to verify that all curing compounds used comply with the VOC Emission requirements of the San Joaquin Valley Air Pollution Control District.

2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.6 CONCRETE MIXTURES

- A. General: Concrete mixtures shall comply with requirements of authorities having jurisdiction.
- B. Mixtures for concrete pavements, gutters and curbs subject to vehicular traffic:
 1. Concrete shall be Class 2 (Previous years denoted as Class A) and shall contain 564 pounds minimum (6 sacks) of Portland Cement per cubic yard conforming to the requirements of Section 90 of the Caltrans Specifications.
 - a. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 2. Proportion mixtures to provide normal-weight concrete with the following properties:

- a. Compressive Strength (28 Days): 3000 psi minimum.
 - b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
 - c. Slump Limit: 4 inches maximum.
- C. Mixtures for concrete walks, gutters and curbs subject to only pedestrian traffic:
1. Concrete shall be Class 3 (Previous years denoted as Class B) and shall contain 505 pounds minimum of Portland Cement per cubic yard conforming to the requirements of Section 90 of the Caltrans Specifications unless noted otherwise on the drawings.
 - a. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 2. Proportion mixtures to provide normal-weight concrete with the following properties:
 - a. Compressive Strength (28 Days): 2500 psi minimum.
 - b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.58.
 - c. Slump Limit: 5 inches maximum.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared base surface below concrete paving to identify soft pockets and areas of excess yielding.
1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
- C. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.

2. Provide tie bars at sides of paving strips where indicated.
 3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys as shown on the Drawings.
 4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips where noted on the Drawings.
1. Extend joint fillers full width and depth of joint.
 2. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 3. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 5. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form 1/4-inch wide contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius unless noted otherwise on the drawings. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
 - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius unless noted otherwise on the Drawings. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement and dowels.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

- K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 CONCRETE FINISHING

- A. Float Finish: After initial floating during placement, begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

- a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 1. Elevation: 1/4 inch.
 2. Thickness: Plus 3/8 inch, no minus.
 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch
 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
 5. Lateral Alignment and Spacing of Dowels: 1 inch.
 6. Vertical Alignment of Dowels: 1/4 inch.
 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
 8. Joint Spacing: 3 inches.
 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 10. Joint Width for Grooved Joints: Plus 1/8 inch, no minus.
- B. Requirements for accessible pedestrian routes for persons with disabilities:
 1. Refer to regulatory requirements referenced in Part 1 Article "Regulatory Requirements for Pedestrian Paving" of this specification section.

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.
- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the concrete construction to determine if they are of the quality specified.
- C. Contractor Responsibilities:
1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
 2. To facilitate testing and inspection, the Contractor shall:
 - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
 - b. Provide access to the Work for the designated Testing and Inspection Agency.
 - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
 - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hr. as required by ASTM C31.
 3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 5000 sq. ft. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each

concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- E. Strength of each concrete mixture will be satisfactory if the average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- F. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
- I. Concrete will be considered defective if it does not pass tests and inspections.
- J. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- K. Test and inspection reports are to be prepared and distributed by the testing agency.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

- B. Additional construction, testing, and replacement costs resulting from damaged or improperly installed infrastructure shall be paid for by the Contractor.
- C. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland Cement concrete bonded to paving with epoxy adhesive.
- D. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- E. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections

END OF SECTION.

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SECTION 32 13 73 – CONCRETE PAVING JOINT SEALANTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Joint-sealant backer materials.
3. Primers.

B. Related Requirements:

1. Section 07 92 00 – Joint Sealants for sealing nontraffic and traffic joints in locations not specified in this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

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

- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- C. Paving-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Certificates: For each type of joint sealant and accessory.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

- A. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920, Type S, Grade P, Class 25, for Use T.
 - 1. Available Product: W.R. Meadows, Inc.; Pourthane SL.
 - a. Subject to compliance with requirements, provide product indicated or a comparable product subject to Architect's approval.
- B. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920, Type M, Grade P, Class 25, for Use T.
 - 1. Available Product: Pecora Corporation; Urexpan NR-200 or DynaFlex.
 - a. Subject to compliance with requirements, provide product indicated or a comparable product subject to Architect's approval.
- C. Joint-Sealant Application: Joints within concrete paving.
 - 1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.

- b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
- D. Joint-Sealant Color: As selected by Architect from Manufacturer's full range.

2.3 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.4 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backings to support joint 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 joint-sealant backings.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements 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 joint sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. 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 and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION.

SECTION 32 17 00 – PAVING SPECIALTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pavement-marking.
2. Wheel stops.
3. Tactile warning surfaces.
4. Traffic and pedestrian signage.

B. Related Sections:

1. Division 32 Sections, as applicable to asphalt paving, concrete paving and concrete walks.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Shop Drawings: For the following:

1. Pavement Markings: Indicate pavement markings, colors, lane separations, parking spaces, directional arrows, and accessibility markings.
2. Tactile Warning Surfaces: Indicate locations and extent of tactile warning surfaces.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: The following shall comply with requirements of the ADA Standards for Accessible Design and the 2022 California Building Code, Chapter 11B.

1. Tactile warning surfaces.
2. Pavement markings for disabled access parking stalls and access aisles.
3. Signage for disabled access relating to parking stalls, parking lots, and accessible path of travel to building entrances including vertical clearance below post mounted signs located adjacent to walking surfaces.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

- A. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 – PRODUCTS

2.1 PAVEMENT MARKING PAINT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Dunn-Edwards Corporation.
 - 2. Ennis Traffic Safety Solutions.
 - 3. Frazee Paint, Comex Group.
 - 4. The Sherwin-Williams Company
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with one of the following:
 - 1. FS TT-P-1952, Type II, with drying time of less than 45 minutes.
 - 2. MPI #97 Latex Traffic Marking Paint.
- C. Colors: Unless otherwise indicated, provide colors as follows:
 - 1. White:
 - a. Parking stall lines and text markings.
 - b. Figure and border of international symbol of accessibility (ISA) markings at accessible parking stalls.
 - c. Diagonal striping for accessible parking stall access aisles where marked on asphalt paving.
 - d. Traffic arrows.
 - 2. Blue: Color equal to Color 15090 per Federal Standard 595C.

- a. Background of international symbol of accessibility (ISA) markings at accessible parking stalls.
 - b. Perimeter of accessible parking stall access aisles.
 - c. Diagonal striping for accessible parking stall access aisles where marked on concrete paving.
3. Red: Curbs of fire lanes, face and top of curb.
 4. Black: For painting out existing pavement markings.
 - a. Tint to match color of pavement.

2.2 TACTILE WARNING SURFACES

- A. Basis of Design: Drawings and Specifications are based on the following:
 1. ADA Solutions, Inc.
 - a. Replaceable Wet-Set detectable warning tile panels.
 - b. Surface Mount detectable warning tile panels.
 2. Subject to compliance with requirements, provide product indicated or a comparable product subject to request for substitution.
- B. Description: Homogeneous fiberglass and carbon reinforced composite panels with ADA compliant truncated dome pattern on exposed surfaces, panels are colorfast and UV stable with uniform color throughout the thickness of the panel.
 1. Replaceable Wet-Set Detectable Warning Tile Panels: Tile panels designed for setting in freshly poured concrete and mechanically anchored with stainless steel fasteners.
 2. Surface Mount Detectable Warning Tile Panels: Tile panels designed for surface application on existing concrete with mechanical and adhesive fastening.
 3. Standard Sizes: 24 by 36, 48, and 60 inches; 36 by 36 and 60 inches.
 4. Thickness:
 - a. Wet-Set Tiles: 1/4 inch nominal thickness with a 3/4 inch thick by 1 inch wide perimeter flange.
 - b. Surface Mount Tiles: 3/16 inch thick with 1/2 inch wide beveled edge at all edges.
 5. Physical Characteristics:
 - a. Compressive Strength: 28,900 psi, ASTM D695.

- b. Slip Resistance: 1.18 dry, 1.05 wet, ASTM C1028.
 - c. Flame Spread Index: Less than 25, ASTM E84.
 - d. Freeze/Thaw/Heat: No disintegration, ASTM C 1026.
6. Tactile Surface Domes (Regulatory Requirements per 2022 CBC 11B-705):
- a. Dome Size:
 - i. Base Diameter: 0.90 inches minimum, 0.92 inches maximum.
 - ii. Top Diameter: 0.45 inches minimum, 0.47 inches maximum.
 - iii. Height: 0.2 inches.
 - b. Dome Configuration and Spacing: Square grid, 2.3 inches minimum, 2.4 inches maximum, center to center spacing. Base edge to base edge spacing of 0.65 inch minimum measured to the most adjacent domes on a square grid.
7. Color: Yellow equal to Color 33538 per Federal Standard 595C.
- C. Accessory Materials: Accessory materials shall be recommended in writing by the tactile surface panel manufacturer.
- 1. Fasteners for Wet-Set Tile: Manufacturer's standard stainless steel inserts and matching bolts, 1/2 inch diameter, factory attached to tile panels.
 - 2. Fasteners for Surface Mounted Tile: Manufacturer's standard stainless steel sleeve anchors, 1/4 inch diameter.
 - 3. Adhesive/Sealant for Surface Mounted Tile: Solvent free polyether adhesive/sealant, ASTM C 920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A & O.
 - a. Acceptable Product: ChemLink, Inc.; M-1 Structural Adhesive/Sealant

2.3 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2,500-psi minimum compressive strength, 6 inches high by 6 inches wide by 48 inches long, and reinforced with (4) #3 reinforcing bars. Provide chamfered corners and holes for anchoring to substrate.
- B. Dowels: Galvanized steel, 1/2 inch diameter, 10-inch minimum length.

2.4 TRAFFIC AND PEDESTRIAN SIGNAGE

- A. Traffic Signs: Provide traffic signs as indicated on Drawings complying with the following requirements:

1. Material: 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, 0.080 inch minimum thickness.
 2. Corner Condition: Rounded to radius of 1-1/2 inches unless otherwise indicated.
 3. Finish: Manufacturer's standard powder coat or baked enamel reflectorized finish.
 4. Size: As indicated on Drawings.
 5. Color: As indicated on Drawings.
 6. Text and Graphics: As indicated on Drawings.
- B. Brackets: Extruded aluminum brackets and fittings to suit sign construction and mounting conditions for bracket-mounted signs.
- C. Fasteners: Non-corrosive fasteners compatible with sign and post materials; provide fasteners with vandal/theft resistant heads.
- D. Sign Posts: Galvanized steel pipe, ASTM A53, standard weight, Schedule 40, size as indicated on Drawings.
- E. Concrete for Sign Posts: Ready mixed concrete or prepackaged concrete mix for site mixing requiring only the addition of water at the project site; minimum 2000 psi compressive strength at 28 days.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine conditions in which products are to be applied or installed with installer/applicator present.
- B. Proceed with only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING APPLICATION

- A. Preparation:
 1. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
 2. Allow paving to age for time period recommended by paint manufacturer, but not less than 30 days before starting pavement marking.
 3. Test concrete paving for alkalinity, pH level shall be less than the maximum value recommended by paint manufacturer.

4. Sweep and clean surface to eliminate loose material and dust. Surfaces shall be clean, dry, and free of oil, grease, and other foreign matter.
- B. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 1. Width of Lines: 4 inches unless otherwise indicated on Drawings.
 2. Graphics and Lettering: Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
- C. Prohibit traffic until traffic paint is fully dry.

3.3 WHEEL STOP INSTALLATION

- A. Accurately locate and align wheel stops as indicated on Drawings. Where wheel stops are installed parallel to curbs or paving edge, wheel stops shall be aligned in a straight line.
- B. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowels beneath top of wheel stop and grout holes.

3.4 TACTILE WARNING SURFACE INSTALLATION

- A. General: Install tactile warning surface tile panels in accordance with manufacturer's written installation instructions.
- B. Wet-Set Tile Panels: Accurately place tile panel in position in freshly finished concrete, tamp unit using a rubber mallet and a block of wood, continue tamping until all air has been released and the surface of the tile panel is flush with the surrounding concrete surface. Provide 1/8 inch space between adjacent panels of multiple panel installations.
 1. Concrete shall have a smooth trowel finish prior to placement of tile panel(s).
 2. After installation of tile panel, finish concrete around perimeter of panel with a 1/4 inch edge trowel.
 3. When no further panel adjustment is needed, apply weight to panel until the concrete is set. Protect panels from traffic until concrete is cured.
 4. Remove protective film from panel after concrete has cured.
- C. Surface Mounted Tile Panels: Install panels using adhesive and mechanical fasteners. Provide 1/8 inch space between adjacent panels of multiple panel installations.
 1. Clean existing concrete surface of debris, oil, and grease.

2. Lay out panels and confirm fit and panel location.
3. Apply adhesive as follows using care in applying adhesive so that excessive amounts of adhesive will not be squeezed out from underneath panels.
 - a. Panels for Curb Ramps: Apply a 3/8 inch bead of adhesive to the flat framework on the bottom of panels.
 - b. Panels for Other Locations: Apply full adhesive coverage to the bottom of the panel using a 3/16 by 3/16 inch or 1/4 by 1/4 inch square notch trowel.
4. Drill concrete through preformed fastener locations in the panel and install fasteners. If additional fastener locations are required, drill and install fasteners in accordance with manufacturer's written instructions.
5. Seal perimeter panel edges after anchoring panels. Remove protective films and clean panels of concrete dust from drilling prior to sealing perimeters of panels.

3.5 SIGNAGE INSTALLATION

A. Sign Post Installation:

1. Post Excavation and Footings: Drill or hand-excavate holes for posts to diameters and depths indicated in firm, undisturbed soil; if footing diameters and depths are not indicated on Drawings, footings shall be not less than 10 inches diameter by 30 inches deep; tops of footings shall be established as 4 inches below finish grade.
2. Post Setting: Verify that posts are set plumb, aligned, and at correct height; hold in position during setting with concrete or mechanical devices; the bottom of posts shall be 3 inches above the bottom of footings. Place concrete around posts and vibrate or tamp for consolidation. Protect above ground portion of posts from concrete splatter.
 - a. Posts in Paved Areas Installed Prior to Paving: Comply with the following:
 - i. Posts in Concrete Paved Areas and Curbs: Coordinate top of paving elevation and pour concrete fill to approximately 6 inches below finish grade.
 - ii. Posts in Asphalt Concrete Paved areas: Concrete fill to be flush with adjacent paving and crowned to shed water away from posts. Coordinate top of paving elevation and form top 6 inches of footing with round concrete form of diameter matching post footing; pour concrete fill prior to paving operations.
 - b. Posts in Unpaved Areas: Concrete fill to be 2 inches above finish grade and crowned to shed water away from posts. Coordinate finish

grade elevation and form top 6 inches of footing with round concrete form of diameter matching post footing.

- B. Sign Installation: Attach signs to posts with appropriate brackets and theft resistant fasteners.
1. The bottom of signs shall be at least 80 inches above walking surfaces when located adjacent to pedestrian paths of travel.
 2. Peen ends of exposed threads to prevent removal of fasteners.
 3. Where signs are indicated to be fastened to buildings or fences, install as indicated on Drawings.

END OF SECTION.

SECTION 32 18 25 – BSS 300 EMBEDDED SANDWICH TRACK SYSTEM – CMAS – MATERIALS

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. The Owner has purchased synthetic track surfacing materials for the Beynon BSS 300 embedded sandwich track system. The track system materials are Owner Furnish (OF) and not part of the project bid. Installation (by Beynon) is part of the bid. This section is for clarification and in coordination with the general contractor's scope of work and project schedules.
- B. It shall be the responsibility of the synthetic track surfacing manufacturer and installer to provide all labor, materials, equipment, and tools necessary for the complete installation of the synthetic track surfacing system as indicated on the plans and as specified herein.
- C. The materials for the specified BSS 300 track system are separate of the project bid and have been purchased direct through CMAS.
- D. Installation of all materials shall be performed in strict accordance with the manufacturer's installation instructions, by certified Beynon installation crews, and in accordance with project specifications, plans, and all approved shop drawings.
- E. Perimeter edge details required for the system shall be as detailed and recommended by the Manufacturer, and as approved by the Owner. Supply and installation of these details will be under the scope of work of the general contractor based on project plans and are not part of the synthetic track surfacing manufacturer / installer's scope.
 - 1. The system shall consist of, but not necessarily be limited to, the following:
 - a. An acceptable subbase including asphalt paving, base rock, concrete curbs and a drainage system to drain the impermeable track surfacing system constructed by the General Contractor per the contract drawings.
 - b. Beynon BSS 300 Track Surfacing System.

1.2 RELATED SECTIONS

- A. Section 32 18 27 – BSS 300 Embedded Polyurethane Sandwich Track System – Synthetic Track Surfacing System Specifications – Installation Only.
- B. Division 31 and 32 Sections, as applicable.

PART 2 – GENERAL CONTRACTOR QUALIFICATIONS FOR INSTALLING DRAINAGE BASE

2.1 QUALIFICATIONS

- A. Installers of the subsurface base system and AC paving for the track shall be required to comply with and supply proof/references to the Owner with bid:

1. General Contractor installing the base system must have a Class A California Engineering Contractor's License.
2. General Contractor and / or AC paving contractor must have prior direct experience in paving a base for synthetic running track to required tolerances and must have paved a minimum of 5 tracks in California during the past 3 years, with a minimum size of 60,000 SF per track and field event areas.

PART 3 – SYNTHETIC TRACK SURFACING MATERIAL/INSTALLATION

3.1 BEYNON BSS 300 TRACK SURFACING SYSTEM

- A. **Beynon materials have been purchased by the Owner direct via separate CMAS contract.**
 1. *Installation of the BSS 300 track surfacing system is part of the civil construction bid scope of work.
 2. Contact for Beynon Sports is: Mason Farnsworth; (559) 283-3071; MFarnsworth@beynonsports.com
- B. Installation of track surfacing including mobilization, prep work, and track surfacing installation, and clean up, will require **15 – 17 working days.**
- C. Track striping will require **4 additional working days** by a separate crew.

PART 4 – CLEANING RECOMMENDATIONS

4.1 GENERAL

- A. The general contractor shall protect installed track asphalt base from subsequent construction operations during the 28 curing time.
- B. Do not permit traffic over unprotected asphalt prior to track surfacing.
- C. General Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of asphalt base and installed items prior to track surfacing installation.

PART 5 – PROJECT CLOSEOUT

5.1 GENERAL

- A. Beynon will train the Owner's facility maintenance staff in the maintenance and care of the new track surfacing.

END OF SECTION.

SECTION 32 18 27 – BSS 300 EMBEDDED POLYURETHANE SANDWICH TRACK SYSTEM SYNTHETIC TRACK SURFACING SYSTEM– INSTALLATION ONLY

PART 1 – GENERAL

1.1 SCOPE

- A. The installing synthetic surfacing contractor shall furnish all labor, equipment, supervision, and services necessary for the proper installation and completion of the BSS 300 Synthetic Track Surfacing System and related work indicated on the drawings and specified herein.
- B. Materials for the BSS 300 synthetic track surfacing system have been purchased direct via CMAS and are not part of the project bid.
- C. Beynon Contact:

Mason Farnsworth
4668 N. Sonora Ave. Suite 101, Fresno, CA 93722
Phone: 559-283-3071
Email: mfarnsworth@beynonsports.com
- D. Installing contractor shall meet Section 3.1 Quality Assurance requirements.
- E. The synthetic surfacing contractor shall refer to the drawings for the required locations of synthetic track surfacing to be installed. All quantities and dimensions shall be field verified by the synthetic surfacing contractor.

1.2 SPECIFIC SCOPE OF WORK

- A. Install a WORLD ATHLETICS (WA) approved, impermeable polyurethane synthetic track system consisting of SBR Rubber and BEYPUR, a single-component polyurethane binder and BEYPUR, a poured-in-place, two-component U.V. stabilized elastomeric polyurethane with an embedded textured wearing layer.
- B. Layout and paint all track lines and event markings as required and specified by owner and the applicable governing body for the specified project; either WORLD ATHLETICS (WA), NCAA, NFSHSA rules and or Owner requirements.

1.3 COORDINATION

- A. The synthetic surfacing contractor shall coordinate the work specified with an authorized and appointed representative of the owner to perform the work during a period and in a manner acceptable to the owner.

PART 2 – CODES AND STANDARDS

2.1 APPLICABLE PUBLICATIONS

- A. Codes and standards follow the current guidelines set forth by the WORLD ATHLETICS (WA), the National Collegiate Athletic Association (NCAA) and the National Federation of State High School Associations (NFSHSA), along with the current material testing guidelines as published by ASTM International (ASTM).

2.2 PERFORMANCE STANDARDS

- A. The BSS 300 synthetic track surfacing system shall exhibit the following minimum performance standards as required by WORLD ATHLETICS (WA):
- | | | |
|----|--------------------------|---------------------------|
| 1. | Thickness: | (12-13mm) or as specified |
| 2. | Force Reduction | 35-50% |
| 3. | Vertical Deformation: | 0.6mm-2.5mm |
| 4. | Coefficient of Friction: | ≥ 0.5 (47 TRRL Scale) |
| 5. | Tensile Strength: | ≥ 0.5 Mpa |
| 6. | Elongation: | ≥ 40% |

PART 3 – QUALITY ASSURANCE

3.1 CONTRACTOR AND MANUFACTURER QUALIFICATIONS

- A. The CONTRACTOR and the MANUFACTURER must be the same.
- B. The CONTRACTOR and MANUFACTURER must have a minimum of 5 years of experience in the installation of poured-in-place, two-component elastomeric polyurethane synthetic track surfacing in the California market.
- C. The CONTRACTOR shall be able to furnish evidence that they have been in business for a period of not less than 3 years, under the present name, and if required, furnish financial statements for each of the past 3 years.
- D. The CONTRACTOR must have a current California contractor's license and DIR number at time of bid.
- E. The CONTRACTOR must have installed a minimum of 10 outdoor track facilities in California in the last 3 years using the exact, WORLD ATHLETICS (WA) certified BSS 300 synthetic track surfacing, as specified herein with the contractor bidding this project. CA install reference form is to be included with bid.
- F. The MANUFACTURER must have a minimum of 10 years of experience with compound two-part polyurethane for athletic surfaces.
- G. The CONTRACTOR is required to provide documentation that shows the selected specified and installed product meets current WORLD ATHLETICS (WA) Performance Standards for Synthetic Surfaced Athletics Tracks (Outdoor) and is certified in terms of the WORLD ATHLETICS (WA) certification system as updated to present day.
- H. The MANUFACTURER must offer a minimum of seven (7) WORLD ATHLETICS (WA) Certified Track Systems.
- I. All polyurethane components must be MANUFACTURED in the United States in an **ISO 9001:2015 Certified** facility to ensure the highest quality materials.
- J. The CONTRACTOR/MANUFACTURER must supply a ten (10) year third party insured warranty covering this project.

3.2 SUBMITTALS

- A. The following submittals must be received prior to installation and be reviewed and approved by the owner:
 - 1. Standard printed specifications of the synthetic track surfacing system to be installed on this project.
 - 2. An affidavit attesting that the synthetic track surfacing material to be installed meets the requirements defined by the manufacturers currently published specifications and any modifications outlined in those technical specifications.
 - 3. A synthetic track surfacing system sample, 4" x 6" (min.) in size, of the same synthetic track surfacing system to be installed on this project.
 - 4. A list of completed facilities, including the installing supervisor, of the exact synthetic track surfacing system.
 - 5. A current WORLD ATHLETICS (WA) Certificate proving the product to be installed meets the current WORLD ATHLETICS (WA) Performance Standards for Synthetic Surfaced Athletics Tracks (Outdoor).

PART 4 – MATERIALS – FOR REFERENCE ONLY (OWNER FURNISHED VIA CMAS)

4.1 ELASTOMERIC POLYURETHANE

- A. BEYPUR, the two-component U.V. stabilized elastomeric polyurethane compounded from polyol and isocyanate components, based on one hundred percent (100%) Methylene Diphenyl Isocyanate (MDI). No Toluene Diisocyanate Isocyanate (TDI) will be allowed.

4.2 EPDM GRANULATE

- A. The EPDM granulates shall be approximately 1 to 3mm in size.
- B. The EPDM granulates and the U.V. stabilized elastomeric polyurethane shall be color matched.

4.3 RUBBER GRANULATE OF THE BASE COURSE

- A. Styrene Butadiene Rubber (SBR) processed ground to a graded size of 1-3mm.
- B. A maximum of 82%, by weight of the paved-in-place base layer, of SBR will be allowed.

4.4 SINGLE COMPONENT POLYURETHANE BINDER

- A. This binder shall be BEYPUR 300, a single-component polyurethane binder with a long cure time for use in paved mat specifications; a minimum of 18%, by weight of the paved-in-place base layer.

4.5 SEAL COAT

- A. This seal coat shall be BEYPUR 200, a two-component polyurethane pore sealer use with paved rubber granule mats. The granular SBR and binder layer shall be sealed with the BEYPUR 200. The application of EPDM dust is not allowed.

4.6 LINE MARKING PAINT

- A. All line and event markings shall be applied by experienced personnel utilizing the manufacturer's recommended pigmented paint compatible with the BSS 300 Track Surfacing material.

PART 5 – INSTALLATION

5.1 SUBBASE REQUIREMENTS

- A. Asphalt Compaction:
 - a. The Synthetic Track Surfacing System shall be laid on an approved subbase. The General Contractor shall provide compaction test results of 92-96% for the installed subbase and asphalt surface.
 - b. For NCAA certification the following criteria must be followed. The track surface, i.e., asphalt substrate, shall not vary from planned cross slope by more than +/- 0.2%, with a maximum lateral slope outside to inside of 1%, and a maximum slope of 0.1% in any running direction. The finished asphalt shall not vary under a 10' straight edge more than 1/8".
 - c. It should be the responsibility of the asphalt-paving contractor to flood the surface immediately after the asphalt is capable of handling traffic. If, after 20 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the architect, in conjunction with the surfacing contractor, to determine the method of correction. No cold tar patching, skin patching or sand mix patching will be acceptable.
- B. Asphalt Quality:
 - a. No Recycled Asphalt Pavement (RAP) shall be used in the wear course asphalt mix design as the inclusion of RAP as an off-set to virgin asphalt binder results in a brittle hot-mix asphalt (HMA) with significantly lower tensile strength and fatigue resistance. The sports surfacing contractor will not be held responsible for asphalt failures resulting from the inclusion RAP in the HMA mix design of the wear course.
 - b. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt. The minimum depth of any asphalt replacement shall be one inch. The curing time for the asphalt base is 28 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of polyurethane surfacing system.

C. Responsibility of Others:

- a. It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e., cross slopes, planarity, and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base before work can commence.

5.2 THICKNESS

- A. The thickness of the **BSS 300** Synthetic Track Surfacing System shall be 13mm.

5.3 EQUIPMENT

- A. The **BSS 300** Synthetic Track Surfacing System components shall be processed and installed by specially designed machinery and equipment. A mechanically operated paver with variable regulated speed and thermostatically controlled screed shall be used in the installation of the base mat. The wearing course shall be installed using automatic electronic portioning, which provides continuous mixing and feeding for an accurate, quality-controlled installation.
- B. No hand mixing is allowed.

5.4 INSTALLATION

A. Base Course:

The SBR granules and BEYPUR 300 shall be mixed on site to regulate the ratio/quantity of SBR, not to exceed 82% in the base mat portion of the system. The BEYPUR 300 shall be mixed with the SBR rubber so that a minimum of 20%, by weight, exists in the final mixture. This mixture is then mechanically installed using the paver.

B. Seal Coat:

The two BEYPUR 200 components are mixed at the prescribed ratio homogeneously with a suitable mixing device. The coating is squeegee applied to the base mat, making it impermeable.

C. Wearing Course:

The 1 to 3mm EPDM granules shall be integrated into the BEYPUR to achieve the full depth of the 5 mm wearing course. The resilient embedded textured finish shall be a dense matrix of exposed EPDM granules. The homogeneous wearing course shall be applied in situ with the base course.

* Final track surfacing colors are to be reviewed and approved during the submittal process prior to ordering and installation of track system. Please refer to the approved physical track surface sample and track surface color approval form included in your project track submittal package.

5.5 SITE CONDITIONS

- A. Installation shall not take place if adjacent or concurrent construction generates excessive dust, abrasives, or any other by-product that, in the opinion of the installer, would be harmful to the track material, until completion of such works.
- B. Apply Synthetic Track Surfacing in dry weather when pavement and atmospheric temperatures are fifty (50) degrees Fahrenheit or above and are anticipated to remain above fifty (50) degrees Fahrenheit for twenty-four (24) hours after completing application.
- C. The maximum temperature cannot exceed 105 degrees at any point during a 24 - hour period.
- D. Rain cannot be falling. If there is a threat of rain, work shall cease until dry conditions can be re-established on the track pavement. Work is to proceed only when adequate curing can be guaranteed by the manufacturer.

PART 6 – LINE STRIPING AND EVENT MARKINGS

6.1 LAYOUT

- A. Line striping and event markings shall be laid out in accordance with the owner and in reference to the project's governing body for current WORLD ATHLETICS (WA), NCAA, NFSHSA rules and or Owner requirements.

6.2 CERTIFICATION

- A. Upon completion of the installation, the owner shall be supplied with all necessary computations and drawings as well as a letter of certification attesting to the accuracy of the markings.

PART 7 – GUARANTEE

- A. The BSS 300 Synthetic Track Surfacing System shall be fully guaranteed by a third party against faulty workmanship and material failure for a period of ten (10) years from the date of acceptance.
- B. Synthetic surfacing material found to be defective because of faulty workmanship and/or material failure shall be replaced or repaired at no charge, upon written notification within the guarantee period.

END OF SECTION.

SECTION 32 31 13 – CHAIN LINK FENCING AND GATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes the following:
- B. Section includes:
 - 1. Chain link fencing, black polyvinyl coated, standard and non-climb mesh, and all accessories to install chain link fencing and gates.
 - 2. Chain link fencing, galvanized, and all accessories to install chain link fencing and gates.
 - 3. Bottom rail.
 - 4. Privacy slats (where noted on plans).

1.3 RELATED SECTIONS

- A. Section 03 33 00 – Concrete Work, for concrete for post footings.
- B. Section 08 71 00 – Finish Hardware.
- C. Section 32 13 13 – Concrete Paving and Walks.

1.4 REFERENCES

- A. Chain Link Fence Manufacturers Institute (CLFMI).

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.
- C. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

- B. Comply with recommendations of Chain Link Fence Manufacturer’s Institute Project Manual for materials, construction and installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. Galvanized Steel Fencing and Fabric:
 - a. Allied Tube and Conduit Corp.
 - b. American Chain Link Fence Company
 - c. American Tube Company
 - d. Anchor Fence, Inc.
 - e. Capital Wire and Fence Co., Inc.
 - f. Century Tube Corp.
 - g. Cyclone Fence Div./USX Corp.

2.2 FABRIC

- A. General: Comply with Chain Link Fence Manufacturers Institute (CLFMI) Product Manual.
- B. Steel Fabric: Furnish one-piece fabric widths for fencing up to 12 feet high. Wire size includes zinc or aluminum coating.
 - 1. Size: 1-3/4-inch mesh, 9 gage (0.148-inch diameter) wire.
 - 2. Galvanized Steel Finish: ASTM A392, Class 1, with not less than 1.2 oz. zinc per sq. ft. of uncoated wire surface.
 - 3. Selvage: Fabric 72 inches high and over shall be knuckled at one selvage and twisted at the other; all mesh 60 inches high and under shall be knuckled at both selvages.
- C. Polyvinyl Coated Fabric: 1-3/4" diamond mesh steel wire, interwoven, 13 gage core, 9 gage finish thick, top and bottom selvage knuckle end closed.
 - 1. Vinyl Coating: Polyvinyl chloride (PVC), plastic resin finish over galvanized steel wire, not less than 7 nor more than 20 mils thick. Coated before fabric fabrication.
 - 2. Color: Matte Black
- D. Polyvinyl Coated Fabric (No Climb): 1" diamond mesh steel wire, no climb, interwoven, 13 gage core, 9 gage finish thick, top and bottom selvage knuckle end closed.

1. Vinyl Coating: Polyvinyl chloride (PVC), plastic resin finish over galvanized steel wire, not less than 7 nor more than 20 mils thick. Coated before fabric fabrication.
2. Color: Matte Black

2.3 FRAMING

- A. Strength requirements for posts and rails conforming to ASTM F1043.
- B. Pipe shall be straight, true to section, material, and sizes specified, and shall conform to the following weights per foot:

NPS in Outside Diameter			
Inches	(OD) in inches	Type I Steel	Type II Steel
1	1.315	1.68	1.35
1-1/4	1.660	2.27	1.84
1-1/2	1.900	2.72	2.28
2	2.375	3.65	3.12
2-1/2	2.875	5.79	4.64
3	3.500	7.58	5.71
3-1/2	4.000	9.11	6.56
4	4.500	10.79	----
6	6.625	18.97	----
8	8.625	28.55	----

- C. Steel Framework, General:
 1. Type I Pipe: Hot-dipped galvanized steel pipe conforming to ASTM F 1083, plain ends, standard weight (schedule 40) with not less than 1.8 oz. zinc per sq. ft. of surface area coated.
 2. Type II Pipe: Manufactured from steel conforming to ASTM A 1011 or A 653, cold formed, electric welded with minimum yield strength of 50,000 psi and triple coated with minimum 0.9 oz. zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to the salt spray test of ASTM B117 for 300 hours with the end point of 5 percent Red Rust.
 3. End, corner, and pull posts for following fabric heights:
 - a. Up to 6 feet: 2.375-inch OD Type I or II steel pipe.
 - b. 6 feet to 10 feet max: 2.875-inch OD Type I or II steel pipe.
 4. Line or intermediate posts for the following fabric heights:
 - a. Up to 6 feet: 1.90-inch OD Type I or II steel pipe.
 - b. 6 feet to 10 feet max: 2.375-inch OD Type I or II steel pipe.

5. Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:
 - a. Up to 6 feet: 2.875" OD Type I or II steel pipe.
 - b. Over 6 feet to 13 feet: 4.00-inch OD Type I or II steel pipe.
 - c. Over 13 feet to 18 feet: 6.625-inch OD Type I steel pipe.
 - d. Over 18 feet: 8.625-inch OD Type I steel pipe.
6. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, for each joint. Provide means for attaching top rail securely to each gate corner, pull, and end post.
7. Galvanized Steel: 1-1/4-inch NPS (1.66-inch OD) Type I or II steel pipe.

2.4 FITTINGS AND ACCESSORIES

- A. Material: Comply with ASTM F626, mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards.
- B. Zinc Coating: Unless specified otherwise, galvanize steel fence fittings and accessories in accordance with ASTM A153, with zinc weights per Table I.
- C. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A824 with finish to match fabric.
- D. Type II Zinc Coated in following class: Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.
- E. Tie Wires: 12-gage (0.106-inch diameter) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating of surface area in accordance with ASTM A641, Class 3.
- F. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized steel or cast iron or cast aluminum cap for each end.
- G. Center Rail: Same material as top rail. Provide manufacturer's standard galvanized steel or cast iron or cast aluminum cap for each end.
- H. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive top rail.
- I. Tension or Stretcher Bars: Hot-dip galvanized steel with minimum length 2 inches less than full height of fabric, minimum cross-section of 3/16 inch by 3/4 inch and minimum 1.2 oz. zinc coating per sq. ft. of surface area. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into post.

- J. Tension and Brace Bands: Minimum 3/4-inch-wide hot-dip galvanized steel with minimum 1.2 oz. zinc coating per sq. ft. of surface area.
1. Tension Bands: Minimum = 14 gage (0.074 inch) thick.
 2. Tension and Brace Bands: Minimum = 12 gage (0.105 inch) thick.
- K. Concrete: Provide concrete consisting of Portland cement, ASTM C150, aggregates ASTM C33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 2500 psi using at least 4 sacks of cement per cubic yard, 1" maximum size aggregate, maximum 3" slump, and 2 to 4 percent entrained air.
- L. Privacy Slats: Provide privacy slats at chain link fencing and gates where shown on plans.

2.5 GATES

- A. Fabrication: Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.
1. Provide same fabric as for fence, unless otherwise indicated. Install fabric with tension bars and bands at vertical edges and at top and bottom edges.
 2. Install diagonal cross-bracing consisting of 3/8-inch diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.
- B. Swing Gates: Comply with ASTM F900. If along an accessible POT, comply with CBC 11B-404.
- C. Steel:
1. Up to 6 feet high and 8 feet wide: Fabricate perimeter frames of minimum 1.660-inch OD Type I or II steel pipe.
 2. Over 6 feet high and 8 feet wide: Fabricate perimeter frames of minimum 1.90-inch OD Type I or II steel pipe.
- D. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A153, and in accordance with the following as well as Section 08 71 00:
1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
 2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
 3. Keeper: Provide keeper for vehicle gates, which automatically engages gate

leaf and holds it in open position until manually released.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Install fence in compliance with ASTM F567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
- B. Excavation: Drill or hand excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
1. If not indicated on drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
 2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Footings: For fences 6'-0" and lower, provide non-reinforced 12" diameter by 3'-0" deep as per manufacturer's requirements, whichever is more stringent.
1. For fences higher than 6'-0" and up to 10'-0", provide non-reinforced 16" diameter by 4'-0" deep as per manufacturer's requirements, whichever is more stringent.
- D. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space maximum 10 feet o.c., unless otherwise indicated.
1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
 2. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.
- E. Top Rails: Run rail continuously through post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.
- F. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.
- G. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under tension.
- H. Bottom Rails: Provide bottom rails throughout, between all posts. Install in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary.

- I. Fabric: Leave approximately 2 inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.
- K. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
- L. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.
- M. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- N. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION.

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SECTION 32 31 19 – ORNAMENTAL METAL FENCING AND GATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein. Fencing shall match existing ornamental fencing in color and style on campus.
 - 2. Vehicular Gates.
 - 3. Pedestrian Gates.

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast-in-Place Concrete.
- B. Section 05 50 00 – Metal Fabrications.
- C. Section 08 71 00 – Finish Hardware.
- D. Section 31 20 00 – Earthwork.
- E. Section 32 13 13 – Concrete Paving and Walks

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data in the form of manufacturer's technical data, specifications, and installation instructions for fence and gate posts, pickets, rails, gates, and accessories.
- C. Shop drawings showing location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain ornamental metal fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

1.6 REFERENCES

- A. 2022 California Building Code (CBC), with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM B117 – Practice for Operating Salt-Spray (Fog) Apparatus.
 - 3. ASTM D523 – Test Method for Specular Gloss.
 - 4. ASTM D714 – Test Method for Evaluating Degree of Blistering in Paint.
 - 5. ASTM D822 – Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
 - 6. ASTM D1654 – Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
 - 7. ASTM D2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 - 8. ASTM D2794 – Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 - 9. ASTM D3359 – Test Method for Measuring Adhesion by Tape Test.
 - 10. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.7 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the jobsite, all materials shall be checked to ensure that no damages occurred during handling or shipping. Materials shall be stored in such a manner as to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft.

1.8 PRODUCT WARRANTY

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

PART 2 – PRODUCTS

2.1 APPROVED MANUFACTURER

- A. The fence system shall conform to Montage II® Welded and Rackable (ATF – All Terrain Flexibility) Ornamental Steel, Genesis, bottom rail treatment, style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.
- B. Refer to plans for fencing and gate heights.

2.2 MATERIAL

- A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft² (276 g/m²), Coating Designation G-90.
- B. Material for pickets shall be 1" square x 14 Ga. tubing. The rails shall be steel channel, 1.75" x 1.75" x .105". Picket holes in the rail shall be spaced 4.715" o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

Table 1 – Minimum Sizes for Montage II Posts

Fence Posts	Panel Height		
2-1/2" x 12 Ga.	Up to & Including 6'-0" Height		
3" x 12 Ga.	Over 6'-0" Up to & Including 8'-0" Height		

Gate Leaf	Gate Height		
	Up to & Including	Over 4'-0" Up to & Including 6'-0"	Over 6'-0" Up to & Including 8'-0"
Up to 4'-0"	2-1/2" x 12 Ga.	3" x 12 Ga.	3" x 12 Ga.
4'-1" to 6'-0"	3" x 12 Ga.	4" x 11 Ga.	4" x 11 Ga.
6'-1" to 8'-0"	3" x 12 Ga.	4" x 11 Ga.	6" x 3/16"
8'-1" to 10'-0"	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
10'-1" to 12'-0"	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
12'-1" to 14'-0"	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
14'-1" to 16'-0"	6" x 3/16"	6" x 3/16"	6" x 3/16"

2.3 FABRICATION

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar’s proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).
- C. The manufactured panels and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be

Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).

Table 2 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.
- E. Swing Gates (Vehicular and Pedestrian): Swing gates shall be fabricated using 1.75" x 14ga Forerunner double channel rail, 2" sq. x 12ga. gate ends, and 1" sq. x 14ga. pickets. Gates that exceed 6'-0" in width will have a 1.75" sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Gusset plates will be welded at each upright to rail intersection. Cable kits will be provided for additional trussing for all gates leaves over 6'-0". If along an accessible POT, comply with CBC 11B-404.
- F. Pedestrian Gates:
 1. Pedestrian swing gates shall be self-closing, having a gate leaf no larger than 48" width. Integrated hinge-closer set (2 qty) shall be ADA compliant that shall include a variable speed and final snap adjustment with compact design (no greater than 5" x 6" footprint). Hinge-closer set (2 qty) shall be tested to a minimum of 500,000 cycles and capable of self-closing gates up to a maximum gate weight of 260 lbs. and maximum weight load capacity of 1,500 lbs. Hinge-closer device shall be externally mounted with tamper-resistant security fasteners, with full range of adjustability, horizontal (0.5"-1.375") and vertical (0-0.5"). Maintenance free hinge-closer set shall be tested to operate in temperatures of - 20°F to 200°F, and swings to negative 2 degrees to ensure reliable final lock engagement.
 2. All pedestrian gates shall have perforated metal mesh attached to full height and width on the gate and extended on fencing 4'-0" on each side of gate for double gates, and on strike side of single gates, as shown on drawings, and

as specified in Section 05 50 00 – Metal Fabrications.

3. All pedestrian gates shall have a fully-welded hardware closure panel flush with rail.
- G. Hardware: Gates to include panic hardware, door stops, heavy duty hinges, etc., as noted on the plans, in this section, and in Section 08 71 00 – Finish Hardware.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
- B. Footings: Unless noted otherwise on plans.
 1. Posts: 8" diameter wide x 36" deep
 2. Gates: 12" diameter wide x 42" deep
- C. Fence posts shall be spaced according to Table 3, plus or minus 1/2". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). Earthwork and Concrete sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

Table 3 – Montage II – Post Spacing By Bracket Type						
Span	8'-0" Nominal (92-5/8" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Industrial Universal 2.5" (BB302) 3" (BB303)		Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*	
Post Settings ± 1/2" O.C.	96"	96-1/2"	96"	96-1/2"	*96"	*96-1/2"
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel. When using the BB301 flat mount bracket for Invincible style, rail may need to be drilled to accommodate rail to bracket attachment.						

1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
2. Unless otherwise indicated, extend concrete footings 2" above grade and trowel to a crown to shed water.

- D. Gates: Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations. Refer to Section 08 71 00.
- E. Hardware on Pedestrian Gates: See Section 08 71 00.
1. Operable parts of hardware shall be between 34" and 44" AFF or ground, per CBC 11B-404.2.7.
 2. Gate closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum (CBC 11B-404.2.8.1). Spring hinges shall be adjusted so that from the open position of 70 degrees, the door or gate shall move to the closed position in 1.5 seconds minimum (CBC 11B-404.2.8.2).
 3. Gate opening force shall be 5 pounds maximum (CBC 11B-404.2.9)
 4. Gate surfaces within 10" of finish floor or ground shall have a smooth surface of the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16" of the same plane as the other and be free of sharp or abrasive edges. Cavities created by added kick plates shall be capped (CBC 11B-404.2.10).
 5. Panic Hardware: Panic hardware system to be Von Duprin Model AXCD99. Contractor to provide all required associated components to ensure a working panic hardware system. Refer to Section 08 71 00 – Finish Hardware.
 6. Kickplates: Kickplates to be fabricated, as shown on plans, and shall be similar or equal to Ives Model 8400. See plans for sizing and mounting heights / locations. Refer to Section 08 71 00 – Finish Hardware.

3.2 FENCE MAINTENANCE

- A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-manufacturer approved parts or components will negate the manufactures' warranty.

3.3 CLEANING

- A. Contractor shall clean jobsite of excess materials; post hole excavations shall be scattered uniformly away from posts.

END OF SECTION.

SECTION 32 80 00 – IRRIGATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.2 DESCRIPTION

- A. Scope of Work: Furnish all labor, materials, tools, equipment, and transportation required to perform and complete the installation of an automatic sprinkler irrigation system, including all piping, sprinkler heads, controls, connections, testing, etc. as shown on the Drawings and as specified herein. The water source for this project is potable water.
- B. Utilize and accept as standards manufacturer's recommendations and/or installation details for any information not specifically detailed on the Drawings.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 01 77 00 – Project Closeout.
- C. Section 31 20 00 – Earthwork.
- D. Section 32 90 00 – Landscaping.

1.4 GUARANTEE

- A. Guarantee all workmanship and materials hereunder against defective workmanship and materials, including damage by leaks and settlement of irrigation trenches, for the duration specified in Division 01 of these Specifications. (The Contractor is not responsible for vandalism or theft after date of final acceptance.)

1.5 QUALITY CONTROL

- A. Qualifications of Contractor: Work must be completed by a licensed Landscape Contractor. Provide proof of five years of continuous experience in landscaping and irrigation of projects of similar size (+/- 20% of the construction cost) and scope for education campuses. Contractor to have a minimum of two projects either completed or in construction in the last five years.
- B. Work Force: Ensure that an experienced foreman is present at all times during installation. Keep the same foreman and workers on the job from commencement to completion.
- C. Reviews: Specifically request reviews of all items listed below in "Inspection Requirements" prior to progressing to the next level of work.

- D. Certification: Ensure that the contractor installing the Central Control System is trained and certified in the installation of the Central Control System. The training and certification must have been completed within two years prior to the installation date.
- E. Standards:
 - 1. Provide work and material in full accordance with the rules and regulations of the California Electric Code; the California Plumbing Code; and other applicable state or local laws or regulations.
 - 2. Furnish, without extra charge, additional material and labor required to comply with these rules and regulations, though the work may not be specifically indicated in the Specifications or Drawings.
 - 3. Where the Specification requirements exceed those of the above-mentioned codes and regulations, comply with the requirements in the Specifications.
- F. Delivery, Storage, and Handling:
 - 1. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect related work and material.
 - 2. Handle plastic pipe carefully, especially protecting it from prolonged exposure to sunlight. Store pipe on beds that are the full length of the pipe and keep pipe flat and off the ground with blocks.
- G. Comply with the requirements of Section 01 77 00 – Project Closeout.

1.6 INSPECTION REQUIREMENTS

- A. Request and hold a pre-construction meeting prior to beginning the work of this Section. Parties required to be in attendance are the Landscape Contractor, Project Inspector, Owner’s Representative, and the Landscape Architect.
- B. Prior to commencement of the work of this Section, obtain written verification from the project Civil Engineer that the rough grade in landscape areas is in conformance with Section 31 20 00 – Earthwork.
- C. Obtain verification from Project Inspector for the following at the appropriate times during construction and prior to further progression of work in this Section:
 - 1. Pressure testing of all mainlines and lateral lines (See “Hydrostatic Tests – Open Trench” in Part 3.14 of this Section),
 - 2. Trench depth,
 - 3. Sleeves under pavement,
 - 4. Flushing of all mainlines and lateral lines,
 - 5. Backfill and pipe bedding,

6. Layout of heads,
 7. Operation of system and coverage adjustments (with Landscape Architect) after system is fully automated and operational, backfill of trenching is completed, and surface has been restored to original grades.
- D. In case of failure to obtain any verification by the Project Inspector as required above, remove and replace work as necessary to obtain the verification at no additional cost to the Owner.

1.7 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with requirements of Section 01 33 00 – Submittals.
- B. Product names are used as standards; provide proof as to equality of any proposed material and do not use other materials or methods unless approved in writing by the Owner's Representative. Submit no more than one request for substitution for each item. The decision of the Owner's Representative is final.
- C. Use equipment capacities specified herein as the minimum acceptable standards.
- D. List materials in the order in which they appear in Specifications; include substitutions. Submit the list for approval by the Owner's Representative.
- E. Make any mechanical, electrical, or other changes required for installation of any approved, substituted equipment to satisfaction of Owner's Representative and without additional cost to Owner. Approval by Owner's Representative of substituted equipment and/or dimensional drawing does not waive these requirements.
- F. Do not construe approval of material as authorization for any deviations from Specifications unless attention of Owner's Representative has been directed to specified deviations.

1.8 PROJECT CONDITIONS, AND PROTECTION

- A. Information on Drawings relative to existing conditions is approximate. During progress of construction, make deviations necessary to conform to actual conditions, as approved by Owner's Representative, without additional cost to Owner. Accept responsibility for any damage caused to existing services. Promptly notify Owner's Representative if services are found which are not shown on Drawings.
- B. Protect existing trees-to-remain as specified in "Existing Tree Protection" in Part 3.2 of this Section.
- C. Protect existing utilities within construction area. Repair damages to utility lines that occur as a result of operations of this work.
- D. Verify dimensions at building site and check existing conditions before beginning work. Make changes necessary to install work in harmony with other crafts after receiving approval by Owner's Representative.

1.9 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Furnish three complete sets of operating maintenance instructions bound in a hardback binder and indexed. Start compiling data upon approval of list of materials. Do not request final inspection until booklets are approved by Owner's Representative.
- B. Incorporate the following information in these sets:
 - 1. Complete operating instructions for each item of irrigation equipment.
 - 2. Typewritten maintenance instructions for each item of irrigation equipment.
 - 3. Manufacturer's bulletins which explain installation, service, replacement parts, and maintenance.
 - 4. Service telephone numbers and/or addresses posted in an appropriate place as designated by Owner's Representative.

1.10 RECORD DRAWINGS

- A. Upon completion of work, and as a precedent to final payment, deliver to Owner's Representative one complete set of reproducible originals of Drawings showing work exactly as installed. (See "Record Drawings" in Part 3.17 of this Section)

PART 2 – PRODUCTS

2.1 GENERAL

- A. Use materials as specified; any deviation from the Specifications must first be approved by the Owner's Representative in writing. All material containers or certificates shall be clearly marked by manufacturer as to contents for inspection.

2.2 MATERIALS

- A. Central Control System: As indicated on Drawings.
- B. Automatic Control Valves: As indicated on Drawings.
- C. Gate Valve: As indicated on Drawings.
- D. Pipe and Fittings:
 - 1. PVC pipe: As indicated on Drawings.
 - 2. PVC fittings three-inch (3") size and smaller: High impact, standard weight, Schedule 40, molded PVC as manufactured by George Fischer, Lasco, Spears, or approved equal.
 - 3. PVC fittings four-inch (4") size and larger: High impact, standard weight, Class 200 gasketed, molded PVC as manufactured by George Fischer, Lasco, Spears, or approved equal.

4. All plastic pipe and fittings: Continuously and permanently marked with manufacturer's name, type of material, IPS size, schedule, NSF approval, and code number.
 5. Threaded PVC pipe and nipples: IPS Schedule 80 when necessary to use threaded connections to gauges, valves, or control valves. Threaded adapters may be used in place of nipples when making pipe to valve connections.
 6. Use 45-degree fittings for changes in depth of pipe, and at transition from main line to automatic control valves.
 7. Piping above ground: Schedule 40 galvanized steel with cast-iron fittings.
 8. Piping used for electrical purposes to be Schedule 40 PVC Rigid Nonmetallic Conduit electrical conduit.
- E. PVC Primer: Weld-On P-70 Purple Primer or approved equal.
- F. PVC Glue: Weld-On 711 Gray heavy bodied PVC Cement or approved equal.
- G. PVC Glue for connections to Flexible PVC: Weld-On 795 Blue Flex PVC Cement or approved equal.
- H. Sprinkler Heads: As indicated on Drawings.
- I. Quick Coupler Valves: As indicated on Drawings.
- J. Sleeves: As indicated on Drawings.
- K. All Valve Boxes and Covers: Manufactured, green with "Irrigation – Non-Potable" permanently embossed on cover. Carson, Rainbird or approved equal.
- L. Automatic Sprinkler Control Wire:
1. Connections between remote control valves and controller: UF-14 direct burial polyethylene (PE) insulated wire, Paige Electric P7079D or approved equal. Common wire to be white, and lead wire to be colored. If multiple controllers are used, a different color is to be used for each controller's lead wire. (Use red for the first controller). Spare wires are to be yellow.
 2. UL Listed waterproof sealing pack for wire connections: 3M DBR/Y-6, or approved equal.
- M. Trace Wire:
1. Direct burial #12 AWG Solid, steel core soft drawn tracer wire, 250# average tensile break load, 30 mil high molecular-high density polyethylene jacket complying with ASTM-D-1248, 30-volt rating. Color shall be green.
 2. Connectors: UL Listed waterproof sealing pack for wire connections: 3M DBR/Y-6, or approved equal.

- N. Unions And Flanges:
 - 1. Steel unions and flanges two inches (2") and smaller: 150 lb. screwed black (brass to iron seat) or galvanized malleable iron (ground joint).
 - 2. Steel unions and flanges two and one-half inches (2 ½") and larger: 150 lb. black flange union, flat-faced, full gasket.
 - 3. Gaskets: One-sixteenth inch (1/16") thick rubber Garlock No. 122, Johns-Manville or approved equal.
 - 4. Flange Bolts: Open-hearth bolt steel, square heads with cold pressed hexagonal nuts, cadmium plated in ground. Provide copper-plated steel bolts and nuts or brass bolts and nuts for brass flanges.
- O. Pipe Supports: Adjustable saddle support type support.
- P. Valve Identification Tags: Christy's irrigation ID tags, standard yellow color or approved equal.
- Q. Sand for Trench Backfill: Natural sand, free of roots, bark, sticks, rags, or other extraneous material.

PART 3 – EXECUTION

3.1 SITE CONDITIONS

- A. Locations of existing utilities and other improvements shown on the Drawings are approximate. Verify existing conditions and, should any utilities be encountered that are not indicated on the plans, notify the Owner's Representative immediately. Accept responsibility for any damages caused to existing services.

3.2 PREPARATION

- A. Scheduling: Notify the Project Inspector prior to commencing and/or continuing the work of this Section. Remove and replace, at no cost to Owner, any work required as a result of failure to give the appropriate notification.
- B. Examination: Examine conditions of work in place before beginning work; report defects.
- C. Measurements: Take field measurements; report variance between plan and field dimensions.
- D. Protection: Maintain warning signs, shoring and barricades as required. Prevent injury to, or defacement of, existing improvements. At no additional cost to Owner, repair or replace items damaged by installation operations.
- E. Existing Tree Protection:
 - 1. Avoid unnecessary root disturbance, compaction of soils within drip line, or limb breakage.

2. Do not store material or dispose of any material other than clean water within the drip line.
 3. Provide adequate irrigation during construction.
 4. Replace any tree damaged during construction with a tree of equal size and value at no additional cost to Owner.
 5. Adjust trench locations in field to minimize damage to existing elements and plant roots of trees-to-remain at no additional cost to Owner.
- F. Surface Preparation: Prior to beginning sprinkler irrigation work, complete placement of topsoil as specified in Section 31 20 00 – Earthwork. Notify Project Inspector of irregularities if any.

3.3 AUTOMATIC CONTROLLER

- A. Connect automatic control valves to controller(s) in sequence as shown on Drawings.

3.4 GRADING

- A. Install all irrigation features to their finished grade and at depths indicated. Complete and /or accommodate all rough grading and/or finish grading before commencing with trenching.

3.5 LAYOUT

- A. Lay out work as accurately as possible to Drawings. Drawings are generally diagrammatic to extent that swing joint offsets and fittings are not shown. Record all changes on the Record Drawings.
- B. Do not willfully install the irrigation system as shown on Drawings when it is obvious, in the field, that obstructions or other discrepancies exist which may not have been considered in the design. Notify Owner's Representative of discrepancies before proceeding.

3.6 EXCAVATING AND TRENCHING

- A. General: Perform excavations as required for installation of work included under this Section, including shoring of earth banks to prevent cave-ins. Restore surfaces, existing underground installations, etc., damaged or cut as result of this work to their original condition and in a manner approved by the Landscape Architect.
- B. Width:
1. Make trenches wide enough to allow a minimum of six inches (6") between parallel pipelines and three inches (3") between side of pipe and side of trench. Do not allow stacking of pipe within trench.
 2. Allow a minimum clearance of twelve inches (12") in any direction from parallel pipes of other trades.
- C. Preparation of Excavations: Remove rubbish and rocks from trenches. Bed pipe on

a minimum of three inches (3") of clean, rock-free soil to provide a firm, uniform bearing for entire length of pipeline. Cover pipe with a minimum of three inches (3") of clean, rock-free soil. If clean, rock-free soil is not available, use sand for pipe bedding and three inches (3") of backfill above the pipe. The remainder of the trench backfill material can be native soil. Do not allow wedging or blocking of pipe.

- D. Minimum depth of cover: Unless shown otherwise, provide the following minimums:
 - 1. Mainline: twenty-four inches (24") cover.
 - 2. Lateral line: twelve inches (12") cover for spray heads, and eighteen inches (18") cover for rotor heads.
- E. Conflicts with other trades:
 - 1. Hand-excavate trenches where potential conflict with other underground utilities exist.
 - 2. Where other utilities interfere with irrigation trenching and piping work, adjust the trench depth as instructed by Owner's Representative.

3.7 BACKFILL AND COMPACTING

- A. General: Do not begin until hydrostatic tests are completed. When system is operating and after required tests and inspections have been made, backfill trenches under paving areas to the compaction rate specified in Section 31 00 00 – EARTHWORK.
- B. Place backfill in six-inch (6") layers and compact with an acceptable mechanical compactor.
 - 1. Compact backfill material in landscape areas to eighty-five percent (85%) maximum dry density of the soil.
 - 2. If settlement occurs along trenches, make adjustments in pipes, valves, and sprinkler heads, soil, sod or paving as necessary to bring the system, soil, sod or paving to the proper level or the permanent grade, without additional cost to the Owner.
- C. Excess Soil: Remove all rocks, debris, and excess soil that results from sprinkler irrigation trenching operations, landscape planting, and soil preparation operations off site at no additional cost to the Owner. If soil meets topsoil requirements in Section 31 20 00 – Earthwork, it may be used for finish grading.
- D. Finishing: Dress-off areas to eliminate construction scars.

3.8 CONTROL WIRES

- A. General: Install control wires beneath sprinkler main line whenever possible; tape wires to mainline pipe. Provide one spare wire for each controller.
- B. Slack Wire: Provide eighteen inches (18") of slack wire for each wire connected to automatic control valve. Slack wire shall be coiled and left in the valve box. Tape

wires in bundles every ten feet (10'); do not tape wires in sleeves.

- C. Expansion and Contraction: Snake wire in trench to allow for contraction of wire.
- D. Wire Passing Under Existing or Future Paving or Construction: Encase in PVC Schedule 40 or galvanized steel conduit extending at least twelve inches (12") beyond edges of paving or construction.
- E. Wire Connections: Install wire connections in a waterproof sealing pack.
- F. Wire Splicing: Permit splicing only on runs exceeding 500 feet. Locate all splices within valve boxes.
- G. Wire Termination: Install wire in a valve box with eighteen inches (18") of slack wire coiled and individually capped with approved waterproof sealing pack.
- H. Spare Wire: Install two (2) spare wires along each wire path. If there is more than one wire path from the controller, the contractor to install two (2) spare wires per path. Provide eighteen inches (18") of slack wire at each automatic control valve.

3.9 TRACE WIRE

- A. General: Install trace wire above sprinkler main line whenever possible; tape wire to mainline pipe at 10' intervals to ensure the wire remains adjacent to the pipe.
- B. Wire Connections: Install wire connections in a waterproof sealing pack.
- C. Trace wire access points shall be accessible at all automatic control valves.
- D. At all mainline end caps, a minimum of six feet (6') of tracer wire shall be coiled and secured to the cap for future connections. The end of the tracer wire shall be spliced to the wire of a six-pound zinc anode and is to be buried at the same elevation as the irrigation mainline.
- E. Testing: The contractor shall perform a continuity test on all trace wires in the presence of the client. If the trace wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of the wire.

3.10 FLUSHING LINES

- A. Thoroughly flush lines prior to installing valves, performing hydrostatic testing, or installing sprinklers. Divert water to prevent washouts.

3.11 AUTOMATIC CONTROL AND QUICK COUPLER VALVES

- A. Install where shown and where practical; place no closer than twelve inches (12") to walk edges, building walls, or fences. Refer to detail for example.
- B. Thoroughly flush mainline before installing valve.
- C. Install valves in ground cover areas where possible.

3.12 PIPING

- A. General: Install in conformance with reference standards, manufacturer’s written directions, as shown on Drawings and as herein specified.
- B. Workmanship:
 - 1. General: Install sprinkler irrigation equipment in planted areas throughout the site.
 - 2. Coordination: Organize location of sleeves with other trades as required.
- C. Pipe Line Assembly:
 - 1. General:
 - a. Cutting: Cut pipe square; remove rough edges or burrs.
 - b. Solvent-welded Connections: Use materials and methods recommended by the pipe manufacturer.
 - c. Primer to be used on PVC fittings only. No Primer to be used on Flexible PVC tubing.
 - d. Brushes: Use non-synthetic brushes to apply solvents and primer.
 - e. Cleaning: Clean pipe and fittings of dirt, moisture, and debris prior to applying solvent or primer.
 - f. Assembly: Allow pipe to be assembled and welded on the surface or in the trench.
 - g. Expansion and Contraction: Snake pipe from side to side of trench to allow for expansion and contraction.
 - h. Location: Locate pipes as shown on Drawings except where existing supply valves, utilities or obstructions prohibit or where slight changes are approved to better suit field conditions.
 - 2. Elastomeric Seal (Gasket) Joints:
 - a. General: Assemble in strict conformance with the pipe manufacturer’s instruction.
 - b. Rubber Rings: Use rubber rings specific for water service systems.
 - c. Cleaning: Thoroughly clean ring and groove of dirt, moisture and debris using a clean, dry cloth. Do not use solvents, lubricants, cleaning fluids or other material for cleaning.
 - d. Seating: Properly seat ring in groove.
 - e. Spigot: General: Clean spigot-end of pipe as in “Cleaning” above

prior to applying lubricant recommended by pipe manufacturer. Insert spigot into bell and seat to full depth required.

3. Connections:
 - a. Threaded Plastic Pipe Connection:
 - i. Use Teflon tape or pipe joint compound.
 - ii. When assembling to threaded pipe, take up joint no more than one full turn beyond hand-tight.
 - b. Metal Valves and Plastic Pipe: Use threaded plastic male adapters.
 - c. Metal to Metal Connections:
 - i. Use specific joint compound or gasket material for type of joint made. Where pipe of dissimilar metals are connected, use dielectric fittings.
 - ii. Where assembling, do not allow more than three full threads to show when joint is made up.
 - d. Where assembling soft metal (brass or copper) or plastic pipe, use strap-type friction wrench only; do not use a metal-jawed wrench.
 - e. Threading:
 - i. Do not permit the use of field-threading of plastic pipe or fittings. Use only factory-formed threads.
 - ii. Use factory-made nipples wherever possible. Permit the use of field-cut threads in metallic pipe only where absolutely necessary. When field-threading, cut threads accurately on axis with sharp dies.
 - iii. Use pipe joint compound for all threaded joints. Apply compound to male thread only.
4. Sleeves and conduits:
 - a. Use sleeves of adequate size to accommodate retrieval for repair of wiring or piping and extend a minimum of twelve inches (12") beyond edges of walls or paving.
 - b. Provide removable, non-decaying plug at end of sleeve to prevent entrance of soil.
5. Unions: Locate unions for easy removal of equipment or valve.
6. Capping: Plug or seal opening as lines are installed to prevent entrance materials that would obstruct pipe. Leave in place until removal is necessary for completion of installation.

3.13 SPRINKLER HEADS

- A. Sprinkler heads: Locate as shown on the Drawings except where existing conditions prohibit, or slight changes are approved to achieve as good or better coverage under the same conditions. Do not allow sprinkler head spacing to exceed the maximum shown on the Drawings. Plumb heads.
- B. Handling, Assembly of Pipe, Fittings, and Accessories: Allow only skilled tradesmen to handle and assemble pipe, fittings and equipment. Keep interior of pipes, fittings and accessories clean at all times. Close ends of pipe immediately after installation; leave closure in place until removal is necessary for completion of installation. Do not permit bending of pipe.
- C. Flushing: Remove end heads and operate system at full pressure until all rust, scale, and sand is removed. Divert water to prevent ponding or damage to finished work.
- D. Coverage: Accept responsibility for full and complete coverage of irrigated areas to satisfaction of Landscape Architect and make necessary adjustments to better suit field conditions at no additional costs to Owner.

3.14 FIELD QUALITY CONTROL

- A. Visual Inspection: Verify that all pipe is homogenous throughout and free from visual cracks, holes, or foreign materials. Inspect each length of pipe. All materials are subject to impact test at the discretion of the Landscape Architect.
- B. Hydrostatic Tests – Open Trench:
 - 1. Center-load piping with a small amount of backfill to prevent arching or slipping under pressure.
 - 2. Request the presence of the Project Inspector in writing at least forty-eight hours in advance of testing.
 - 3. At no additional cost to Owner, test in the presence of the Project Inspector.
 - 4. Apply continuous static water pressure of 100 psi when welded plastic joints have cured at least twenty-four hours, and with the risers capped, as follows: test main lines and submains for four hours; test lateral lines for two hours.
 - 5. Repair leaks resulting from tests; and repeat tests.
 - 6. Test to determine that all sprinkler heads function according to manufacturer's data and give full coverage according to intent of Drawings. Replace any sprinklers not functioning as specified with ones that do, or otherwise correct system to provide satisfactory performance.
- C. Continuity Testing: Test locating device and control wires for continuity prior to and after back-filling operations.

3.15 CLEAN-UP

- A. Remove debris resulting from work of this Section.

3.16 ADJUSTMENTS AND MAINTENANCE

- A. Adjusting System: Prior to acceptance, satisfactorily adjust and regulate entire system. Set watering schedule on controller appropriate to types of plants and season of year. Adjust remote control valves to operate sprinkler heads at optimum performance based on pressure and simultaneous demands through supply lines.
- B. System Layout: Provide reduced prints of Record Document irrigation plans, laminated in four (4) mil. plastic, of size to fit controller door. Enlarge remote-control valve designations as necessary for legibility. Color-code areas covered by each station. Affix plans to inside of controller door.
- C. Instructions: Upon completion of work, instruct maintenance personnel on operation and maintenance procedures for entire system.
- D. Flow Charts: Record and prepare an accurate flow-rate chart for each automatic control valve.

3.17 RECORD DRAWINGS

- A. Regularly update plans of the system and any changes made to the system throughout the project. Record all changes on this plan before trenches are back-filled.
- B. Record the as-built information on reproducible plans provided by the Architect. Complete and submit the Record Drawings to the Architect before applying for payment for work installed.
- C. As-built drawings are to be completed electronically with a pdf editing software or computer aided drafting software. As-built drawing done by hand will not be accepted for final submittal.
- D. Show the following on the Record Drawings accurately to scale and dimensioned from two permanent points of reference:
 - 1. Distance of mainline from nearby hardscape.
 - 2. Location of automatic control valves, quick couplers, and gate valves.
 - 3. Location and size of all sleeves.
 - 4. Location of automatic control wires and spares.

3.18 OPERATION MANUALS

- A. Deliver two complete sets of manufacturer's warranties, Contractor guarantees, instruction sheets, parts lists and operation manuals to the Architect before requesting final acceptance of the project. Do not request final inspection until the sets are approved.

END OF SECTION.

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SECTION 32 90 00 – LANDSCAPING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Scope of Work: Furnish all labor, materials, tools, equipment, and transportation required to perform and complete the following work as specified herein:
 - 1. Soil Preparation and Fertilization
 - 2. Planting
 - 3. Sodding
 - 4. Weed Control
 - 5. Mulch
 - 6. Clean-up
 - 7. Landscape Maintenance Period
 - 8. Guarantee
- B. Work not included in this Section: Landscape elements such as concrete walks, fencing, outdoor lighting, rough grading, and clearing are not a part of this Section unless shown on the landscape Drawings.
- C. Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications sections, apply to this section.

1.2 RELATED SECTIONS

- A. Section 01 33 00 – Submittals.
- B. Section 01 77 00 – Project Closeout.
- C. Section 31 20 00 – Earthwork.
- D. Section 32 80 00 – Irrigation.

1.3 GUARANTEE

- A. The guarantee period for lawn and plant material shall be the duration of the landscape maintenance period, from commencement until final acceptance of the work of this Section. See Division 01 for other applicable guarantee requirements.

- B. During the guarantee period, repair and/or replace plants and lawn not in satisfactory growing condition, as determined by Owner's Representative, without additional cost to Owner. Plants are to be replaced as per "Landscape Maintenance" in Part 3.9 of this Section, using plants of the same kind and size specified in plant list.

1.4 QUALITY CONTROL

- A. **Qualifications:** Work must be completed by a licensed Landscape Contractor. Provide proof of five years of continuous experience in landscaping and irrigation of projects of similar size (+/- 20% of the construction cost) and scope for education campuses. Contractor to have a minimum of two projects either completed or in construction in the last five years.
- B. **Work Force:** Ensure that an experienced foreman is present at all times during installation. Keep the same foreman and workers on the job from commencement to completion.
- C. **Reviews:** Specifically request reviews of all items listed below in "Inspection Requirements" prior to progressing to the next level of work. The Owner's Representative reserves the right to inspect and reject material, both at place of growth and at site, before and/or after planting, for compliance with requirements for name, variety, size and quality.
- D. **Reference Standards:** Meet or exceed Federal, State and County laws requiring inspection of all plants and planting materials for plant disease and insect control.
- E. **Delivery, Storage, and Handling:**
 - 1. **Packaged Materials:** Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
 - 2. **Bulk Materials:**
 - a. Do not dump or store bulk materials near structures, utilities, walkways or pavements, or on existing turf areas or plants.
 - b. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - c. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.
- F. **Plant Material:**
 - 1. Conform to the current edition of Horticultural Standards for quality of Number 1 grade nursery stock as adopted by the American Association of Nurserymen. Conform to sizes specified on plant legend. Select plants which have a natural shape and appearance.

2. Select only plants that are true to name, and tag one of each bundle or lot with the name of the plant in accordance with the standards of practice of the American Association of Nurserymen. In all cases, botanical names shall take precedence over common names.
3. Tag each plant of a patented variety with the variety and identification number, where applicable, as it is delivered to the job site.
4. Select only plants which have been nursery-grown in accordance with good horticultural practices and which have been grown under climatic conditions similar to those in the locality of the project for at least one year.
5. Select only plants which are typical of their species or variety; have normal habits of growth; are sound, healthy, vigorous, well-branched and densely-foliated when in leaf; are free of disease, insect pests, eggs or larvae; and have a healthy and well-developed root system.
6. Select only container stock that has been grown in the containers in which delivered for at least six (6) months, but not over two (2) years. Provide samples to show that there are no root-bound conditions.
7. Do not use plants that are severely pruned or headed-back to meet size requirements.
8. Do not plant container-grown plants that have cracked or broken balls of earth when taken from the container. Remove canned stock carefully from cans after containers have been cut on two sides with tin snips or other approved cutter.
9. Coordinate a time for the Landscape Architect to inspect the plants upon their delivery to the project site.
10. At any time prior to final acceptance, be prepared to replace any plants that are rejected by the Owner's Representative because of physical damage to the plant.
11. Do not remove container-grown stock from containers before time of planting.
12. Be prepared to replace plants which are rejected by the Owner's Representative for the following reasons:
 - a. Trunk bark damage caused by sunburn,
 - b. Trunk bark wounds caused by rubbing stakes or ties,
 - c. Trunk bark damage caused by ties that have girdled the tree,
 - d. Tree head development that is lopsided and not symmetrical in form,
 - e. Tree branches that cross or touch,
 - f. Tree branches with double leaders (unless multi-trunk trees are specified).

13. Stake shrubs with one-inch by one-inch by eighteen-inch (1"x1"x18") stakes in such manner that the stakes are not visible, and tie to upright position if they lean and/or are not growing in a vertical position.
 14. Furnish quantities necessary to complete the work as shown on the Drawings and, if necessary, make up for any discrepancies in the quantities given in the Plant List at no additional cost to Owner.
- G. Decomposed Granite with Binder Mock-up:
1. Install 4 ft wide x 10 ft long mock-up of decomposed granite with Stabilizer additive at location as directed by owner's representative for review and acceptance prior to placement of decomposed granite.
- H. Comply with the requirements of Section 01 77 00 – Project Closeout.

1.5 INSPECTION REQUIREMENTS

- A. Landscape Architect reserves the right to examine and reject plant material both at place of growth and at site, before and after planting, for compliance with requirements of name, variety, size, and quality.
- B. Request and hold a pre-construction meeting prior to beginning the work of this Section. Parties required to be in attendance are the Landscape Contractor, Project Inspector, Owner's Representative, and Landscape Architect.
- C. Obtain verification from Project Inspector for the following at the appropriate times during construction and prior to further progression of work in this Section:
1. Rough grading is to tolerances specified in Section 31 20 00 – Earthwork.
 2. The placement of landscape backfill material is as specified in this Section.
 3. Prior to the commencement of the work specified in this Section, the coverage and operation of the sprinkler irrigation system are as specified in Section 32 80 00 – Irrigation.
 4. The soil amendment does not include any metal fragments. (Obtain a letter from the manufacturer stating that the material submitted for use on this project has no metal or foreign objects. Submit this letter as part of the Data Sheet submittal package [see "Submittals and Substitutions" in this Section])
 5. Required Test: For each load of soil amendment delivered to the site, spread at least two cubic yards (2 cy) of material onto a paved surface approximately two inches (2") deep. Pass a magnetic rake over the material in two directions. If any metal is found, test the entire load in the same manner. Perform all testing in the presence of the Project Inspector.
 6. Soil amendments, fertilizer, bark mulch and materials used for hydroseeding have been delivered to the site by the supplier, the invoices from the supplier indicate the project name and quantities delivered, and the Project Inspector has received copies of all such documents.

7. Prior to planting, amendments and conditioners have been incorporated as per pre-planting recommendations, and planting areas have been made ready to receive planting.
- D. In case of failure to obtain any verification by the Project Inspector as required above, remove and replace work as necessary to obtain the verification at no additional cost to the Owner.
- E. Beginning of Maintenance Period: Verify all work is complete, then request and hold a meeting to include the Landscape Architect, Project Inspector, Architect and Owner's Representative for authorization to begin the landscape maintenance period.
- F. End of Maintenance: Verify that all work is complete and acceptable, and that the maintenance has been completed per specifications; and continue to provide landscape maintenance until the Owner's Representative has accepted the work.

1.6 SUBMITTALS AND SUBSTITUTIONS

- A. See Section 01 33 00 – Submittals for additional requirements.
- B. Plant Material: Within fifteen (15) days after award of contract, locate plant materials required for construction. Ensure that trees and shrubs are contract-grown from a certified nursery. Notify Owner's Representative of plant material "tied off" for review at selected nursery. If specified material is not obtainable, submit the following to Owner's Representative: proof of non-availability, proposal for use of equivalent material, photographs of alternative choices of plant material. Include clear, written description of type, size, condition, and general character of plant material.
- C. Data Sheets: Provide product data for each type of landscape material indicated in the Drawings and Specifications.
- D. Samples: Submit samples of the following materials to Landscape Architect for approval:
 1. Soil amendment: (3) one-quart zip-locked plastic bags.
 2. Bark Mulch: (3) one-quart zip-locked plastic bags.
 3. Imported Topsoil: (3) one-quart zip-locked plastic bags. (if needed)
- E. Provide soils analysis reports prepared by a qualified soils laboratory in compliance with the Soil Testing Requirements under "Soil Testing" in Part 3.02 of this Section.
- F. Prior to planting, submit copies of all trucking or packaging tags for all soil amendment, fertilizer and other additives to Landscape Architect so the quantities can be verified.

1.7 PROTECTION AND CLEAN-UP

- A. Provide protection for persons and property throughout progress of work. Use temporary barricades as required. Proceed with work in such manner as to minimize spread of dust and flying particles and to provide safe working conditions for

personnel. Store materials and equipment where directed.

- B. Existing Construction: Execute work in an orderly and careful manner to protect paving, work of other trades, and other improvements.
- C. Existing Utilities: Provide protection for existing utilities within construction area. At no additional cost to Owner, repair any damages to utility lines that occur as a result of this work.
- D. Landscaping: Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods.
- E. Paving: Maintain cleanliness of paving areas and other public areas used by equipment, and immediately remove spillage; remove rubbish, debris, and other material resulting from landscaping work, leaving site in a safe and clean condition.

1.8 PLANTING SCHEDULE / ENVIRONMENTAL REQUIREMENTS

- A. Install, establish, and maintain all lawn areas for a minimum of ninety (90) days prior to date of substantial completion. Coordinate schedule with other work and overall project schedule. Failure to install lawn areas by this date shall result in assessment of liquidated damages.
- B. Proceed with work in an orderly and timely manner to complete installation of landscaping within contract limits.
- C. Planting Season Limits: Do not plant when grounds are wet or temperature is below 25°F. Do not proceed with any soil preparation and fertilization if all planting cannot be completed within Planting Season Limit.

1.9 LANDSCAPE MAINTENANCE PERIOD REQUIREMENTS

- A. Beginning of Landscape Maintenance Period:
 - 1. General: Landscape Maintenance Period does not begin until all work is installed as determined by Landscape Architect, in writing.
 - 2. On-site Inspection: When all work is complete, request and hold a meeting to include the Landscape Architect, Project Inspector, Architect and Owner's Representative who must together authorize and determine the start date for the landscape maintenance period. Coordinate and give notice of the date and time of the on-site meeting to all parties at least forty-eight (48) hours in advance.
 - 3. Acceptability: In cases where the lawn has reached adequate fullness and germination in some areas but not all, and authorization has not been given to begin the maintenance period, proceed with mowing, trimming, spraying, etc., as necessary prior to the beginning of the maintenance period.

- B. Duration of Landscape Maintenance Period: The Landscape Maintenance Period shall continue for a minimum of ninety (90) calendar days. During this time, continuously maintain all areas involved until final acceptance of the work by the Owner's Representative. See Landscape Maintenance Period procedure in Part 3.9 of this Section.
- C. Final Acceptance of the Landscape Maintenance Period: Request the final inspection forty-eight (48) hours in advance. If items require attention, hold on-site meetings until Landscape Architect can certify, in writing, and in concurrence with the Owner's Representative, the successful completion of the Landscape Maintenance Period.

1.10 RECORD DRAWINGS

- A. Upon completion of work, and as a precedent to final payment, deliver to Owner's Representative one complete set of reproducible originals of Drawings showing work exactly as installed.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Use material in new and perfect condition as specified. Any deviations or substitutions from the Specification and Drawings must first be approved by Owner's Representative in writing prior to use.

2.2 SOIL PREPARATION MATERIALS

- A. Topsoil: Fertile; friable; natural loam surface soil; reasonably free of subsoil, clay lumps, brush, weeds and other litter; and free of roots, stumps, stones/rocks, and other extraneous or toxic matter harmful to plant growth.
- B. Soil Amendment: One-percent nitrogen-impregnated bark product with a ninety-percent (90%) bark base and zero to one-quarter inch (0-1/4") particle size, or approved equivalent. Do not spread until testing requirements have been satisfied.
- C. Fertilizer/Soil Conditioner: Gro-Power Plus or approved equal.
- D. Fertilizer for Trees and Shrubs: Seven-gram Gro-Power Planting Tablets (12-8-8 NPK) or approved equal.
- E. Vitamin B-1: "Superthrive", "Liquinox Start", "Cal-Liquid", or approved equal.

2.3 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Bark Mulch: Untreated, shredded cedar.
- B. Tree-staking System: As indicated on Drawings.
- C. Pre-Emergent Weed Control: Oxadiazon, "Treeflan", "Ronstar 2G", "Surflan" (Elano Products Company), or approved equal.
- D. Root Barrier: As indicated on Drawings.

2.4 PLANT MATERIAL

- A. Nursery Plant Stock:
 - 1. As indicated on Drawings. Do not remove container-grown stock from containers until planting time. Plants shall be true to name.
 - 2. Healthy, shapely, well-rooted, not pot-bound, free from insect pests or plant diseases and properly "hardened off" before planting. Replace plants that are not alive or are not in satisfactory growing condition, as determined by the Landscape Architect, without additional cost to Owner. The Landscape Architect may reject plants before and/or after planting.
 - 3. Labeled. Label at least one tree and one shrub of each species with a securely-attached, waterproof tag bearing legible designation of botanical and common name.
- B. Lawn Sod: Ninety percent (90%) Perennial Ryegrass and ten percent (10%) Kentucky Bluegrass.

PART 3 – EXECUTION

3.1 SITE CONDITIONS

- A. Examine the site, verify grade elevations, and observe conditions under which work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Owner's Representative.
- B. Proceed with complete landscape work as rapidly as portions of the site become available, working within seasonal limitations for each kind of landscape work required.
- C. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand-excavate, as required, to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- D. When conditions detrimental to sod or plant growth are encountered, such as rubble fill, adverse drainage condition, or other obstructions, notify the Owner's Representative before planting.

3.2 SOIL TESTING

- A. Coordinate soil testing in an expeditious and timely manner as required for on-site topsoil materials. Contract with a soil laboratory and include cost of sampling and testing in contract price. Take one (1) sample for every 5,000 square feet of landscape area up to a maximum of six (6) samples under the direction of and in the presence of the Owner's Representative.
- B. Submit each sample, according to the quantity of soil required by testing laboratory, to a competent laboratory approved by the Owner's Representative.
- C. Provide analysis of soil samples for pH, salinity, ammonia, phosphate, potassium,

calcium, magnesium, boron, and sodium levels. Provide appraisal of chemical properties, including particle size determination, and recommendations for types and quantities of amendments and fertilizers.

3.3 PREPARATION

A. Clearing of Vegetation:

1. If live perennial weeds exist on site at the beginning of work, spray with a non-selective systemic contact herbicide as recommended and applied by an approved licensed landscape pest control advisor and applicator. Leave sprayed plants intact for at least 15 days.
2. Clear and remove existing weeds by mowing or grubbing off all plant parts at least one-quarter inch ($\frac{1}{4}$ ") inch below surface of soil over entire areas to be planted.

B. Soil preparation:

1. Loosen soil in all planting areas, and on slopes flatter than 3:1 gradient, to a depth of six to eight inches (6" - 8") below finish grade. All debris, foreign matter, and stones shall be removed prior to the placing of any fertilizers or conditioners. Soil preparation is for all shrub planting beds, lawn hydroseeded areas and sodded lawn areas.
2. Conduct the required soil tests and instruct the lab to include a minimum of the following soil improvements in the recommendation on the soils report.
 - a. Soil Amendment: Two cubic yards (2 cy) per 1,000 square feet.
 - b. If the lab recommends less than six cubic yards (6 cy) of soil amendment, the excess bid amount shall be applied to the cost of any additional recommended soil improvements, or returned to the Owner as a credit
3. Apply amendments as follows, using rates recommended by the soils testing laboratory (the rates of amendments shown below are for bidding purposes only):
 - a. Fertilizer/Soil Conditioner: Broadcast 50 pounds of 6-24-24 per 1,000 square feet in all planting areas and rototill to a depth of six to eight inches (6" - 8"). Remove from the site any rock and debris brought to the surface by cultivations. "Cultipack" all areas to receive sod or hydroseed.
 - b. Apply soil amendment to all planting areas at the rate of six cubic yards (6 cy) per 1,000 sf and rototill into the top six to eight inches (6" – 8").
4. Upon completion of finish grading, request a review and obtain approval of Landscape Architect prior to commencement of planting or hydroseeding.

C. Finish Grading for all Planting areas

1. Refer to Earthwork Specification Section for Rough Grading.
2. Grade to elevations and contours shown on Drawings. Fill low spots with landscape backfill material and grade to surface drain in manner indicated on Drawings.
3. Finish-grade so that the entire area within the contract lines has a natural and pleasing appearance as specified and as directed by Landscape Architect.
4. Adjust sprinkler heads flush to finish grade in preparation to receive hydroseeding or one-half inch above finish grade in preparation to receive sod. Reset sprinkler heads flush to grade after turf has germinated.
5. Flag the sprinkler heads and valve markers.

D. Planting Pits for Trees:

1. Excavate pits with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage.
2. Set container-grown stock in center of pit on earth pedestal. Separate roots and/or prune roots as directed by Landscape Architect. In hot weather, pre-wet pit. Loosen outside roots from sides and bottom of root ball. When set, place additional backfill around base and sides of root ball. Work each layer to settle backfill and eliminate voids and air pockets. Water after placing final layer of backfill.
3. Loosen hard subsoil in bottom of excavation. Extend excavation as required to insure proper drainage from plant pits.
4. Fill excavated planting pits with water to half the depth of pit. Pits should drain within four hours (4 hrs). If planting pits do not drain, notify Project Inspector immediately. Do not proceed with planting until Landscape Architect has resolved a method to provide drainage.

E. Planting Pits for Shrubs/Groundcover:

1. Excavate pits and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage.
2. Loosen hard subsoil in bottom of excavation. Extend excavation as required to insure proper drainage from plant pits.
3. Fill excavated planting pits with water to half the depth of pit. Pits should drain within four hours (4 hrs). If planting pits do not drain, notify Project Inspector immediately. Do not proceed with planting until Landscape Architect has resolved a method to provide drainage.

3.4 ROOT BARRIER INSTALLATION

- A. Root barriers location are specifically shown on the plan. If a tree is moved during

construction to a location where root barrier is not shown on the plan, the following minimum requirements are to be met:

1. Install root barrier where trees are planted within sixty inches (60") of paving or other hardscape elements, such as walls, curbs, and walkways.
 2. Install root barrier continuously for a distance of five feet (5') in each direction from the tree trunk, for a total distance of ten feet (10') per tree. If trees are spaced closer, use a single continuous piece of root barrier.
- B. Align root barrier vertically and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.
- C. Position top of root barrier just below the top of adjacent hardscape element but above finish grade of the soil so that is visible.
- D. If there are concrete spoils or overpour that is impeding the root barrier from being installed directly adjacent to the hardscape element, the contractor is to remove the extra concrete in a manner that does not damage the integrity of the hardscape element.
- E. Do not distort or bend root barrier during construction activities.
- F. Do not install root barrier surrounding the root ball of tree.

3.5 PLANTING

- A. Lawn Sod:
1. Cultivate all lawn areas to a depth of six inches (6"). If cultivation does not break lumps, pull a spike-toothed harrow over the area behind the tractor.
 2. Give all lawn areas that are to be sodded a smooth finish to prevent pockets. Do not allow any abrupt changes of surface. Prior to installation of sod, roll the grade with a 200-pound water-ballast roller. Request that the lawn grade be inspected and approved by the Landscape Architect prior to sodding to determine its suitability for planting. Obtain such approval prior to commencing sodding operations.
 3. Do not take heavy objects (except lawn rollers) over lawn areas after they have been prepared for planting.
 4. Completely lay the sod within twelve hours (12 hrs.) of delivery. Do not leave sod on pallets in the hot sun longer than necessary.
 5. Unroll sod carefully. Lay sod tight without any visible open joints, and without overlapping; stagger end joints twelve inches (12") minimum. Do not stretch or overlap sod pieces. Do not place sod in pieces smaller than twenty-four inches (24") in length by width of roll.
 6. When new sod is to match existing turf, cut the edge of the existing turf in a series of straight lines that will accept new sod rolls in full width of the sod roll. Make the transition of grade between existing turf and new sod to be

seamless with no change in elevation.

7. Immediately after laying sod, roll lawn areas with a 200-pound water-ballast roller.
 8. Trim sod to conform to lawn shapes designated in Drawings.
 9. On slopes of six inches (6") per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at a maximum of two feet (2') on center. Drive pegs flush with soil portion of sod.
 10. Ensure that finished appearance is that of one continuous lawn.
 11. Do not lay whole lawn before watering. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to lay sod and to water until installation is complete.
 12. All sod areas must be approved by Landscape Architect.
 13. Water the complete lawn surface thoroughly. Moisten soil at least eight inches (8") deep. Repeat sprinkling at regular intervals to keep sod moist at all times until rooted. After sod is established, decrease frequency and increase amount of water per application as necessary.
- B. Trees, Shrubs, and Groundcover:
1. Lay out individual tree and shrub locations and areas for multiple plantings. Stake the locations, outline the areas, and secure the Owner's Representative's acceptance before beginning the planting work. Make minor adjustments as requested.
 2. Scarify root ball prior to planting. Plant in holes twice the diameter of the root ball and to a depth equal to the container's height. Place the shrub and/or groundcover so the top of the root ball is one inch (1") higher than the surrounding grade; place the tree so that the crown of the trunk is two inches (2") higher than the surrounding grade. Set container-grown stock in center of pit. In hot weather, pre-wet the pit. When set, place additional backfill around base and sides of root ball. Work each layer to settle backfill and eliminate voids and air pockets. Thoroughly compact lower half of backfill in plant pit. See staking or guying detail. Water after planting. Provide a berm or watering basin for each tree. Add Vitamin B-1, in the proper solution as recommended by the manufacturer, to the second watering of the basin.
 3. Place fertilizer planting tablets in root zone and alongside each plant. Follow manufacturer's instructions for number of tablets to use for each container size.
 4. See Drawings for additional information.
 5. Grooming and Staking of Trees:
 - a. Prune, thin-out and shape trees in accordance with standard horticultural practice. Prune trees to retain required height and

spread. Unless otherwise directed by Landscape Architect, do not cut tree leaders, and remove only injured or dead branches from flowering trees.

- b. Paint cuts over one-half inch ($\frac{1}{2}$ ") in size with standard tree paint or compound, covering exposed, living tissue. Use paint that is waterproof, antiseptic, adhesive, elastic and free of kerosene, coal tar, creosote, and other substances harmful to plants. Do not use shellac.
 - c. Stake or guy trees immediately after planting, as indicated on Drawings.
6. Grooming of Shrubs:
- a. Prune, thin-out and shape shrubs in accordance with standard horticultural practice. Prune shrubs to retain natural character and to accomplish their use in landscape design. The required plant size is its size after pruning.
 - b. Remove and replace excessively pruned or malformed new plants resulting from improper pruning.
- C. Request review by the Landscape Architect after locating, but prior to planting all trees. Under the direction of the Landscape Architect, make slight adjustments to plant material location as necessary to reflect original intention of Drawings.

3.6 WEED CONTROL

- A. Apply pre-emergent weed control to all planting areas (except lawn) after completion of all planting and one complete watering. Follow manufacturer's directions. To prevent washing away of weed control, do not over-water after its application. Do not allow any weed control into lawn areas. Treat any existing noxious weeds, such as Johnson grass, with Roundup in successive treatments until all roots are destroyed, then remove all grass and roots. Notify Owner's Representative of time of installation for verification of application.

3.7 BARK MULCH

- A. Apply mulch at the rate of three inches (3") deep to all planting areas, exclusive of lawn, after the planting and weed control are completed. Twelve inches (12") from planter edges, taper full depth of mulch to meet adjacent grades. Do not place mulch within three inches (3") of trunk or stems.

3.8 CLEAN-UP

- A. During construction, keep the site free of rubbish and debris, and clean up the site promptly when notified to do so. Take care to prevent spillage on streets from hauling and immediately clean up any such spillage and/or debris deposited on streets due to the work of this Section.
- B. During all phases of the construction work, take all precautions to abate dust nuisance by clean-up, sweeping, sprinkling with water, or other means as necessary.

3.9 LANDSCAPE MAINTENANCE

- A. The Landscape Maintenance Period will begin when all the Landscape Maintenance Period Requirements have been met (See Part 1 of these Specifications).
- B. Cleaning: Maintain cleanliness on paving areas and other public areas used by equipment and immediately remove all spillage. Remove from project site all rubbish and debris found thereon and all material and debris resulting from landscaping work, leaving the site in a safe and clean condition.
- C. Maintenance:
 - 1. Sprinkler Irrigation System:
 - a. Check system weekly for proper operation. Flush lateral lines out after removing last sprinkler head or two at each end of lateral. Adjust all heads as necessary for unimpeded coverage.
 - b. Set and program automatic controllers for seasonal water requirements. Provide the Owner's Representative with keys to the controllers and instructions on how to turn off system in case of emergency.
 - c. Repair all damages to sprinkler irrigation system as part of the contract work. Make repairs within one watering period or one week, whichever is the least amount of time.
 - 2. Turf Areas:
 - a. Begin mowing turf when grass has reached a height of three inches (3") and cut to a height of one and one-half inches to two inches (1 ½" - 2"). Mow at least weekly after the first cut. Turf must be well-established and free of bare spots and weeds, to satisfaction of Landscape Architect, prior to final acceptance. Do not mow lawns when the soil is not able to support maintenance equipment. Repair wheel marks and ruts caused by the maintenance equipment at no additional cost to the Owner.
 - b. Pick up grass clippings and remove from the site and premises.
 - c. Trim edges at least twice monthly for neat appearance. Vacuum or blow clippings off walks.
 - d. Water the lawns at such frequency as weather conditions require to replenish soil moisture below the root zone. Normally, a total of one and one-half inches (1 ½") of water is needed weekly in hot weather.
 - e. Fertilize the lawn areas at the beginning of the Landscape Maintenance Period and at the completion of the Landscape Maintenance Period. Use a fertilizer with the following characteristics:
 - i. Slow release, Best 16-6-8, or approved equal, at the rate of

6.25 lbs per 1,000 square feet from March through October.

- ii. Calcium Nitrate (15-0-0) at the rate of 6.5 lbs per 1,000 square feet from November through February.
 - f. Broadcast fertilizer using a mechanical spreader; do not apply by hand-broadcasting. Sweep all fertilizer off hardscape into adjacent planters.
 - g. Weekly as needed and as directed, re-sod lawn areas with material that matches previously installed material. Use sod to repair any bare areas. Repair areas to receive sod as follows:
 - i. Mark out areas to receive new sod repair.
 - ii. Cut straight lines that will accept sod the full width of the roll and a minimum of twenty-four inches (24") in length.
 - iii. Transition the grade between existing turf and new sod seamlessly, with no change in elevation.
3. Trees and Shrubs:
 - a. Water enough that moisture penetrates throughout root zone and only as frequently as necessary to maintain healthy growth.
 - b. Construct and/or remove water basins around each plant, depending on the time of the year and as directed.
 - c. Do not prune unless directed by the Landscape Architect.
 - d. Re-stake and re-tie trees as needed and as directed by the Landscape Architect. Do not allow tops of tree stakes to protrude into head of tree.
 - e. Replace any dead, dying or vandalized plant material on a weekly basis throughout the Landscape Maintenance Period.
4. Insecticide and Herbicide Application:
 - a. If needed, control weeds with selective herbicides and sprays. In areas where crabgrass has infested the lawn, apply pre-emergent herbicides such as Dacthal by Amvac, Balan, or Betasan by Gowan for control prior to crabgrass germination. Control insect pests if necessary.
 - b. Use only a licensed Pest Control Operator to apply herbicides and sprays and to maintain a log for applications indicating material, timing, and rate.
5. Pre-scheduled On-site Meetings: Hold regularly-scheduled (monthly or bimonthly as determined by the Landscape Architect) on-site meetings with the Landscape Architect, Project Inspector and Owner's Representative.

Dates and times will be jointly agreed upon.

6. Request, forty-eight hours (48 hrs.) in advance, on-site visits by the Landscape Architect to determine the end of the Landscape Maintenance Period.

END OF SECTION.

DIVISION 33 – UTILITIES

33 10 00 – Water Distribution

33 30 00 – Sanitary Sewers

33 40 00 – Storm Drainage Facilities

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SECTION 33 10 00 – WATER DISTRIBUTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for water piping.
 - 2. Valves.
 - 3. Valve boxes.
 - 4. Accessories.
- B. Related Sections:
 - 1. Section 31 20 05 – Trenching.

1.3 REFERENCES

- A. ASTM Test Method D1557.
- B. ANSI/ASTM D2466 Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
- C. ANSI/AWWA C110 - Ductile Iron and Grey-Iron Fittings, 3 inch through 48 inch, for Water and Other Liquids.
- D. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- E. ANSI/AWWA C500 Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.
- F. ANSI/AWWA C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.
- G. ASTM D1785 Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and Class 200.
- H. ASTM D2855 Making Solvent Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
- I. ASTM D3139 Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

1.4 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Project Record Documents: Submit under provisions of Division 01.
 - 1. Accurately record actual locations of piping mains, valves, connections, and appurtenances.
 - 2. Identify and describe discovery of uncharted utilities, or utilities found at locations different than indicated on plans.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with product manufacturer's recommendations and these Contract Documents.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle all products required.

PART 2 – PRODUCTS

2.1 PIPE MATERIALS

- A. Ductile Iron Pipe (for iron pipe larger than 3 inches in diameter, above ground): ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, thickness Class 50, with cement - mortar lining and seal coating per ANSI/AWWA C104/A21.4.
 - 1. Fittings: ANSI/AWWA C110/A21.10, ductile iron.
 - 2. Joints: Flanged.
- B. PVC Pipe (for pipe 3" and smaller, underground): ASTM D1785, Schedule 40; 1120 high impact.
 - 1. Fittings: ANSI/ASTM D2464, Schedule 80 PVC (Schedule 40 PVC for pipes 1 ½ inches and smaller).
 - 2. Joints: ASTM D2855, solvent weld.
- C. PVC Pipe (for pipe 4" and larger, underground): ANSI/AWWA C900 Class 200, 1120 high impact.
 - 1. Fittings: ANSI/AWWA C111, cast iron.
 - 2. Joints: ASTM D3139 compression gasket ring.

2.2 VALVES

- A. General: Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, IPS ends.
- B. Valves Up to 2 inches: Full port ball valves.
- C. Valves 2-1/2 inches and Larger: Gate valves, ANSI/AWWA C509, Iron body, bronze trim, non-rising stem with square nut or control handle wheel, resilient single wedge, threaded or flanged, epoxy lined.

2.3 VALVE BOXES

- A. Valve Boxes and Covers: Precast reinforced concrete with cast iron lid marked for service, Christy No. G5 traffic box or approved equal. Cover marking shall read "Water".
 - 1. A one-piece PVC riser extension shall be provided as necessary to allow unobstructed access to valve operating nut.

2.4 ACCESSORIES

- A. Concrete for Thrust Blocks and Valve Box Surface Collars: Concrete type specified in Division 03 Section "Cast-in-Place Concrete".
- B. Concrete pad and guard post for the fire hydrant shall be as per detail drawing.
- C. Solvent Cement and Primer for PVC Pipe and Fittings: Per ASTM F656 and ASTM D2564.
- D. Construct blow-off assembly as indicated on Drawings.
- E. Furnish and install reduced pressure backflow preventers as indicated on Drawings.
- F. Furnish and install fire main and appurtenances as indicated on Drawings and per the governing Fire Department Standards.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions. All plot dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and report any variations to the Inspector.
- B. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. Carefully investigate the structural and finished conditions affecting all work, and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between water systems, planting, and architectural features will be minimized.

- C. Do not install the facilities as indicated on the drawings when it is obvious in the field that unknown obstructions might not have been considered in the engineering. Such obstructions or differences should be brought to the attention of the Architect.

3.2 PREPARATION

- A. Prepare for pipe installation by assembling all needed materials.
- B. Cover all PVC pipe during storage.

3.3 TRENCHING

- A. Trenching shall be in accordance with Division 31 Section “Trenching.”

3.4 BEDDING

- A. Pipe bedding shall be per pipe manufacturer recommendations and City/County Standards and Specifications.
- B. Where trench or pit has been over excavated, place bedding material at bottom of excavations, level soil materials in continuous layers not exceeding 6 inches uncompacted depth.
- C. Backfill around sides and to a level six inches above the top of pipe with bedding sand, tamped in place.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.5 INSTALLATION, PIPE AND FITTINGS

- A. Install pipe at locations and depths indicated on Drawings.
- B. Install pipe, fittings, and associated materials in accordance with manufacturer’s written recommendations.
- C. Route pipe in straight line, whenever possible. All changes in direction of pipes shall be made with fittings, not by bending.
- D. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- E. Form and place concrete for thrust blocks at each elbow, tee, angle or other significant change of direction in loose-joint pipe as indicated on Drawings. Establish elevations of buried piping to ensure not less than 24 inches of cover, except at connections to existing lines, which may be shallower or deeper, or where shown otherwise on Drawings.
- F. When two water pipes are to be installed in same trench, maintain 4-inch horizontal clearance between pipes.
- G. Backfill trench or other excavation in accordance with Division 31 Section “Trenching”.

3.6 INSTALLATION, VALVES

- A. Set valves on solid bearing.
- B. Where valves are installed below finish surface grade, center and plumb valve box and any necessary extensions over valve. Set box cover flush with finished grade.
- C. Pour concrete collar around top of valve box as indicated on Drawings.
- D. Furnish and install valves and valve boxes in addition to those shown on plans as required for isolation of lines for construction and disinfection, while minimizing disruption of service to buildings, at no additional cost to Owner.

3.7 INSTALLATION, THREADED CONNECTIONS

- A. Assemble all plastic and galvanized steel threaded pipe and fittings using an approved Teflon tape applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved Teflon tape will be required.
- B. At all plastic (PVC) pipe connections, work the ductile iron connections first. Connections shall always be plastic into steel, never steel into plastic.
- C. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of Teflon tape. Apply sealant to clean male threads brushing into grooves and to the first three threads of the female threads.

3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect all domestic water piping systems in accordance with AWWA Standard C601, "AWWA Standard for Disinfecting Water Mains", and in accordance with administrative authority. Disinfection process shall be performed in cooperation with health department having jurisdiction and witnessed by a representative of the Architect. During procedure signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Architect.
- B. Additional disinfection requirements per the authorities having jurisdiction may exist. Contractor shall review City/County standards and specifications and coordinate with appropriate agency.

3.9 FIELD QUALITY CONTROL

- A. Follow City/County standards for additional testing specifications.
- B. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
- C. Field inspection will be performed under provisions of Division 01 General Requirements Sections.

- D. Compaction testing will be performed in accordance with ASTM Test Method D1557.
- E. If compaction tests indicate Work does not meet specified requirements, recompact and retest at no additional cost to Owner.
- F. If tests indicate that Work does not meet specified requirements, remove work, replace and retest at no additional cost to Owner.

END OF SECTION.

SECTION 33 30 00 – SANITARY SEWERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Furnish and install site sanitary sewer collection systems and associated accessory items as shown on the Drawings and as specified herein. Items include, but are not necessarily limited to, the following:
- 2. Sanitary Sewer Pipelines and Services.

B. Related Sections:

- 1. Section 31 20 00 – Trenching.

1.3 REFERENCES

- A. American Water Works Association (AWWA).
- B. ASTM International (ASTM):
 - 1. Designation D3034 – Polyvinyl Chloride (PVC) pipe SDR-26.

1.4 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
 - 1. Submit manufacturer's data and/or fabrication drawings for all pipes, and appurtenances installed under this Section. No items shall be incorporated into the work until submittals are approved by the Architect.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

- 1. Safety Regulations: Work shall comply with all Federal, State and Municipal regulations regarding safety, including the requirements of the following:
- 2. William-Steiger Occupational Safety & Health Act of 1970.
 - a. State of California, California Administrative Code, Title 8 Industrial Relations, Chapter 4, Subchapter 4, "Construction of Safety Orders" and other State and local agencies having jurisdiction.

- b. All trenching work shall conform to Trench Construction Safety Orders of California State Industrial Accident Commission.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Cleanout Boxes shall be precast reinforced concrete and cast iron lid marked for sewer service. Christy G5 or approved equal.
- B. Sanitary sewer pipelines shall be polyvinyl chloride (PVC) pipe for sanitary sewers conforming to ASTM Designation: D3034, SDR26 for 4" and larger and be Schedule 40 PVC pipe, ASTM D1785, 1120 high impact, for 3" and smaller.
- C. Concrete for structures shall conform to Division 03 Section "Cast-in-Place Concrete".

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions. All plot dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and report any variations to the Inspector.
- B. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. Carefully investigate the structural and finished conditions affecting all work, and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between water systems, planting, and architectural features will be minimized.

3.2 TRENCH EXCAVATION

- A. Trench excavation and backfilling shall be in accordance with Division 31 Section "Trenching."

3.3 PIPE INSTALLATION

- A. Pipe bedding shall be per pipe manufacturer recommendations and City/County Standards and Specifications.
- B. Pipe Laying: Sewer pipe shall be laid in strict conformity to the prescribed line and grade, with grade bars set and each pipe length checked to the grade line. Three consecutive points on the same rate of slope shall be used at all times to detect any variation from a straight grade. In case any discrepancy exists, the work shall be stopped and the discrepancy immediately reported to the Architect. In addition, when requested by the Architect, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The elevation of the pipe invert shall not deviate from the design elevation by more than +2 percent to the pipe size concerned, or 1 inch, whichever is greater. The rate of

deviation from grade or returning to grade shall be limited to 1/16 inch per foot of pipe.

1. Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe placed upstream. Each section of pipe shall be laid to line and grade as herein specified and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be cleared of all dirt and debris and excess joint sealing material as the work progresses. Pipe shall not be laid when the condition of the trench or weather is unsuitable. All open ends of pipe and fittings shall be adequately and securely closed whenever the work is discontinued for more than one-half hour. If pipe with elliptical or quadrant reinforcement is used, care shall be taken to properly orient the axis.
 2. Where plain end vitrified clay pipe with the compression coupling is installed, the contractor shall tighten the compression bands as pipe lying process. The first length of pipe laid on any run, except where a connection is made to an existing line, shall be anchored securely to prevent movement when each succeeding length is pushed home. After each compression band is torqued, the Contractor shall replace and tamp any bedding material that may have been displaced under the pipe and particularly under the coupler before proceeding with the initial backfill.
 3. All joint surfaces shall be cleaned before joints are made.
- C. Sewer Systems Plugs: Temporary plugs of brick or mortar shall be installed on all sewer projects at points of connection to existing facilities. These plugs shall remain in place until completion of the balling and flushing operation. The plugs, intended to prevent water from the balling and flushing operation, drainage, or any other condition from entering the existing system, shall be installed or removed in the presence of and under the direct supervision of the Engineer. Until the system has been pumped clear of accumulated water, the plugs shall not be removed. This water must not be allowed to enter adjacent sewer or drainage systems.
- D. Internal Inspection: Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which in the opinion of the Architect resulted from the new installation, shall also be removed by the Contractor. Sewer pipes shall be cleaned by the controlled balling method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility. Temporary plugs for sewer systems shall also conform to Subsection B, above. Water from the drainage system operations shall be routed through a suitable trap to collect any dirt and debris prior to discharging into any downstream facility. The Contractor shall notify the Architect immediately after completion of the pipe cleaning operations. Cleaning of drainage pipes by the controlled balling method will not be required.
1. As soon as possible after the completion of the pipe cleaning, and prior to final acceptance, the Architect may make a visual internal inspection of the new pipeline either manually or with television equipment.

3.4 CLEANOUTS

- A. Install cleanouts at locations shown on the Plans. Locate cleanouts in accessible locations and bring flush to finished surface.

3.5 TESTING OF SANITARY SEWERS

- A. Follow City/County standards for additional testing specifications.
- B. After cleaning, each section of sewer constructed shall be tested in accordance with acceptable "Low Pressure Air Test for Sanitary Sewers" methods such as presented in the Journal of Sanitary Engineering, Division ASCE, April 1964.

3.6 ADJUSTMENT

- A. Adjustment of sewer manholes and cleanouts to finish grade shall be as per the Drawings.

3.7 CLEAN-UP

- A. Remove from the site all rubbish, debris, etc. resulting from Work in this Section. The clean up shall include the replacement and repair of any damaged or disturbed property.

END OF SECTION.

SECTION 33 40 00 – STORM DRAINAGE FACILITIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Locating existing utilities.
2. Furnishing and installing storm drainage facilities, including pipe, manholes, cleanout and inlet and outfall structures.
3. Placing and compacting pipe bedding.
4. Final backfilling, compaction and grading.

B. Related Sections:

1. Section 03 30 00 – Cast-in-Place Concrete.
2. Section 31 20 00 – Earthwork.
3. Section 31 20 05 – Trenching.

1.3 DEFINITIONS

- A. Bedding: Fill placed under, around, beside and directly over pipe, prior to subsequent backfill operations.
- B. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.4 REFERENCES

- A. ANSI/ASTM C76 – Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- B. ANSI/ASTM C443 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- C. ANSI/ASTM C478 – Precast Reinforced Concrete Manhole Sections.
- D. California Test Method No. 216 (Dry Method).

1.5 SUBMITTALS

- A. Product Data: Provide data indicating pipe, accessories, and associated equipment to be furnished.
- B. Certificates of compliance for material.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install products supplied.

1.6 COORDINATION

- A. Verify that the location of existing utilities have been indicated at work site by utility authorities and Campus personnel.
- B. Coordinate work with other project work.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Reinforced Concrete Pipe for pipe larger than 12": ANSI/ASTM C76, Class 3, with rubber gasket joints per ANSI/ASTM C443.
- B. Storm drainage sewer pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM designation 3034, SDR 35 for pipe 12" or less.
- C. Precast Reinforced Concrete Manhole Sections: Per ANSI/ASTM C478. Elliptical single line reinforcement is not allowed and as shown on detail drawing.
- D. Cast in Place Concrete: Per Section 03 30 00 – Cast-in-Place Concrete.
- E. Steel Reinforcement: Per Section 03 30 00 – Cast-in-Place Concrete.
- F. Mortar: Composed of one part, by weight, Portland Cement (Type II low alkali per ASTM C150), 2 parts, by weight, sand, and water.
- G. Manhole Frames, Covers and Grates: Cast Iron per ASTM A48, Class 25.
- H. Storm drain inlet shall be Christy U-23 and V-12 drain inlet with precast extension as required. Contractor shall also construct concrete bottom as shown on detailed drawing.
- I. Soil Fill for Concrete Pipe Bedding Envelope: Type S2 or S4 per Section 31 05 13 – Soils for Earthwork.
- J. Concrete collar shall be constructed as per detailed drawing.
- K. Cleanout shall be constructed as per detail drawing.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions. All plot dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions and report any variations to the Inspector.
- B. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. Carefully investigate the structural and finished conditions affecting all work, and plan work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between water systems, planting, and architectural features will be minimized.
- C. Do not install the facilities as indicated on the drawings when it is obvious in the field that unknown obstructions might not have been considered in the engineering. Such obstructions or differences should be brought to the attention of the Architect.

3.2 PREPARATION

- A. Identify location of proposed storm drainage facilities to be constructed. Expose connection points to existing system.
- B. Locate, identify, and protect existing above and below grade utilities from damage.
- C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- D. Protect existing structures and other improvements to remain from damage from excavation equipment and vehicular traffic.
- E. Employ equipment and methods appropriate to the work site.
- F. Protect excavated areas from drainage inflow and provide drainage to all excavated areas. Dewater existing drainage basins and existing drainage pipeline systems as necessary to accomplish the work.
- G. Remove all interfering surface and subsurface improvements authorized for removal.

3.3 TRENCH EXCAVATION

- A. Trench excavation and backfilling shall be in accordance with Division 31 Section "Trenching."

3.4 INSTALLATION AND BEDDING OF STORM DRAIN PIPE

- A. Pipe bedding shall be per pipe manufacturer recommendations and City/County Standards and Specifications.
- B. Install the pipe and fittings to the lines and grades shown on the construction plans.

- C. Install pipe and fittings in accordance with the manufacturer's recommendations, and these specifications.
- D. Unless otherwise approved by the Architect, lay all pipe upgrade from structure to structure, with bell or socket ends of pipe upgrade.
- E. Excavate suitable bell (or socket) holes in the bedding material, so that the bells do not bear on the subgrade or bedding. Provide uniform bearing of pipe barrel on bedding material.
- F. Ensure that all joints are properly "homed" and are watertight.
- G. Bed concrete pipe in Type S2 or S4 soil envelope, and compact to a minimum of 85% relative compaction. Place and compact the bedding material under, around and over the pipe, filling the trench cavity and extending from the bottom of the trench (4 inches below the outside bottom of the pipe barrel) to a level 12 inches above the outside top of the pipe barrel.

3.5 INSTALLATION OF STORM DRAINAGE STRUCTURES AND APPURTENANCES

- A. Install storm drainage structures as indicated on the construction plans, in accordance with the manufacturer's recommendations, and as specified herein.
- B. Key top of poured-in-place concrete bases for structures to receive the tongue of precast riser sections.
- C. Joint precast manhole and structure riser sections with a minimum thickness of 1/2 inch of mortar to make a watertight joint. Neatly point the inside and outside of the joint. Set sections plumb.
- D. Construct cleanout, outfall structure per Drawings.

3.6 BACKFILLING TO FINISH GRADE AND FINISH GRADING

- A. Place and compact backfill per Section 31 20 05 – Trenching.
- B. Conform finished surface to the lines, grades and cross-sections shown on the plans, or as otherwise directed by the Inspector.
- C. In areas to receive paving or a significant thickness of sealing material, temporarily set manhole frame and cover below finish grade, then return after final surfacing and/or pavement sealing and bring manhole frame and cover to final grade, as shown on the plans.
- D. Fine grade all finished soil surfaces disturbed to the lines, grades and cross-sections shown on the plans.
- E. Rake and smooth all finished dirt surfaces.

3.7 TOLERANCES

- A. Pipe laying tolerances:

1. Above grade: Not to exceed 1/4 inch above planned grade.
 2. Below grade: Not to exceed 1/2 inch below planned grade.
 3. Alignment: Not to exceed 2 inches from planned alignment, if gradual and regular over a distance of 20 feet.
- B. Structure finish grade tolerance: Within 1/4 inch of planned grade, but must match adjacent improvements.

3.8 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed as required by authorities having jurisdiction.
- B. Compaction testing of bedding and backfill will be performed in accordance with ASTM D1557.
- C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.

END OF SECTION.

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