



PROJECT MANUAL

**ALICE BIRNEY PUBLIC WALDORF SCHOOL
CAMPUS RENEWAL**

PROJECT/CONTRACT NUMBER: 0004-468

**SACRAMENTO CITY
UNIFIED SCHOOL DISTRICT**

Document 00 00 03

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**SACRAMENTO CITY USD
Alice Birney Public Waldorf Campus
Renewal**

**SEALS PAGE
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END OF DOCUMENT

NOTICE TO BIDDERS

1. Notice is hereby given that the governing board ("Board") of the Sacramento City Unified School District ("District") will receive sealed bids for **Alice Birney Public Waldorf Campus Renewal** project, **Project Number #0004-468** ("Project" or "Contract"). **Engineer's estimate is \$3,500,000.**
2. The Project consists of but not limited to:
3. To bid on this Project, the Bidder is required to possess one or more of the following State of California contractors' license(s): **Class B General Building Contractor.**

The Bidder's license(s) must remain active and in good standing throughout the term of the Contract.
4. To bid on this Project, the Bidder is required to be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code.
5. Contract Documents will be available on or after **February 13, 2024**, from the District's website, <https://www.scusd.edu/construction-projects-bids>.
6. Sealed bids will be received until **2:00pm on March 7, 2024**, at the **District Administration Office, 5735 47th Avenue, Sacramento, California 95824** at or after which time the bids will be opened and publicly read aloud. Any bid that is submitted after this time shall be nonresponsive and returned to the bidder. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code.
7. All bids shall be on the form provided by the District. Each bid must conform and be responsive to all pertinent Contract Documents, including, but not limited to, the Instructions to Bidders.
8. Pursuant to Public Contract Code section 20111.6, only prequalified bidders will be eligible to submit a bid for contracts \$1 million or more using or planning to use state bond funds. Any bid submitted by a bidder who is not prequalified shall be non-responsive and returned unopened to the bidder. Moreover, any bid listing subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses who have not been prequalified shall be deemed nonresponsive.
9. The District must receive applications at least ten (10) business days prior to the scheduled bid opening on any advertised project in order for the candidate to qualify for that project. Prequalification approval will remain valid for one (1) calendar year from the date of notice of qualification except as noted in the prequalification documents.
 - a. Please go to <https://www.scusd.edu/contractor-prequalification> for more information and links.

10. A bid bond by an admitted surety insurer on the form provided by the District a cashier's check or a certified check, drawn to the order of the Sacramento City Unified School District, in the amount of ten percent (10%) of the total bid price, shall accompany the Bid Form and Proposal, as a guarantee that the Bidder will, within seven (7) calendar days after the date of the Notice of Award, enter into a contract with the District for the performance of the services as stipulated in the bid.
11. A mandatory pre-bid conference and site visit will be held at **2:00pm on February 21, 2024 at 6215 13th Avenue, Sacramento, CA 95831 – meet at the flag pole**. The site visit is expected to not be more than 1 hour. Failure to attend or tardiness will render bid ineligible.
12. The successful Bidder shall be required to furnish a 100% Performance Bond and a 100% Payment Bond if it is awarded the Contract for the Work.
13. The successful Bidder may substitute securities for any monies withheld by the District to ensure performance under the Contract, in accordance with the provisions of section 22300 of the Public Contract Code.
14. The successful bidder will be required to certify that it either meets the Disabled Veteran Business Enterprise ("DVBE") goal of three percent (3%) participation or made a good faith effort to solicit DVBE participation in this Contract if it is awarded the Contract for the Work.
15. The Contractor and all Subcontractors under the Contractor shall pay all workers on all Work performed pursuant to this Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to section 1770 et seq. of the California Labor Code. Prevailing wage rates are also available from the District or on the Internet at: <<http://www.dir.ca.gov>>.
16. This Project is subject to labor compliance monitoring and enforcement by the Department of Industrial Relations pursuant to Labor Code section 1771.4 and subject to the requirements of Title 8 of the California Code of Regulations. The successful Bidder shall comply with all requirements of Division 2, Part 7, Chapter 1, Articles 1-5 of the Labor Code.
17. The District has entered into a Project Labor Agreement that is applicable to this Project. A copy of the Project Labor Agreement is available for review at the District Facilities Office and may be downloaded from the District's website, <https://www.scusd.edu/pod/project-labor-agreement>. The successful bidder and all subcontractors will be required to agree to be bound by the Project Labor Agreement.
18. The Contractor and all Subcontractors under the Contractor shall comply with applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic including, if required, preparing, posting, and implementing a Social Distancing Protocol. Contractor shall further comply with the SCUSD Board Resolution 3211 from 10/12/21 requiring workers on District sites to be fully vaccinated against COVID-19, or else subject to weekly testing for COVID-19.

19. The Board reserves the right to reject any and all bids and/or waive any irregularity in any bid received. If the District awards the Contract, the security of unsuccessful bidder(s) shall be returned within sixty (60) days from the time the award is made. Unless otherwise required by law, no bidder may withdraw its bid for ninety (90) days after the date of the bid opening.
20. The District shall award the Contract, if it awards it at all, to the lowest responsive responsible bidder based on:

Any combination of Total Base Bid (including allowance) and Additive Alternate as determined by the District. All awards will be made in the District's best interest.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS

Bidders shall follow the instructions in this document, and shall submit all documents, forms, and information required for consideration of a bid.

Sacramento City Unified School District ("District") will evaluate information submitted by the apparent low Bidder and, if incomplete or unsatisfactory to District, Bidder's bid may be rejected at the sole discretion of District.

1. Bids are requested for a general construction contract, or work described in general, for the following project ("Project" or "Contract"):

**Alice Birney Public Waldorf Campus Renewal
Project Number #0004-468**

2. A Bidder and its subcontractors must possess the appropriate State of California contractors' license and must maintain the license throughout the duration of the project. Bidders must also be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code. Bids submitted by a contractor who is not properly licensed or registered shall be deemed nonresponsive and will not be considered.
3. The District has prequalified bidders pursuant to Public Contract Code section 20111.6 for contracts \$1 million or more using or planning to use state bond funds. Only prequalified bidders will be eligible to submit a bid for this Project. Any bid submitted by a bidder who is not prequalified shall be deemed nonresponsive and will not be considered. Moreover, any bid listing subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 licenses who have not been prequalified shall be deemed nonresponsive.
4. District will receive sealed bids from bidders as stipulated in the Notice to Bidders.
 - a. All bids must be sealed in an envelope, marked with the name and address of the Bidder, name of the Project, the Project Number and/or bid number, and time of bid opening.
 - b. Bids must be submitted to the District Office by date and time shown in the Notice to Bidders.
 - c. Bids must contain all documents as required herein.
5. Bidders are advised that on the date that bids are opened, telephones will not be available at the District Offices for use by bidders or their representatives.
6. Bids will be opened at or after the time indicated for receipt of bids.
7. Bidders must submit bids on the documents titled Bid Form and Proposal, and must submit all other required District forms. Bids not submitted on the District's required

forms shall be deemed nonresponsive and shall not be considered. Additional sheets required to fully respond to requested information are permissible.

8. Bidders shall not modify the Bid Form and Proposal or qualify their bids. Bidders shall not submit to the District a re-formatted, re-typed, altered, modified, or otherwise recreated version of the Bid Form and Proposal or other District-provided document.
9. Bids shall be clearly written and without erasure or deletions. District reserves the right to reject any bid containing erasures, deletions, or illegible contents.
10. Bidders must supply all information required by each Bid Document. Bids must be full and complete. District reserves the right in its sole discretion to reject any bid as nonresponsive as a result of any error or omission in the bid. Bidders must complete and submit all of the following documents with the Bid Form and Proposal:
 - a. Bid Bond on the District's form, or other security.
 - b. Designated Subcontractors List.
 - c. Site Visit Certification, if a site visit was required.
 - d. Non-Collusion Declaration.
 - e. Iran Contracting Act Certification, if contract value is \$1,000,000 or more.
11. Bidders must submit with their bids a cashier's check or a certified check payable to District, or a bid bond by an admitted surety insurer of not less than ten percent (10%) of amount of Base Bid, plus all additive alternates ("Bid Bond"). If Bidder chooses to provide a Bid Bond as security, Bidder must use the required form of corporate surety provided by District. The Surety on Bidder's Bid Bond must be an insurer admitted in the State of California and authorized to issue surety bonds in the State of California. Bids submitted without necessary bid security will be deemed nonresponsive and will not be considered.
12. If Bidder to whom the Contract is awarded fails or neglects to enter into the Contract and submit required bonds, insurance certificates, and all other required documents, within **SEVEN (7)** calendar days after the date of the Notice of Award, District may deposit Bid Bond, cashier's check, or certified check for collection, and proceeds thereof may be retained by District as liquidated damages for failure of Bidder to enter into Contract, in the sole discretion of District. It is agreed that calculation of damages District may suffer as a result of Bidder's failure to enter into the Contract would be extremely difficult and impractical to determine and that the amount of the Bidder's required bid security shall be the agreed and conclusively presumed amount of damages.
13. Bidders must submit with the bid the Designated Subcontractors List for those subcontractors who will perform any portion of Work, including labor, rendering of service, or specially fabricating and installing a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of total bid. Failure to submit this list when required

by law shall result in bid being deemed nonresponsive and the bid will not be considered.

14. All of the listed subcontractors are required to be registered as a public works contractor with the Department of Industrial Relations pursuant to the Labor Code.
 - a. An inadvertent error in listing the California contractor license number on the Designated Subcontractors List shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the correct contractor's license number is submitted to the District within 24 hours after the bid opening and the corrected number corresponds with the submitted name and location for that subcontractor.
 - b. An inadvertent error listing an unregistered subcontractor shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive provided that any of the following apply:
 - (1) The subcontractor is registered prior to the bid opening.
 - (2) The subcontractor is registered and has paid the penalty registration fee within 24 hours after the bid opening.
 - (3) The subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.
15. If a mandatory pre-bid conference and site visit ("Site Visit") is required as referenced in the Notice to Bidders, then Bidders must submit the Site Visit Certification with their Bid. District will transmit to all prospective Bidders of record such Addenda as District in its discretion considers necessary in response to questions arising at the Site Visit. Oral statements shall not be relied upon and will not be binding or legally effective. Addenda issued by the District as a result of the Site Visit, if any, shall constitute the sole and exclusive record and statement of the results of the Site Visit.
16. Bidders shall submit the Non-Collusion Declaration with their bids. Bids submitted without the Non-Collusion Declaration shall be deemed nonresponsive and will not be considered.
17. The Contractor and all Subcontractors under the Contractor shall pay all workers on all work performed pursuant to the Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to sections 1770 et seq. of the California Labor Code. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the Department of Industrial Relations, are available upon request at the District's principal office. Prevailing wage rates are also available on the internet at <http://www.dir.ca.gov>.
18. The District has entered into a Project Labor Agreement that is applicable to this Project. A copy of the Project Labor Agreement is available for review at the District

Facilities Office and may be downloaded from the District's website, <https://www.scusd.edu/pod/project-labor-agreement>. The successful bidder and all subcontractors will be required to agree to be bound by the Project Labor Agreement.

19. Section 17076.11 of the Education Code requires school districts using funds allocated pursuant to the State of California School Facility Program for the construction and/or modernization of school building(s) to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended on projects that receive state funding or demonstrate its good faith effort to solicit DVBE participation in this Contract. In order to meet this requirement by demonstrating a good faith effort, Bidder must advertise for DVBE-certified subcontractors and suppliers before submitting its Bid. For any project that is at least partially state-funded, the lowest responsive responsible Bidder awarded the Contract must submit certification of compliance with the procedures for implementation of DVBE contracting goals with its signed Agreement. DVBE Certification form is attached. Do not submit this form with your Bid.
20. Submission of bid signifies careful examination of Contract Documents and complete understanding of the nature, extent, and location of Work to be performed. Bidders must complete the tasks listed below as a condition to bidding, and submission of a bid shall constitute the Bidder's express representation to District that Bidder has fully completed the following:
 - a. Bidder has visited the Site, if required, and has examined thoroughly and understood the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as-built conditions, and all local conditions and federal, state and local laws, and regulations that in any manner 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;
 - b. Bidder has conducted or obtained and has understood all examinations, investigations, explorations, tests, reports, and studies that pertain to the subsurface conditions, as-built conditions, underground facilities, and all other physical conditions at or contiguous to the Site or otherwise that may affect the cost, progress, performance, or furnishing of Work, as Bidder considers necessary for the performance or furnishing of Work at the Contract Sum, within the Contract Time, and in accordance with the other terms and conditions of Contract Documents, including specifically the provisions of the General Conditions; and additional examinations, investigations, explorations, tests, reports, studies, or similar information or data are or will be required by Bidder for such purposes;
 - c. Bidder has correlated its knowledge and the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents;
 - d. Bidder has given the District prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract

Documents and the actual conditions, and the written resolution(s) thereof by the District is/are acceptable to Bidder;

- e. Bidder has made a complete disclosure in writing to the District of all facts bearing upon any possible interest, direct or indirect, that Bidder believes any representative of the District or other officer or employee of the District presently has or will have in this Contract or in the performance thereof or in any portion of the profits thereof;
- f. Bidder must, prior to bidding, perform the work, investigations, research, and analysis required by this document and that Bidder represented in its Bid Form and Proposal and the Agreement that it performed prior to bidding. Contractor under this Contract is charged with all information and knowledge that a reasonable bidder would ascertain from having performed this required work, investigation, research, and analysis. Bid prices must include entire cost of all work "incidental" to completion of the Work.
- g. Conditions Shown on the Contract Documents: Information as to underground conditions, as-built conditions, or other conditions or obstructions, indicated in the Contract Documents, e.g., on Drawings or in Specifications, has been obtained with reasonable care, and has been recorded in good faith. However, District only warrants, and Bidder may only rely, on the accuracy of limited types of information.
 - (1) As to above-ground conditions or as-built conditions shown or indicated in the Contract Documents, there is no warranty, express or implied, or any representation express or implied, that such information is correctly shown or indicated. This information is verifiable by independent investigation and Bidder is required to make such verification as a condition to bidding. In submitting its Bid, Bidder shall rely on the results of its own independent investigation. In submitting its Bid, Bidder shall not rely on District-supplied information regarding above-ground conditions or as-built conditions.
 - (2) As to any subsurface condition shown or indicated in the Contract Documents, Bidder may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated. District is not responsible for the completeness of such information for bidding or construction; nor is District responsible in any way for any conclusions or opinions that the Bidder has drawn from such information; nor is the District responsible for subsurface conditions that are not specifically shown (for example, District is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown).
- h. Conditions Shown in Reports and Drawings Supplied for Informational Purposes: Reference is made to the document entitled Geotechnical Data, and the document entitled Existing Conditions, for identification of:

- (1) Subsurface Conditions: Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that have been utilized by Architect in preparing the Contract Documents; and
 - (2) Physical Conditions: Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that has been utilized by Architect in preparing the Contract Documents.
 - (3) These reports and drawings are **not** Contract Documents and, except for any "technical" data regarding subsurface conditions specifically identified in Geotechnical Data and Existing Conditions, and underground facilities data, Bidder may not in any manner rely on the information in these reports and drawings. Subject to the foregoing, Bidder must make its own independent investigation of all conditions affecting the Work and must not rely on information provided by District.
21. Bids shall be based on products and systems specified in Contract Documents or listed by name in Addenda. Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Bidder may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified. The District is not responsible and/or liable in any way for a Contractor's damages and/or claims related, in any way, to that Contractor's basing its bid on any requested substitution that the District has not approved in advance and in writing. Contractors and materials suppliers who submit requests for substitutions prior to the award of the Contract must do so in writing and in compliance with Public Contract Code section 3400. All requests must comply with the following:
- a. District must receive any notice of request for substitution of a specified item a minimum of **TEN (10)** calendar days prior to bid opening. The Successful Bidder will not be allowed to substitute specified items unless properly noticed.
 - b. Within 35 days after the date of the Notice of Award, the Successful Bidder shall submit data substantiating the request(s) for all substitution(s) containing sufficient information to assess acceptability of product or system and impact on Project, including, without limitation, the requirements specified in the Special Conditions and the Specifications. Insufficient information shall be grounds for rejection of substitution.
 - c. Approved substitutions, if any, shall be listed in Addenda. District reserves the right not to act upon submittals of substitutions until after bid opening.
 - d. Substitutions may be requested after Contract has been awarded only if indicated in and in accordance with requirements specified in the Special Conditions and the Specifications.
22. Bidders may examine any available "as-built" drawings of previous work by giving District reasonable advance notice. District will not be responsible for accuracy of

"as-built" drawings. The document entitled Existing Conditions applies to all supplied "as-built" drawings.

23. All questions about the meaning or intent of the Contract Documents are to be directed via email to the District to **Tina Alvarez-Bevens @ Tina-Alvarez-Bevens@scusd.edu** and cc: **Chris Ralston at chris-ralston@scusd.edu and Dave Fukui, ICS at dave@icscm.com**. Interpretations or clarifications considered necessary by the District in response to such questions will be issued in writing to all parties recorded by the District as having received the Contract Documents from the District's website, <https://www.scusd.edu/construction-projects-bids>. **Questions not received by February 28, 2024 by 2:00pm may not be answered.** Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
24. Addenda may also be issued to modify other parts of the Contract Documents as deemed advisable by the District.
25. Each Bidder must acknowledge each Addendum in its Bid Form and Proposal by number or its Bid shall be considered non-responsive. Each Addendum shall be part of the Contract Documents. A complete listing of Addenda may be secured from the District.
26. This Contract may include alternates. Alternates are defined as alternate products, materials, equipment, systems, methods, or major elements of the construction that may, at the District's option and under terms established in the Contract and pursuant to section 20103.8 of the Public Contract Code, be selected for the Work.
27. The District shall award the Contract, if it awards it at all, to the lowest responsive responsible bidder based on the criteria as indicated in the Notice to Bidders. In the event two or more responsible bidders submit identical bids, the District shall select the Bidder to whom to award the Contract by lot.
28. Discrepancies between written words and figures, or words and numerals, will be resolved in favor of figures or numerals.
29. Bidders in contention for contract awards may be required to attend a Post-Bid interview, which will be set within three (3) calendar days following bid opening. A duly authorized representative of the apparent low bidder is required to attend the Post Bid Interview, in person. The apparent low bidder's authorized representative(s) must have (1) knowledge of how the bid submitted was prepared, (2) the person responsible for supervising performance of the Work, and (3) the authority to bind the apparent low bidder. Failure to attend the Post Bid Interview as scheduled will be considered just cause for the District to reject the Bid as nonresponsive.
30. Any bid protest by any Bidder regarding any other bid must be submitted in writing to the District, before 5:00 pm of the **THIRD (3rd)** business day following bid opening.
 - a. Only a Bidder who has actually submitted a bid, and who could be awarded the Contract if the bid protest is upheld, is eligible to submit a bid protest.

Subcontractors are not eligible to submit bid protests. A Bidder may not rely on the bid protest submitted by another Bidder.

- b. A bid protest must contain a complete statement of any and all bases for the protest and all supporting documentation. Materials submitted after the bid protest deadline will not be considered.
 - c. The protest must refer to the specific portions of all documents that form the basis for the protest.
 - (1) Without limitation to any other basis for protest, an inadvertent error in listing the California contractor's license number on the Designated Subcontractors List shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive if the correct contractor's license number is submitted to the District within 24 hours after the bid opening and the corrected number corresponds with the submitted name and location for that subcontractor.
 - (2) Without limitation to any other basis for protest, an inadvertent error listing an unregistered subcontractor shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive provided that any of the following apply:
 - (i) The subcontractor is registered prior to the bid opening.
 - (ii) The subcontractor is registered and has paid the penalty registration fee within 24 hours after the bid opening.
 - (iii) The subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.
 - d. The protest must include the name, address and telephone number of the person representing the protesting party.
 - e. The party filing the protest must concurrently transmit a copy of the protest and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
 - f. The procedure and time limits set forth in this paragraph are mandatory and are each bidder's sole and exclusive remedy in the event of bid protest. Failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.
31. The Bidder to whom Contract is awarded shall execute and submit the following documents by 5:00pm of the **SEVENTH (7th)** calendar day following the date of the Notice of Intent to Award. Failure to properly and timely submit these documents entitles District to reject the bid as nonresponsive.

- a. Agreement: To be executed by successful Bidder. Submit three (3) copies, each bearing an original signature. An electronic signature shall be deemed to be the equivalent of the actual original signature.
 - b. Escrow of Bid Documentation: This must include all required documentation. See the document titled Escrow Bid Documentation for more information.
 - c. Performance Bond (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
 - d. Payment Bond (Contractor's Labor and Material Bond) (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
 - e. Insurance Certificates and Endorsements as required.
 - f. Workers' Compensation Certification.
 - g. Prevailing Wage and Related Labor Requirements Certification.
 - h. Disabled Veteran Business Enterprise Participation Certification.
 - i. Drug-Free Workplace Certification.
 - j. Tobacco-Free Environment Certification.
 - k. Hazardous Materials Certification.
 - l. Lead-Based Materials Certification.
 - m. Imported Materials Certification.
 - n. Criminal Background Investigation/Fingerprinting Certification.
 - o. Registered Subcontractors List: Must include Department of Industrial Relations (DIR) registration number of each subcontractor for all tiers.
32. Time for Completion: District may issue a Notice to Proceed within **NINETY (90)** days from the date of the Notice of Intent to Award. Once Contractor has received the Notice to Proceed, Contractor shall complete the Work within the period of time indicated in the Contract Documents.
- a. In the event that the District desires to postpone issuing the Notice to Proceed beyond this 90-day period, it is expressly understood that with reasonable notice to the Contractor, the District may postpone issuing the Notice to Proceed.
 - b. It is further expressly understood by Contractor that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed beyond a 90-day period. If the Contractor believes that a postponement of issuance of the Notice to Proceed will cause a hardship to the Contractor, the Contractor may

terminate the Contract. Contractor's termination due to a postponement beyond this 90-day period shall be by written notice to District within **TEN (10)** calendar days after receipt by Contractor of District's notice of postponement.

- c. It is further understood by the Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement and which the District had in writing authorized Contractor to perform prior to issuing a Notice to Proceed.
 - d. Should the Contractor terminate the Contract as a result of a notice of postponement, District shall have the authority to award the Contract to the next lowest responsive responsible bidder.
33. District reserves the right to reject any or all bids, including without limitation the right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional bids, to re-bid, and to reject the bid of any bidder if District believes that it would not be in the best interest of the District to make an award to that bidder, whether because the bid is not responsive or the bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by District. District also reserves the right to waive any inconsequential deviations or irregularities in any bid. For purposes of this paragraph, an "unbalanced bid" is one having nominal prices for some work items and/or enhanced prices for other work items.
34. It is the policy of the District that no qualified person shall be excluded from participating in, be denied the benefits of, or otherwise be subjected to discrimination in any consideration leading to the award of contract, based on race, color, gender, sexual orientation, political affiliation, age, ancestry, religion, marital status, national origin, medical condition or disability. The Successful Bidder and its subcontractors shall comply with applicable federal and state laws, including, but not limited to the California Fair Employment and Housing Act, beginning with Government Code section 12900, and Labor Code section 1735.
35. Prior to the award of Contract, District reserves the right to consider the responsibility of the Bidder. District may conduct investigations as District deems necessary to assist in the evaluation of any bid and to establish the responsibility, including, without limitation, qualifications and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to District's satisfaction within the prescribed time.
36. Bidder expressly acknowledges that it is familiar with and capable of complying with applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic including, if required, preparing, posting, and implementing a Social Distancing Protocol, and such costs shall be included in the bid.

END OF DOCUMENT

EXISTING CONDITIONS

1. Summary

This document describes existing conditions at or near the Project, and use of information available regarding existing conditions. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

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 Sacramento City Unified 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 offices 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 in the contract documents.
 - (1) Geotechnical Report(s).
 - (2) Hazardous Material Report(s).

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.

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.

END OF DOCUMENT

GEOTECHNICAL DATA

Summary

This document describes geotechnical data at or near the Project that is in the District's possession available for Contractor's review, and use of data resulting from various investigations. This document is **not** part of the Contract Documents. See General Conditions for definition(s) of terms used herein.

1. Geotechnical Reports

- a. Geotechnical reports may have been prepared for and around the Site and/or in connection with the Work by soil investigation engineers hired by Sacramento City Unified School District ("District"), and its consultants, contractors, and tenants.
- b. Geotechnical reports may be inspected at the District offices 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 are **not** part of the Contract Documents.
- c. The reports and drawings of physical conditions that may relate to the Project are the following:

UES Geotechnical Engineering Report dated 12/14/2023

2. Use of Data

- a. Geotechnical data were obtained only for use of District and its consultants, contractors, and tenants for planning and design and are **not** a part of Contract Documents.
- b. Except as expressly set forth below, District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting a bid it is not relying on any geotechnical data supplied by District, except as specifically allowed below.
- c. Under no circumstances shall District be deemed to make a warranty or representation of existing above ground conditions, as-built conditions, geotechnical 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 should perform as a condition to bidding and Bidder must not and shall not rely on information supplied by District.

3. Limited Reliance Permitted on Certain Information

a. Reference is made herein for identification of:

Reports of explorations and tests of subsurface conditions at or contiguous to the Site that have been utilized by District in preparation of the Contract Documents.

Drawings of physical conditions in or relating to existing subsurface structures (except underground facilities) that are at or contiguous to the Site and have been utilized by District in preparation of the Contract Documents.

b. Bidder may rely upon the general accuracy of the "technical data" contained in the reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required pursuant to Instructions to Bidders, and discrepancies are not apparent. The term "technical data" in the referenced reports and drawings shall be limited as follows:

- (1) The term "technical data" shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment or structures that were encountered during subsurface exploration. The term "technical data" does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures.
- (2) The term "technical data" shall not include the location of underground facilities.
- (3) Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the "technical data" contained in such reports or drawings.
- (4) Bidder is solely responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information provided in the identified reports and drawings.

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.

END OF DOCUMENT

BID FORM AND PROPOSAL

To: Governing Board of the Sacramento City Unified School District ("District" or "Owner")

From: _____
(Proper Name of Bidder)

The undersigned declares that Bidder has read and understands the Contract Documents, including, without limitation, the Notice to Bidders and the Instructions to Bidders, and agrees and proposes to furnish all necessary labor, materials, and equipment to perform and furnish all work in accordance with the terms and conditions of the Contract Documents, including, without limitation, the Drawings and Specifications of **Bid No. 0004-468**, for the following project known as:

Alice Birney Public Waldorf Campus Renewal

("Project" or "Contract") and will accept in full payment for that Work the following total lump sum amount, all taxes included:

BASE BID

| |
|---------------|
| _____ |
| _____ dollars |
| \$ _____ |

Allowance: Owner

| | |
|---|----------------------------|
| Three hundred fifty thousand and no/100 _____ dollars | <u>\$350,000.00</u> |
| Allowance | |

TOTAL (Base bid + Owner Allowance)

| |
|---------------|
| _____ |
| _____ dollars |
| \$ _____ |

Additive Alternate for work associated with Sheet A141 Kitchen Electrification

| |
|---------------|
| _____ |
| _____ dollars |
| \$ _____ |

Additional Detail Regarding Calculation of Base Bid

1. Allowance: The above allowance shall only be allocated for unforeseen items relating to the Work. Contractor shall not bill for or be due any portion of this allowance unless the District has identified specific work, Contractor has submitted a price for that work or the District has proposed a price for that work, the District has accepted the cost for that work, and the District has prepared an Allowance Expenditure Directive incorporating that work. Contractor hereby authorizes the District to execute a unilateral deductive change order at or near the end of the Project for all or any portion of the allowance not allocated. Any unused portion of the allowance will revert back to the District documented by a deductive change order.
2. The undersigned has reviewed the Work outlined in the Contract Documents and fully understands the scope of Work required in this Proposal, understands the construction and project management function(s) is described in the Contract Documents, and that each Bidder who is awarded a contract shall be in fact a prime contractor, not a subcontractor, to the District, and agrees that its Proposal, if accepted by the District, will be the basis for the Bidder to enter into a contract with the District in accordance with the intent of the Contract Documents.
3. The undersigned has notified the District in writing of any discrepancies or omissions or of any doubt, questions, or ambiguities about the meaning of any of the Contract Documents, and has contacted the Construction Manager before bid date to verify the issuance of any clarifying Addenda.
4. The undersigned agrees to commence work under this Contract on the date established in the Contract Documents and to complete all work within the time specified in the Contract Documents.
5. The liquidated damages clause of the General Conditions and Agreement is hereby acknowledged.
6. It is understood that the District reserves the right to reject this bid and that the bid shall remain open to acceptance and is irrevocable for a period of ninety (90) days.
7. The following documents are attached hereto:
 - Bid Bond on the District's form or other security
 - Designated Subcontractors List
 - Site Visit Certification

- Non-Collusion Declaration
- Iran Contracting Act Certification

8. Receipt and acceptance of the following Addenda is hereby acknowledged:

| | |
|------------------------|------------------------|
| No. _____, Dated _____ | No. _____, Dated _____ |
| No. _____, Dated _____ | No. _____, Dated _____ |
| No. _____, Dated _____ | No. _____, Dated _____ |

- Bidder acknowledges that the license required for performance of the Work is a **Class B General Building Contractor** license.
- Bidder hereby certifies that Bidder is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the Work.
- Bidder specifically acknowledges and understands that if it is awarded the Contract, that it shall perform the Work of the Project while complying with all requirements of the Department of Industrial Relations.
- Bidder hereby certifies that its bid includes sufficient funds to permit Bidder to comply with all local, state or federal labor laws or regulations during the Project, including payment of prevailing wage, and that Bidder will comply with the provisions of Labor Code section 2810(d) if awarded the Contract
- Bidder agrees to comply with all requirements of the Project Labor Agreement.
- Bidder represents that it is competent, knowledgeable, and has special skills with respect to the nature, extent, and inherent conditions of the Work to be performed. Bidder further acknowledges that there are certain peculiar and inherent conditions existent in the construction of the Work that may create, during the Work, unusual or peculiar unsafe conditions hazardous to persons and property.
- Bidder expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to adequately and safely perform the Work with respect to such hazards.
- Bidder expressly acknowledges that it is familiar with and capable of complying with applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic including, if required, preparing, posting, and implementing a Social Distancing Protocol.
- Bidder expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Gov. Code, § 12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

18. The undersigned Bidder certifies that it is, at the time of bidding, and shall be throughout the period of the Contract, licensed by the State of California to do the type of work required under the terms of the Contract Documents and registered as a public works contractor with the Department of Industrial Relations. Bidder further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.

Furthermore, Bidder hereby certifies to the District that all representations, certifications, and statements made by Bidder, as set forth in this bid form, are true and correct and are made under penalty of perjury.

Dated this _____ day of _____ 20 ____

Name of Bidder: _____

Type of Organization: _____

Signature: _____

Print Name: _____

Title: _____

Address of Bidder: _____

Taxpayer Identification No. of Bidder: _____

Telephone Number: _____

E-mail: _____ Web Page: _____

Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

Public Works Contractor Registration No.: _____

END OF DOCUMENT

BID BOND

(Note: If Bidder is providing a bid bond as its bid security, Bidder must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

That the undersigned, _____, as Principal ("Principal"),

and _____, as Surety ("Surety"), a corporation organized and existing under and by virtue of the laws of the State of California and authorized to do business as a surety in the State of California, are held and firmly bound unto the Sacramento City Unified School District ("District") of Sacramento County, State of California, as Obligee, in an amount equal to ten percent (10%) of the Base Bid plus alternates, in the sum of

_____ Dollars (\$ _____)

lawful money of the United States of America, for the payment of which sum well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted a bid to the District for all Work specifically described in the accompanying bid for the following project: **Alice Birney Public Waldorf Campus Renewal 0004-468** ("Project" or "Contract").

NOW, THEREFORE, if the Principal is awarded the Contract and, within the time and manner required under the Contract Documents, after the prescribed forms are presented to Principal for signature, enters into a written contract, in the prescribed form in accordance with the bid, and files two bonds, one guaranteeing faithful performance and the other guaranteeing payment for labor and materials as required by law, and meets all other conditions to the Contract between the Principal and the Obligee becoming effective, or if the Principal shall fully reimburse and save harmless the Obligee from any damage sustained by the Obligee through failure of the Principal to enter into the written contract and to file the required performance and labor and material bonds, and to meet all other conditions to the Contract between the Principal and the Obligee becoming effective, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. The full payment of the sum stated above shall be due immediately if Principal fails to execute the Contract within seven (7) days of the date of the District's Notice of Award to Principal.

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

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

If the District awards the bid, the security of unsuccessful bidder(s) shall be returned within sixty (60) days from the time the award is made. Unless otherwise required by law, no bidder may withdraw its bid for ninety (90) days after the date of the bid opening.

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

Principal

By

Surety

By

Name of California Agent of Surety

Address of California Agent of Surety

Telephone Number of California Agent of Surety

Bidder must attach Power of Attorney and Certificate of Authority for Surety and a Notarial Acknowledgment for all Surety's signatures. The California Department of Insurance must authorize the Surety to be an admitted Surety Insurer.

END OF DOCUMENT

DESIGNATED SUBCONTRACTORS LIST
(Public Contact Code Sections 4100-4114)

PROJECT: **Alice Birney Public Waldorf Campus Renewal 0004-468**

Bidder acknowledges and agrees that it must clearly set forth below the name, location and California contractor license number of each subcontractor who will perform work or labor or render service to the Bidder in or about the construction of the Work or who will specially fabricate and install a portion of the Work according to detailed drawings contained in the plans and specifications in an amount in excess of one-half of one percent (0.5%) of Bidder's total Base Bid and the kind of Work that each will perform. Vendors or suppliers of materials only do not need to be listed.

Bidder acknowledges and agrees that, if Bidder fails to list as to any portion of Work, or if Bidder lists more than one subcontractor to perform the same portion of Work, Bidder must perform that portion itself or be subjected to penalty under applicable law. In case more than one subcontractor is named for the same kind of Work, state the portion of the kind of Work that each subcontractor will perform.

If alternate bid(s) is/are called for and Bidder intends to use subcontractors different from or in addition to those subcontractors listed for work under the Base Bid, Bidder must list subcontractors that will perform Work in an amount in excess of one half of one percent (0.5%) of Bidder's total Base Bid plus alternate(s).

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

CA Cont. Lic. #: _____ Location: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

SITE VISIT CERTIFICATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
IF SITE VISIT WAS MANDATORY

PROJECT: **Alice Birney Public Waldorf Campus Renewal 0004-468**

Check option that applies:

_____ I certify that I visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. I fully understand the facilities, difficulties, and restrictions attending the execution of the Work under contract.

_____ I certify that _____ (Bidder's representative) visited the Site of the proposed Work, received the attached _____ pages of information, and became fully acquainted with the conditions relating to construction and labor. The Bidder's representative fully understood the facilities, difficulties, and restrictions attending the execution of the Work under contract.

Bidder fully indemnifies the Sacramento City Unified School District, its Architect, its Engineers, its Construction Manager, and all of their respective officers, agents, employees, and consultants from any damage, or omissions, related to conditions that could have been identified during my visit and/or the Bidder's representative's visit to the Site.

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

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

**NON-COLLUSION DECLARATION
(Public Contract Code Section 7106)**

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.
[Title] [Name of Firm]

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

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

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

at _____, _____.
[City] [State]

Date: _____

Proper Name of Bidder: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code Sections 2202-2208)

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**
between the Sacramento City Unified School District ("District") and _____
_____"(Contractor" or "Bidder") ("Contract" or "Project").

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.

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

END OF DOCUMENT

WORKERS' COMPENSATION CERTIFICATION

PROJECT/CONTRACT NO **Alice Birney Public Waldorf Campus Renewal 0004-468**

between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

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.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

(In accordance with Labor Code sections 1860 and 1861, the above certificate must be signed and filed with the awarding body prior to performing any Work under this Contract.)

END OF DOCUMENT

**PREVAILING WAGE AND
RELATED LABOR REQUIREMENTS CERTIFICATION**

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**
between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

I hereby certify that I will conform to the State of California Public Works Contract requirements regarding prevailing wages, benefits, on-site audits with 48-hours' notice, payroll records, and apprentice and trainee employment requirements, for all Work on the above Project including, without limitation, labor compliance monitoring and enforcement by the Department of Industrial Relations.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

**DISABLED VETERAN BUSINESS
ENTERPRISE PARTICIPATION CERTIFICATION**

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**
between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

GENERAL INSTRUCTIONS

Section 17076.11 of the Education Code requires school districts using, or planning to use, funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%) per year of the overall dollar amount expended each year by the school district on projects that receive state funding. Therefore, the lowest responsive responsible Bidder awarded the Contract must submit this document to the District with its executed Agreement, identifying the steps contractor took to solicit DVBE participation in conjunction with this Contract. **Do not submit this form with your bids.**

PART I – Method of Compliance with DVBE Participation Goals. Check the appropriate box to indicate your method of committing the contract dollar amount.

| YOUR BUSINESS ENTERPRISE IS: | AND YOU WILL | AND YOU WILL |
|--|---|---|
| 1.01 <input type="checkbox"/> Disabled veteran owned and your forces will perform at least 3% of this Contract | Include a copy of your DVBE letter from Office of Small Business and Disabled Veterans Business Enterprise Services ("OSDS")* | Complete Part 1 of this form and the Certification |
| 1.02 <input type="checkbox"/> Disabled veteran owned but is unable to perform 3% of this Contract with your forces | Use DVBE subcontractors /suppliers to bring the Contract participation to at least 3% | Include a copy of each DVBE's letter from OSDS (including yours, if applicable), and complete Part 1 of this form and the Certification |
| 1.03 <input type="checkbox"/> NOT disabled veteran owned | Use DVBE subcontractors /suppliers for at least 3% of this Contract | |
| 1.04 <input type="checkbox"/> Unable to meet the required participation goals after good faith efforts | Make good faith efforts, including contacts, advertisement and DVBE solicitation | Complete all of this form and the Certification |

* A DVBE letter from OSDS is obtained from the participating DVBE.

You must complete the following table to show the dollar amount of DVBE participation:

| | TOTAL CONTRACT PRICE |
|---|-----------------------------|
| 1.01 Prime Bidder, if DVBE (own participation) | \$ |
| 1.02 DVBE Subcontractor or Supplier | |
| A. | |
| B. | |
| C. | |
| D. | |
| 1.03 Subtotal (A & B) | |
| 1.04 Non-DVBE | |
| 1.05 Total Bid | |

PART II – Contacts. To identify DVBE subcontractors/suppliers for participation in your contract, you must contact each of the following categories. You should contact several DVBE organizations.

| CATEGORY | TELEPHONE NUMBER | DATE CONTACTED | PERSON CONTACTED |
|---|-------------------------|-----------------------|-------------------------|
| A. The District, if any | | | * |
| B. OSDS, provides assistance locating DVBEs at https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx | (916) 375-4940 | | * |
| C. DVBE Organization (List) | | | * |
| | | | |
| | | | |
| | | | |

*Write "recorded message" in this column, if applicable.

PART III – Advertisement. You must advertise for DVBE participation in both a trade and focus paper. List the advertisement you place to solicit DVBE participation. Advertisements should be published at least fourteen (14) days prior to bid/proposal opening; if you cannot advertise fourteen (14) days prior, advertisements should be published as soon as possible. Advertisements must include that your firm is seeking DVBE participation, the project name and location, and your firm’s name, your contact person, and telephone number. Attach copies of advertisements to this form.

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

PART IV – 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 a copy of their DVBE letter(s) from OSDS | | |
| was NOT selected to participate | Check “NO” in the “SELECTED” column | state why in the “REASON NOT SELECTED” column | | |
| did not respond to your solicitation | Check the “NO RESPONSE” column. | | | |
| DVBE CONTACTED | SELECTED | | REASON NOT SELECTED | NO RESPONSE |
| | YES | NO | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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 _____ 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.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

DRUG-FREE WORKPLACE CERTIFICATION

PROJECT/CONTRACT NO: **Alice Birney Public Waldorf Campus Renewal 0004-468**
between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

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

The District is not a "state agency" as defined in the applicable section(s) of the Government Code, but the District is a local agency and public school district under California law and requires all contractors on District projects to comply with the provisions and requirements of the Drug-Free Workplace Act of 1990.

Contractor must also comply with the provisions of Health & Safety Code section 11362.3 which prohibits the consumption or possession of cannabis or cannabis products in any public place, including school grounds, and specifically on school grounds while children are present.

Contractor shall certify that it will provide a drug-free workplace by doing all of the following:

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

- c. Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required above, and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

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

I also understand that if the District determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of section 8355, that the Contract awarded herein is subject to termination, suspension of payments, or both. I further understand that, should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of the aforementioned Act.

I acknowledge that I am aware of the provisions of and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990 and Health and Safety Code section 11362.3.

Date: _____
Proper Name of Contractor: _____
Signature: _____
Print Name: _____
Title: _____

END OF DOCUMENT

TOBACCO-FREE ENVIRONMENT CERTIFICATION

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**

between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

This Tobacco-Free Environment Certification form is required from the successful Bidder.

Pursuant to, without limitation, 20 U.S.C. section 6083, Labor Code section 6400 et seq., Health & Safety Code section 104350 et seq., Business and Professions Code section 22950 et seq., and District Board policies, all District sites, including the Project site, are tobacco-free environments. 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. The prohibition on smoking includes the use of any electronic smoking device that creates an aerosol or vapor, in any manner or in any form, and the use of any oral smoking device for the purpose of circumventing the prohibition of tobacco smoking. Further, Health & Safety Code section 11362.3 prohibits the smoking or use of cannabis or cannabis products in any place where smoking tobacco is prohibited.

I acknowledge that I am aware of the District's policy regarding tobacco-free environments at District sites, including the Project site and hereby certify that I will adhere to the requirements of that policy and not permit any of my firm's employees, agents, subcontractors, or my firm's subcontractors' employees or agents, to use tobacco and/or smoke on the Project site.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**

between Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

- 19. Contractor hereby certifies that no asbestos, or asbestos-containing materials, polychlorinated biphenyl (PCB), or any material listed by the federal or state Environmental Protection Agency or federal or state health agencies as a hazardous material, or any other material defined as being hazardous under federal or state laws, rules, or regulations, ("New Hazardous Material"), shall be furnished, installed, or incorporated in any way into the Project or in any tools, devices, clothing, or equipment used to affect any portion of Contractor's work on the Project for District.
- 20. Contractor further certifies that it has instructed its employees with respect to the above-mentioned standards, hazards, risks, and liabilities.
- 21. Asbestos and/or asbestos-containing material shall be defined as all items containing but not limited to chrysotile, crocidolite, amosite, anthophyllite, tremolite, and actinolite. Any or all material containing greater than one-tenth of one percent (0.1%) asbestos shall be defined as asbestos-containing material.
- 22. Any disputes involving the question of whether or not material is New Hazardous Material shall be settled by electron microscopy or other appropriate and recognized testing procedure, at the District's determination. The costs of any such tests shall be paid by Contractor if the material is found to be New Hazardous Material.
- 23. All Work or materials found to be New Hazardous Material or Work or material installed with equipment containing New Hazardous Material will be immediately rejected and this Work will be removed at Contractor's expense at no additional cost to the District.
- 24. Contractor has read and understood the document titled Hazardous Materials Procedures & Requirements, and shall comply with all the provisions outlined therein. Contractor certifies that it is knowledgeable of, and shall comply with, all laws applicable to the Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

LEAD-BASED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**
between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

This certification provides notice to the Contractor that:

- (1) Contractor's work may disturb lead-containing building materials.
- (2) Contractor shall notify the District if any work may result in the disturbance of lead-containing building materials.
- (3) Contractor shall comply with the Renovation, Repair and Painting Rule, if lead-based paint is disturbed in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors.

1. Lead as a Health Hazard

Lead poisoning is recognized as a serious environmental health hazard facing children today. Even at low levels of exposure, much lower than previously believed, lead can impair the development of a child's central nervous system, causing learning disabilities, and leading to serious behavioral problems. Lead enters the environment as tiny lead particles and lead dust disburse when paint chips, chalks, peels, wears away over time, or is otherwise disturbed. Ingestion of lead dust is the most common pathway of childhood poisoning; lead dust gets on a child's hands and toys and then into a child's mouth through common hand-to-mouth activity. Exposures may result from construction or remodeling activities that disturb lead paint, from ordinary wear and tear of windows and doors, or from friction on other surfaces.

Ordinary construction and renovation or repainting activities carried out without lead-safe work practices can disturb lead-based paint and create significant hazards. Improper removal practices, such as dry scraping, sanding, or water blasting painted surfaces, are likely to generate high volumes of lead dust.

Because the Contractor and its employees will be providing services for the District, and because the Contractor's work may disturb lead-containing building materials, CONTRACTOR IS HEREBY NOTIFIED of the potential presence of lead-containing materials located within certain buildings utilized by the District. All school buildings built prior to 1978 are presumed to contain some lead-based paint until sampling proves otherwise.

2. Overview of California Law

Education Code section 32240 et seq. is known as the Lead-Safe Schools Protection Act. Under this act, the Department of Health Services is to conduct a sample survey of schools in the State of California for the purpose of developing risk factors to predict lead contamination in public schools. (Ed. Code, § 32241.)

Any school that undertakes any action to abate existing risk factors for lead is required to utilize trained and state-certified contractors, inspectors, and workers. (Ed. Code, § 32243, subd. (b).) Moreover, lead-based paint, lead plumbing, and solders, or other potential sources of lead contamination, shall not be utilized in the construction of any new school facility or the modernization or renovation of any existing school facility. (Ed. Code, § 32244.)

Both the Federal Occupational Safety and Health Administration ("Fed/OSHA") and the California Division of Occupational Safety and Health ("Cal/OSHA") have implemented safety orders applicable to all construction work where a contractor's employee may be occupationally exposed to lead.

The OSHA Regulations apply to all construction work where a contractor's employee may be occupationally exposed to lead. The OSHA Regulations contain specific and detailed requirements imposed on contractors subject to those regulations. The OSHA Regulations define construction work as work for construction, alteration, and/or repair, including painting and decorating. Regulated work includes, but is not limited to, the following:

- a. Demolition or salvage of structures where lead or materials containing lead are present;
- b. Removal or encapsulation of materials containing lead;
- c. New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
- d. Installation of products containing lead;
- e. Lead contamination/emergency cleanup;
- f. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and
- g. Maintenance operations associated with the construction activities described in the subsection.

Because it is assumed by the District that all painted surfaces (interior as well as exterior) within the District contain some level of lead, it is imperative that the Contractor, its workers and subcontractors fully and adequately comply with all applicable laws, rules and regulations governing lead-based materials (including title 8, California Code of Regulations, section 1532.1).

Contractor shall notify the District if any Work may result in the disturbance of lead-containing building materials. Any and all Work that may result in the disturbance of lead-containing building materials shall be coordinated through the District. A signed copy of this Certification shall be on file prior to beginning Work on the Project, along with all current insurance certificates.

3. Renovation, Repair and Painting Rule, Section 402(c)(3) of the Toxic Substances Control Act

The EPA requires lead safe work practices to reduce exposure to lead hazards created by renovation, repair and painting activities that disturb lead-based paint. Pursuant to the Renovation, Repair and Painting Rule (RRP), renovations in homes, childcare facilities, and schools built prior to 1978 must be conducted by certified renovations firms, using renovators with training by a EPA-accredited training provider, and fully and adequately complying with all applicable laws, rules and regulations governing lead-based materials, including those rules and regulations appearing within title 40 of the Code of Federal Regulations as part 745 (40 CFR 745).

The RRP requirements apply to all contractors who disturb lead-based paint in a six-square-foot or greater area indoors or a 20-square-foot or greater area outdoors. If a DPH-certified inspector or risk assessor determines that a home constructed before 1978 is lead-free, the federal certification is not required for anyone working on that particular building.

4. Contractor's Liability

If the Contractor fails to comply with any applicable laws, rules, or regulations, and that failure results in a site or worker contamination, the Contractor will be held solely responsible for all costs involved in any required corrective actions, and shall defend, indemnify, and hold harmless the District, pursuant to the indemnification provisions of the Contract, for all damages and other claims arising therefrom.

If lead disturbance is anticipated in the Work, only persons with appropriate accreditation, registrations, licenses, and training shall conduct this Work.

It shall be the responsibility of the Contractor to properly dispose of any and all waste products, including, but not limited to, paint chips, any collected residue, or any other visual material that may occur from the prepping of any painted surface. It will be the responsibility of the Contractor to provide the proper disposal of any hazardous waste by a certified hazardous waste hauler. This company shall be registered with the Department of Transportation (DOT) and shall be able to issue a current manifest number upon transporting any hazardous material from any school site within the District.

The Contractor shall provide the District with any sample results prior to beginning Work, during the Work, and after the completion of the Work. The District may request to examine, prior to the commencement of the Work, the lead training records of each employee of the Contractor.

THE CONTRACTOR HEREBY ACKNOWLEDGES, UNDER PENALTY OF PERJURY, THAT IT:

1. HAS RECEIVED NOTIFICATION OF POTENTIAL LEAD-BASED MATERIALS ON THE OWNER'S PROPERTY;
2. IS KNOWLEDGEABLE REGARDING AND WILL COMPLY WITH ALL APPLICABLE LAWS, RULES, AND REGULATIONS GOVERNING WORK WITH, AND DISPOSAL, OF LEAD.

THE UNDERSIGNED WARRANTS THAT HE/SHE HAS THE AUTHORITY TO SIGN ON BEHALF OF AND BIND THE CONTRACTOR. THE DISTRICT MAY REQUIRE PROOF OF SUCH AUTHORITY.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

IMPORTED MATERIALS CERTIFICATION

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**

between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

This form shall be executed by all entities that, in any way, provide or deliver and/or supply any soils, aggregate, or related materials ("Fill") to the Project Site and shall be provided to the District at least ten (10) days before delivery. All Fill shall satisfy all requirements of any environmental review of the Project performed pursuant to the statutes and guidelines of the California Environmental Quality Act, section 21000 et seq. of the Public Resources Code ("CEQA"), and all requirements of section 17210 et seq. of the Education Code, including requirements for a Phase I environmental assessment acceptable to the State of California Department of Education and Department of Toxic Substances Control.

Certification of: Delivery Firm/Transporter Supplier Manufacturer
 Wholesaler Broker Retailer
 Distributor Other _____

Type of Entity Corporation General Partnership
 Limited Partnership Limited Liability Company
 Sole Proprietorship Other _____

Name of firm ("Firm"): _____

Mailing address: _____

Addresses of branch office used for this Project: _____

If subsidiary, name and address of parent company: _____

By my signature below, I hereby certify that I am aware of section 25260 of the Health and Safety Code and the sections referenced therein regarding the definition of hazardous material. I further certify on behalf of the Firm that all soils, aggregates, or related materials provided, delivered, and/or supplied or that will be provided, delivered, and/or supplied by this Firm to the Project Site are free of any and all hazardous material as defined in section 25260 of the Health and Safety Code. I further certify that I am authorized to make this certification on behalf of the Firm.

Date: _____

Proper Name of Firm: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

CRIMINAL BACKGROUND INVESTIGATION
/FINGERPRINTING CERTIFICATION

PROJECT/CONTRACT NO.: **Alice Birney Public Waldorf Campus Renewal 0004-468**

between the Sacramento City Unified School District ("District") and _____
_____ ("Contractor" or "Bidder") ("Contract" or "Project").

The undersigned does hereby certify to the District that I am a representative of the Contractor currently under contract with the District; that I am familiar with the facts herein certified; and that I am authorized and qualified to execute this certificate on behalf of Contractor.

Contractor certifies that it has taken at least one of the following actions (check all that apply):

- Pursuant to Education Code section 45125.2(a), Contractor has installed or will install, prior to commencement of Work, a physical barrier at the Work Site, that will limit contact between Contractor's employees, Subcontractors or suppliers and District pupils at all times; and/or
- Pursuant to Education Code section 45125.2(a), Contractor certifies that all employees will be under the continual supervision of, and monitored by, an employee of the Contractor who the California Department of Justice ("DOJ") has ascertained, or as described below, will ascertain, has not been convicted of a violent or serious felony. The name and title of the employee who will be supervising Contractor's and its subcontractors' or suppliers' employees is:

Name: _____

Title: _____

NOTE: If Contractor is a sole proprietor, and elects the above option, Contractor must have the above-named employee's fingerprints prepared and submitted by District for submission to the DOJ, in accordance with Education Code section 45125.1(h). No work shall commence until such determination by DOJ has been made.

- Pursuant to Education Code section 45125.2(a), the District will take appropriate steps to protect the safety of any pupils that may come in contact with Contractor's employees, subcontractors or suppliers so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.2 shall not apply to Contractor under the Contract.
- The Work on the Contract is either (i) at an unoccupied school site and no employee of Contractor and/or subcontractor or supplier of any tier of the Contract shall come in contact with the District pupils or (ii) if Contractor's employees or any subcontractor or supplier of any tier of the Contract interacts with pupils, such interaction shall only take place under the immediate supervision and control of the pupil's parent or guardian or a school employee, so that the fingerprinting and criminal background investigation requirements of Education Code section 45125.1 shall not apply to Contractor under the Contract.

- The Contractor, who is not a sole proprietor, has complied with the fingerprinting requirements of Education Code section 45125.1 with respect to all Contractor's employees and all of its Subcontractors' employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and the DOJ has determined (A) that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). When the Contractor performs the criminal background check, it shall immediately provide any subsequent arrest and conviction information it receives to the District pursuant to the subsequent arrest service. No work shall commence until the Department of Justice ascertains that Contractor's employees and any subcontractors' employees have not been convicted of a felony as defined in Government Code Section 45122.1.

A complete and accurate list of Contractor's employees and of all of its subcontractors' employees who may come in contact with District pupils during the course and scope of the Contract is attached hereto as ATTACHMENT "A;" and/or

- The Contractor is a sole proprietor and intends to comply with the fingerprinting requirements of Education Code section 45125.1(h) with respect to all Contractor's employees who may have contact with District pupils in the course of providing services pursuant to the Contract, and hereby agrees to the District's preparation and submission of fingerprints such that the DOJ may determine (A) that none of those employees has been convicted of a felony, as that term is defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). No work shall commence until the Department of Justice ascertains that Contractor's employees and any subcontractors' employees have not been convicted of a felony as defined in Government Code Section 45122.1.

Contractor's responsibility for background clearance extends to all of its employees, Subcontractors or suppliers, and employees of Subcontractors or suppliers coming into contact with District pupils regardless of whether they are designated as employees or acting as independent contractors of the Contractor.

[CONTINUED ON NEXT PAGE]

ATTACHMENT "A"

List of Employees/Subcontractors

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

Name/Company: _____

If further space is required for the list of employees/subcontractors, attach additional copies of this page.

Date: _____

Proper Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

REGISTERED SUBCONTRACTORS LIST
(Labor Code Section 1771.1)

PROJECT: **Alice Birney Public Waldorf Campus Renewal 0004-468**

Date Submitted (for Updates): _____

Contractor acknowledges and agrees that it must clearly set forth below the name and Department of Industrial Relations (DIR) registration number of each subcontractor **for all tiers** who will perform work or labor or render service to Contractor or its subcontractors in or about the construction of the Work **at least two (2) weeks before the subcontractor is scheduled to perform work**. This document is to be updated as all tiers of subcontractors are identified.

Contractor acknowledges and agrees that, if Contractor fails to list as to any subcontractor of any tier who performs any portion of Work, the Contract is subject to cancellation and the Contractor will be subjected to penalty under applicable law.

If further space is required for the list of proposed subcontractors, attach additional copies of page 2 showing the required information, as indicated below.

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Subcontractor Name: _____

DIR Registration #: _____

Portion of Work: _____

Date: _____

Name of Contractor: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

POST BID INTERVIEW

PART 5 – GENERAL

5.01 SUMMARY

If requested by the District, this Section requires the apparent low bidder to attend and participate in a Post Bid Interview with the Construction Manager, prior to award of any contract by the District. The Post Bid Interview will be scheduled by the Construction Manager within three (3) calendar days after the date of bid.

5.02 REQUIRED ATTENDANCE

- A. A duly authorized representative of the apparent low bidder is required to attend the Post Bid Interview, in person.
- B. The apparent low bidder's authorized representative(s) must have (1) knowledge of how the bid submitted was prepared, (2) the person responsible for supervising performance of the Work, and (3) the authority to bind the apparent low bidder.
- C. Failure to attend the Post Bid Interview as scheduled will be considered just cause for the District to reject the Bid as nonresponsive.

5.03 POST BID INTERVIEW PROCEDURE

- A. The Construction Manager will review the Bid with the attendees.
- B. The Construction Manager will review the Contract Documents with the attendees, including but not limited to:
 - (1) Insurance
 - (2) Bonding
 - (3) Addenda
 - (4) Pre-Bid Clarifications
 - (5) Scope of Work
 - (6) Bid Packages Descriptions
 - (7) Bid Alternates
 - (8) Contract Plans
 - (9) Contract Specifications

- (10) Project Schedule and Schedule Requirements
- (11) Critical Dates Requirement for Other Bid Packages
- (12) Prevailing Wage Requirements
- (13) Liquidated Damages
- (14) Required Documentation for Contract Administration
- (15) Contract Coordination Requirements

5.04 POST BID INTERVIEW DOCUMENTATION

The Construction Manager will document the Post Bid Interview on the form attached to this Section. Both the apparent low bidder and the Construction Manager are required to sign the Post Bid Interview Documentation.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

POST BID INTERVIEW

CONSTRUCTION MANAGER

[Name]
[Address 1]
[Address 2]
[Phone] [Fax]

BIDDER: _____

DATE: _____ TIME: _____ PHONE: _____

1. INTRODUCTIONS:

Present

a.

CONTRACTOR

CONTRACTOR

[CM]

[CM]

2. PROPOSED CONTRACT:

3.

PURPOSE OF INTERVIEW IS TO ASSURE A MUTUAL UNDERSTANDING OF THE FOLLOWING:

- a. Do you acknowledge submission of a complete and accurate bid? Yes No
- b. Do you acknowledge the Bid Document submittal timelines after NOA and NTP and can you meet those timelines? Yes No
- c. Do you acknowledge the requirements for the escrow of bid documents? Yes No
- d. Are you comfortable with your listed subcontractors? Yes No

CONTRACTUAL REQUIREMENTS:

4.

- a. Do you understand you are a prime contractor? Yes No
- b. Can you meet specified insurance requirements? Yes No
 - (1) Do any of your policies that require Additional Insured endorsements exceed the minimum coverage requirements? Yes No
 - (2) Are you requesting that the District accept an Excess Liability Insurance Policy to meet the policy limit? Yes No

- (3) Will there be a gap between the per occurrence amount of any underlying policy and the start of the coverage under the Umbrella or Excess Liability Insurance Policy? Yes No
- c. Will you provide the Performance Bond and Labor and Material Bond for 100% of the Contract Price as stipulated? Yes No
- (1) Cost for bonds: _____% Yes No
- (2) Is the cost of your bonds in your base bid? Yes No
- (3) Is your surety licensed to issue bonds in California? Yes No
- d. Do you understand the fingerprinting requirements? Yes No
- e. Is it understood that all workers must be paid prevailing wage? Yes No
- f. Is it understood that all subcontractors of every tier must be registered as a public works contractor with the Department of Industrial Relations? Yes No
5. SCOPE OF WORK:
- a. Acknowledged Receipt of Addenda Yes No
- b. Are the costs for addenda items included in your bid? (if applicable) Yes No
- c. Do you have a complete understanding of your Scope of Work under the proposed Agreement? Yes No
- d. You have re-reviewed the documents and understand the Scope of the Work. Are there any items that require clarification? If yes, please identify them. Yes No
- (1) _____
- _____
- (2) _____
- _____
- (3) _____
- _____
- Is (are) there additional cost(s) for the above item(s)? Yes No
- e. Is the cost for allowance included in your bid? Yes No

- f. Have you reviewed bid alternative(s) #1-____? (if applicable) Yes No
- g. Are the costs for bid alternatives included in your bid? Yes No
- h. Are the plans and specifications clear and understandable to your satisfaction? Yes No
- i. Do you acknowledge that the time to submit notice of requests for substitution of specified materials has expired? Yes No

6. SCHEDULE:

- a. Do you acknowledge and agree to the stipulated completion dates and milestones in the contract? Yes No

(1) Will you provide a detailed construction schedule to _____ within the required ten (10) days of the Notice to Proceed, per the contract? Yes No

(2) Can you meet the submittal deadline? Yes No

(3) It is understood that the Project schedule is critical and that that weekend and overtime work may be required to meet the milestones. Yes No

(4) It is understood that if rain does occur, then all dewatering and protection of work is required, per the contract. If not, what do you believe must change and why? Yes No

- b. Identify critical materials, deliveries, long lead items and other dependencies, including Owner Furnished items that could affect the completion of your work. Yes No

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

- c. Do you understand that there is going to be maintenance and other construction taking place on site during the course of the project? Yes No

7. EXECUTION OF WORK

- a. Do you understand the access to the site? Yes No
- b. Do you understand the staging area restrictions? Yes No
- c. Have you included protection of [asphalt, floors, and roofs]? Yes No
- d. Do you understand that the site is occupied by students, teachers, administrators, parents, etc.? Yes No

8. CONTRACTOR COMMENTS/SUGGESTIONS:

- (1) _____
- (2) _____
- (3) _____

9. CONTRACTOR

You agree the information contained herein is part of your contractual obligations. Your signature acknowledges your agreement to perform all Work in the Contract Documents, and that costs for all Work are included in your bid.

The foregoing information is true and accurate, and I am authorized to sign as an officer of the company I am representing.

[Company Name]

Signature _____ Title: _____

Date: _____

10. CONSTRUCTION MANAGER

Signature _____ Title: _____

Date: _____

Title of Document: POST BID INTERVIEW
Number of Pages: _____
Date of Document: _____

END OF DOCUMENT

NOTICE OF AWARD

Dated: _____ 20__

To: _____ (Contractor)

(Address)

From: Governing Board ("Board") of the Sacramento City Unified School District ("District")

Re: _____, Project No. _____ ("Project").

Contractor has been awarded the Contract for the above-referenced Project on _____
_____, 20__, by action of the District's Board.

The Contract Price is _____ Dollars (\$_____), and
includes alternates _____.

Three (3) copies of each of the Contract Documents (except Drawings) accompany this Notice of Award. Three (3) sets of the Drawings will be delivered separately or otherwise made available. Additional copies are available at cost of reproduction.

You must comply with the following conditions precedent within **SEVEN (7)** calendar days of the date of this Notice of Award.

The Contractor shall execute and submit the following documents by 5:00 p.m. of the **SEVENTH (7th)** calendar day following the date of the Notice of Award.

- a. Agreement: To be executed by successful Bidder. Submit three (3) copies, each bearing an original signature.
- b. Escrow of Bid Documentation: This must include all required documentation. See the document titled Escrow Bid Documentation for more information.
- c. Performance Bond (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
- d. Payment Bond (Contractor's Labor & Material Bond) (100%): On the form provided in the Contract Documents and fully executed as indicated on the form.
- e. Insurance Certificates and Endorsements as required.
- f. Workers' Compensation Certification.
- g. Prevailing Wage and Related Labor Requirements Certification.
- h. Disabled Veteran Business Enterprise Participation Certification.

- i. Drug-Free Workplace Certification.
- j. Tobacco-Free Environment Certification.
- k. Hazardous Materials Certification.
- l. Lead-Based Materials Certification.
- m. Imported Materials Certification.
- n. Criminal Background Investigation/Fingerprinting Certification.

Failure to comply with these conditions within the time specified will entitle District to consider your bid abandoned, to annul this Notice of Award, and to declare your Bid Security forfeited, as well as any other rights the District may have against the Contractor.

After you comply with those conditions, District will return to you one fully signed counterpart of the Agreement.

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

AGREEMENT

THIS AGREEMENT IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20____, by and between the Sacramento City Unified School District ("District") and _____ ("Contractor") ("Agreement").

WITNESSETH: That the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree with each other, as follows:

- 1. The Work:** Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, and material necessary to perform and complete in a good and workmanlike manner, the work of the following project:

Alice Birney Public Waldorf Campus Renewal 0004-468

("Project" or "Contract" or "Work")

It is understood and agreed that the Work shall be performed and completed as required in the Contract Documents including, without limitation, the Drawings and Specifications and submission of all documents required to secure funding or by the Division of the State Architect for close-out of the Project, under the direction and supervision of, and subject to the approval of, the District or its authorized representative.

- 2. The Contract Documents:** The complete Contract consists of all Contract Documents as defined in the General Conditions and incorporated herein by this reference. Any and all obligations of the District and Contractor are fully set forth and described in the Contract Documents. All Contract Documents are intended to cooperate so that any Work called for in one and not mentioned in the other or vice versa is to be executed the same as if mentioned in all Contract Documents.
- 3. Interpretation of Contract Documents:** Should any question arise concerning the intent or meaning of Contract Documents, including the Drawings or Specifications, the question shall be submitted to the District for interpretation. If a conflict exists in the Contract Documents, valid, written modifications, beginning with the most recent, shall control over this Agreement (if any), which shall control over the Special Conditions, which shall control over any Supplemental Conditions, which shall control over the General Conditions, which shall control over the remaining Division 0 documents, which shall control over Division 1 Documents which shall control over Division 2 through Division 49 documents, which shall control over figured dimensions, which shall control over large-scale drawings, which shall control over small-scale drawings. In the case of a discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In no case shall a document calling for lower quality and/or quantity material or workmanship control. The decision of the District in the matter shall be final.

- 4. Time for Completion:** It is hereby understood and agreed that the Work under this Contract shall be **completed by January 31, 2025** ("Contract Time). **This includes construction (8/30/2024), punchlist (10/28/2024), landscape maintenance 1/3/2025), and closeout and project acceptance 1/31/2025).** All work should be in coordination with the schedule provided at bid time and established milestones.
- 5. Completion - Extension of Time:** Should the Contractor fail to complete this Contract, and the Work provided herein, within the time fixed for completion, due allowance being made for the contingencies provided for herein, the Contractor shall become liable to the District for all loss and damage that the District may suffer on account thereof. The Contractor shall coordinate its Work with the Work of all other contractors. The District shall not be liable for delays resulting from Contractor's failure to coordinate its Work with other contractors in a manner that will allow timely completion of Contractor's Work. Contractor shall be liable for delays to other contractors caused by Contractor's failure to coordinate its Work with the Work of other contractors.
- 6. Liquidated Damages:** Time is of the essence for all work under this Agreement. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage that the District will sustain in the event of and by reason of Contractor's delay; therefore, Contractor agrees that it shall pay to the District the sum of Two Thousand and No/100 dollars (\$2,000) per calendar day (CD) as liquidated damages for the first 30 CDs and Four Thousand Five Hundred and no/100 dollars (\$4,500) for each and every day's delay beyond the first 30 CD past the date herein prescribed in completion of the Work.

It is hereby understood and agreed that this amount is not a penalty.

In the event that any portion of the liquidated damages is not paid to the District, the District may deduct that amount from any money due or that may become due the Contractor under this Agreement, and such deduction does not constitute a withholding or penalty. The District's right to assess liquidated damages is as indicated herein and in the General Conditions.

The time during which the Contract is delayed for cause, as hereinafter specified, may extend the time of completion for a reasonable time as the District may grant, provided that Contractor has complied with the claims procedure of the Contract Documents. This provision does not exclude the recovery of damages by either party under other provisions in the Contract Documents.

- 7. Loss Or Damage:** The District and its agents and authorized representatives shall not in any way or manner be answerable or suffer loss, damage, expense, or liability for any loss or damage that may happen to the Work, or any part thereof, or in or about the same during its construction and before acceptance, and the Contractor shall assume all liabilities of every kind or nature arising from the Work, either by accident, negligence, theft, vandalism, or any cause whatsoever; and shall hold the District and its agents and authorized representatives harmless from all liability of every kind and nature arising from accident, negligence, or any cause whatsoever.

- 8. Limitation Of District Liability:** District's financial obligations under this Contract shall be limited to the payment of the compensation provided in this Contract. Notwithstanding any other provision of this Contract, in no event shall District be liable, regardless of whether any claim is based on contract or tort, for any special, consequential, indirect or incidental damages, including, but not limited to, lost profits or revenue, lost bonding capacity, arising out of or in connection with this Contract for the services performed in connection with this Contract.
- 9. Insurance and Bonds:** Prior to issuance of the Notice to Proceed by the District, Contractor shall provide all required certificates of insurance, insurance endorsements, and payment and performance bonds as evidence thereof.
- 10. Prosecution of Work:** If the Contractor should neglect to prosecute the Work properly or fail to perform any provisions of this Contract, the District, may, pursuant to the General Conditions and without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.
- 11. Authority of Architect, Project Inspector, and DSA:** Contractor hereby acknowledges that the Architect(s), the Project Inspector(s), and the Division of the State Architect ("DSA") have authority to approve and/or suspend Work if the Contractor's Work does not comply with the requirements of the Contract Documents, Title 24 of the California Code of Regulations, and all applicable laws and regulations. The Contractor shall be liable for any delay caused by its non-compliant Work.
- 12. Assignment of Contract:** Neither the Contract, nor any part thereof, nor any moneys due or to become due thereunder, may be assigned by the Contractor without the prior written approval of the District, nor without the written consent of the Surety on the Contractor's Performance Bond (the "Surety"), unless the Surety has waived in writing its right to notice of assignment.
- 13. Classification of Contractor's License:** Contractor hereby acknowledges that it currently holds valid **Type B General Building Contractor's** license(s) issued by the State of California, Contractors' State License Board, in accordance with division 3, chapter 9, of the Business and Professions Code and in the classification called for in the Contract Documents.
- 14. Registration as Public Works Contractor:** The Contractor and all Subcontractors currently are registered as public works contractors with the Department of Industrial Relations, State of California, in accordance with Labor Code section 1771.1.
- 15. Payment of Prevailing Wages:** The Contractor and all Subcontractors shall pay all workers on all Work performed pursuant to this Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to sections 1770 et seq. of the California Labor Code.

16. Labor Compliance Monitoring and Enforcement: This Project is subject to labor compliance monitoring and enforcement by the Department of Industrial Relations pursuant to Labor Code section 1771.4 and Title 8 of the California Code of Regulations. Contractor specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code, including, without limitation, the requirement that the Contractor and all of its Subcontractors shall timely submit complete and accurate electronic certified payroll records as required by the Contract Documents, or the District may not issue payment.

17. Contract Price: In consideration of the foregoing covenants, promises, and agreements on the part of the Contractor, and the strict and literal fulfillment of each and every covenant, promise, and agreement, and as compensation agreed upon for the Work and construction, erection, and completion as aforesaid, the District covenants, promises, and agrees that it will well and truly pay and cause to be paid to the Contractor in full, and as the full Contract Price and compensation for construction, erection, and completion of the Work hereinabove agreed to be performed by the Contractor, the following price, including allowance:

_____ Dollars
(\$ _____),

in lawful money of the United States, which sum is to be paid according to the schedule provided by the Contractor and accepted by the District and subject to additions and deductions as provided in the Contract. This amount supersedes any previously stated and/or agreed to amount(s).

18. No Representations: No representations have been made other than as set forth in writing in the Contract Documents, including this Agreement. Each of the Parties to this Agreement warrants that it has carefully read and understood the terms and conditions of this Agreement and all Contract Documents, and that it has not relied upon the representations or advice of any other Party or any attorney not its own.

19. Entire Agreement: The Contract Documents, including this Agreement, set forth the entire agreement between the parties hereto and fully supersede any and all prior agreements, understandings, written or oral, between the parties hereto pertaining to the subject matter thereof.

20. Severability: If any term, covenant, condition, or provision in any of the Contract Documents is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remainder of the provisions in the Contract Documents shall remain in full force and effect and shall in no way be affected, impaired, or invalidated thereby.

21. Authority of Signatories: Each party has the full power and authority to enter into and perform this Contract, and the person signing this Contract on behalf of each party has been properly authorized and empowered to enter into this Contract. This Contract may be executed in one or more counterparts, each of which shall be

deemed an original. For this Agreement, and for all Contract Documents requiring a signature, a facsimile or electronic signature shall be deemed to be the equivalent of the actual original signature. All counterparts so executed shall constitute one Contract binding all the Parties hereto.

IN WITNESS WHEREOF, accepted and agreed on the date indicated above:

[CONTRACTOR NAME]

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

By: _____

By: _____

Title: _____

Title: Rose F. Ramos, Chief Business & Operations Officer

NOTE: If the party executing this Contract is a corporation, a certified copy of the by-laws, or of the resolution of the Board of Directors, authorizing the officers of said corporation to execute the Contract and the bonds required thereby must be attached hereto.

END OF DOCUMENT

NOTICE TO PROCEED

Dated: _____, 20__

TO: _____
("Contractor")

ADDRESS: _____

PROJECT: _____

PROJECT/CONTRACT NO.: _____ between the Sacramento City Unified School District and Contractor ("Contract").

You are notified that the Contract Time under the above Contract will commence to run on _____, 20__. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement executed by Contractor, the date of completion is _____, 20__.

You must submit the following documents by 5:00 p.m. of the TENTH (10th) calendar day following the date of this Notice to Proceed:

- a. Contractor's preliminary schedule of construction.
- b. Contractor's preliminary schedule of values for all of the Work.
- c. Contractor's preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals
- d. Contractor's Safety Plan specifically adapted for the Project.
- e. Registered Subcontractors List: A complete subcontractors list for all tiers, including the name, address, telephone number, email address, facsimile number, California State Contractors License number, license classification, Department of Industrial Relations registration number, and monetary value of all Subcontracts.

Thank you. We look forward to a very successful Project.

**SACRAMENTO CITY UNIFIED
SCHOOL DISTRICT**

BY: _____

NAME: _____

TITLE: _____

END OF DOCUMENT

ESCROW BID DOCUMENTATION

1. Requirement to Escrow Bid Documentation

- a. Contractor shall submit, within **SEVEN (7)** calendar days after the date of the Notice of Award, one copy of all documentary information received or generated by Contractor in preparation of bid prices for this Contract, as specified herein. This material is referred to herein as "Escrow Bid Documentation." The Escrow Bid Documentation of the Contractor will be held in escrow for the duration of the Contract.
- b. Contractor agrees, as a condition of award of the Contract, that the Escrow Bid Documentation constitutes all written information used in the preparation of its bid, and that no other written bid preparation information shall be considered in resolving disputes or claims. Contractor also agrees that nothing in the Escrow Bid Documentation shall change or modify the terms or conditions of the Contract Documents.
- c. The Escrow Bid Documentation will not be opened by District except as indicated herein. The Escrow Bid Documentation will be used only for the resolution of change orders and claims disputes.
- d. Contractor's submission of the Escrow Bid Documentation, as with the bonds and insurance documents required, is considered an essential part of the Contract award. Should the Contractor fail to make the submission within the allowed time specified above, District may deem the Contractor to have failed to enter into the Contract, and the Contractor shall forfeit the amount of its bid security, accompanying the Contractor's bid, and District may award the Contract to the next lowest responsive responsible bidder.
- e. NO PAYMENTS WILL BE MADE, NOR WILL DISTRICT ACCEPT PROPOSED CHANGE ORDERS UNTIL THE ABOVE REQUIRED INFORMATION IS SUBMITTED AND APPROVED.
- f. The Escrow Bid Documentation shall be submitted in person by an authorized representative of the Contractor to the District.

2. Ownership of Escrow Bid Documentation

- a. The Escrow Bid Documentation is, and shall always remain, the property of Contractor, subject to review by District, as provided herein.
- b. Escrow Bid Documentation constitute trade secrets, not known outside Contractor's business, known only to a limited extent and only by a limited number of employees of Contractor, safeguarded while in Contractor's possession, extremely valuable to Contractor, and could be extremely valuable to Contractor's competitors by virtue of reflecting Contractor's contemplated techniques of construction. Subject to the provisions herein, District agrees to safeguard the Escrow Bid Documentation, and all

information contained therein, against disclosure to the fullest extent permitted by law.

3. **Format and Contents of Escrow Bid Documentation**

- a. Contractor may submit Escrow Bid Documentation in its usual cost-estimating format; a standard format is not required. The Escrow Bid Documentation shall be submitted in the language (e.g., English) of the specification.
- b. Escrow Bid Documentation must clearly itemize the estimated costs of performing the work of each bid item contained in the bid schedule, separating bid items into sub-items as required to present a detailed cost estimate and allow a detailed cost review. The Escrow Bid Documentation shall include all subcontractor bids or quotes, supplier bids or quotes, quantity takeoffs, crews, equipment, calculations of rates of production and progress, copies of quotes from subcontractors and suppliers, and memoranda, narratives, add/deduct sheets, and all other information used by the Contractor to arrive at the prices contained in the bid proposal. Estimated costs should be broken down into Contractor's usual estimate categories such as direct labor, repair labor, equipment ownership and operation, expendable materials, permanent materials, and subcontract costs as appropriate. All labor rates must be broken down to specify any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind. Plant and equipment and indirect costs should be detailed in the Contractor's usual format. The Contractor's allocation of indirect costs, contingencies, markup, and other items to each bid item shall be identified.
- c. All costs shall be identified. For bid items amounting to less than \$10,000, estimated unit costs are acceptable without a detailed cost estimate, provided that labor, equipment, materials, and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and markup, as applicable, are allocated.
- d. Bid Documentation provided by District should not be included in the Escrow Bid Documentation unless needed to comply with the following requirements.

4. **Submittal of Escrow Bid Documentation**

- a. The Escrow Bid Documentation shall be submitted by the Contractor in a sealed container within **SEVEN (7)** calendar days after the date of the Notice of Award. The container shall be clearly marked on the outside with the Contractor's name, date of submittal, project name and the words "Escrow Bid Documentation – Intended to be opened in the presence of Authorized Representatives of Both District and Contractor".
- b. By submitting Escrow Bid Documentation, Contractor represents that the material in the Escrow Bid Documentation constitutes all the documentary information used in preparation of the bid and that the Contractor has personally examined the contents of the Escrow Bid Documentation container and has found that the documents in the container are complete.

- c. If Contractor's proposal is based upon subcontracting any part of the work, each subcontractor whose total subcontract price exceeds 5 percent of the total contract price proposed by Contractor, shall provide separate Escrow Documents to be included with those of Contractor. Those documents shall be opened and examined in the same manner and at the same time as the examination described above for Contractor.
- d. If Contractor wishes to subcontract any portion of the Work after award, District retains the right to require Contractor to submit Escrow Documents for the Subcontractor before the subcontract is approved.

5. **Storage, Examination and Final Disposition of Escrow Bid Documentation**

- a. The Escrow Bid Documentation will be placed in escrow, for the life of the Contract, in a mutually agreeable institution. The cost of storage will be paid by Contractor for the duration of the project until final Contract payment. The storage facilities shall be the appropriate size for all the Escrow Bid Documentation and located conveniently to both District's and Contractor's offices.
- b. The Escrow Bid Documentation shall be examined by both District and Contractor, at any time deemed necessary by either District or Contractor, to assist in the negotiation of price adjustments and change orders or the settlement of disputes and claims. In the case of legal proceedings, Escrow Bid Documentation shall be used subject to the terms of an appropriate protective order if requested by Contractor and ordered by a court of competent jurisdiction. Examination of the Escrow Bid Documentation is subject to the following conditions:
 - (1) As trade secrets, the Escrow Bid Documentation is proprietary and confidential to the extent allowed by law.
 - (2) District and Contractor shall each designate, in writing to the other party **SEVEN (7)** calendar days prior to any examination, the names of representatives who are authorized to examine the Escrow Bid Documentation. No other person shall have access to the Escrow Bid Documentation.
 - (3) Access to the documents may take place only in the presence of duly designated representatives of the District and Contractor. If Contractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative may examine the Escrow Bid Documents alone upon an additional **THREE (3)** calendar days' notice if a representative of the Contractor does not appear at the time set.
 - (4) If a subcontractor has submitted sealed information to be included in the Escrow Bid Documents, access to those documents may take place only in the presence of a duly designated representative of the District, Contractor and that subcontractor. If that subcontractor fails to designate a representative or appear for joint examination on **SEVEN (7)** calendar days' notice, then the District representative and/or the

Contractor may examine the Escrow Bid Documentation without that subcontractor present upon an additional **THREE (3)** calendar days' notice if a representative of that subcontractor does not appear at the time set.

- c. The Escrow Bid Documentation will be returned to Contractor at such time as the Contract has been completed and final settlement has been achieved.

END OF DOCUMENT

ESCROW AGREEMENT IN LIEU OF RETENTION
(Public Contract Code Section 22300)

(Note: Contractor must use this form.)

This Escrow Agreement in Lieu of Retention ("Escrow Agreement") is made and entered into this _____ day of _____, 20____, by and between the Sacramento City Unified School District ("District"), whose address is 5735 47th Avenue, Sacramento, California 95824, and _____ ("Contractor"), whose address is _____, and _____ ("Escrow Agent"), a state or federally chartered bank in the state of California, whose address is _____.

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

- 11. Pursuant to section 22300 of Public Contract Code of the State of California, which is hereby incorporated by reference, Contractor has the following two (2) options:
 - Deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to the Construction Contract No.____ entered into between District and Contractor for the _____ Project, in the amount of _____ Dollars (\$_____) dated, _____, 20____, (the "Contract"); **or**
 - On written request of Contractor, District shall make payments of the retention earnings for the above referenced Contract directly to Escrow Agent.

When Contractor deposits the securities as a substitute for Contract earnings (first option), Escrow Agent shall notify District within ten (10) calendar days of the deposit. The market value of the securities at the time of substitution and at all times from substitution until the termination of the Escrow Agreement shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between District and Contractor.

Securities shall be held in the name of Sacramento City Unified School District, and shall designate Contractor as beneficial owner.

- 12. District shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified above.
- 13. When District makes payment of retentions earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the Parties shall be equally applicable and binding when District pays Escrow Agent directly.

14. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. The District will charge Contractor \$_____ for each of District's deposits to the escrow account. These expenses and payment terms shall be determined by District, Contractor, and Escrow Agent.
15. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to District.
16. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Contractor.
17. District shall have the right to draw upon the securities and/or withdraw amounts from the Escrow Account in the event of default by Contractor. Upon seven (7) days' written notice to Escrow Agent from District of the default, if applicable, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District. Escrow Agent shall not be authorized to determine the validity of any notice of default given by District pursuant to this paragraph, and shall promptly comply with District's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to a conflicting demand.
18. Upon receipt of written notification from District certifying that the Contract is final and complete, and that 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.
19. Escrow Agent shall rely on written notifications from District and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and District and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

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

On behalf of District:

Title

Name

Signature

Address

On behalf of Contractor:

Title

Name

Signature

Address

On behalf of Escrow Agent:

Title

Name

Signature

Address

At the time that the Escrow Account is opened, District and Contractor shall deliver to Escrow Agent a fully executed copy 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 District:

Title

Name

Signature

Address

On behalf of Contractor:

Title

Name

Signature

Address

END OF DOCUMENT

PERFORMANCE BOND
(100% of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Sacramento City Unified 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 perform the following project:

Alice Birney Public Waldorf Campus Renewal #0004-468

("Project" or "Contract") which Contract dated _____, 20____, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of the Contract to furnish a bond for the faithful performance of the Contract.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto the Board of the District in the penal sum of

_____ Dollars (\$_____), lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents, to:

- Promptly perform all the work required to complete the Project; and
- Pay to the District all damages the District incurs as a result of the Principal's failure to perform all the Work required to complete the Project.

Or, at the District's sole discretion and election, the Surety shall obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by the District of the lowest responsible bidder, arrange for a contract between such bidder and the District and make available as Work progresses sufficient funds to pay the cost of completion less the "balance of the Contract Price," and to pay and perform all obligations of Principals under the Contract, including, without limitation, all obligations with respect to warranties, guarantees and the payment of liquidated damages. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by the District under the Contract and any modifications thereto, less the amount previously paid by the District to the Principal, less any withholdings by the District allowed under the Contract. District shall not be required or obligated to accept a tender of a completion contractor from the Surety for any or no reason.

The condition of the obligation is such that, if the above bound Principal, its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly

keep and perform the covenants, conditions, and agreements in the Contract and any alteration thereof made as therein provided, on its part to be kept and performed at the time and in the intent and meaning, including all contractual guarantees and warranties of materials and workmanship, and shall indemnify and save harmless the District, its trustees, officers and agents, as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

Surety expressly agrees that the District may reject any contractor or subcontractor proposed by Surety to fulfill its obligations in the event of default by the Principal. Surety shall not utilize Principal in completing the Work nor shall Surety accept a Bid from Principal for completion of the Work if the District declares the Principal to be in default and notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the District's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

The 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. The Surety also stipulates and agrees that it shall not be exonerated or released from the obligation of this bond by any overpayment or underpayment by the District that is based upon estimates approved by the Architect. The Surety 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, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20__.

| | |
|--------------------|--|
| _____ Principal | _____ Surety |
| _____ By | _____ By |
| | _____ Name of California Agent of Surety |
| | _____ Address of California Agent of Surety |
| | _____ Telephone No. of California Agent of Surety |

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

PAYMENT BOND
Contractor's Labor & Material Bond
(100% Of Contract Price)

(Note: Contractor must use this form, NOT a surety company form.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the governing board ("Board") of the Sacramento City Unified 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 perform the following project:

Alice Birney Public Waldorf Campus Renewal #0004-468

("Project" or "Contract") which Contract dated _____, 20____, and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law and the Contract, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by which the Contract is awarded in an amount equal to one hundred percent (100%) of the Contract price, to secure the claims to which reference is made in sections 9000 through 9510 and 9550 through 9566 of the Civil Code, and division 2, part 7, of the Labor Code.

NOW, THEREFORE, the Principal and _____ ("Surety") are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of _____ Dollars (\$_____), lawful money of the United States, being a sum not less than the total amount payable by the terms of Contract, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the Principal or any of its subcontractors, or their heirs, executors, administrators, successors, or assigns of any, all, or either of them shall fail to pay for any labor, materials, provisions, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or any of his or its subcontractors of any tier under Section 13020 of the Unemployment Insurance Code with respect to such work or labor, that the Surety will pay the same in an amount not exceeding the amount herein above set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of

the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise it shall be and remain in full force and affect.

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

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____, 20__.

| | |
|-----------|---|
| Principal | Surety |
| By | By |
| | Name of California Agent of Surety |
| | Address of California Agent of Surety |
| | Telephone No. of California Agent of Surety |

Contractor must attach a Notarial Acknowledgment for all Surety's signatures and a Power of Attorney and Certificate of Authority for Surety. The California Department of Insurance must authorize the Surety to be an admitted surety insurer.

END OF DOCUMENT

ALLOWANCE EXPENDITURE DIRECTIVE

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

**ALLOWANCE
 EXPENDITURE
 DIRECTIVE NO.:**

Contractor Name
 Address
 Address

Project: _____

Date: _____

Bid No.: _____

DSA File No.: _____

DSA Appl. No.: _____

The following parties agree to the terms of this Allowance Expenditure Directive ("AED"):

| Reference | Description | Allowance Authorized for Expenditure |
|--|---|--------------------------------------|
| Request for AED # Requested by: Performed by: Reason: | [Description of unforeseen item relating to Work] [Requester] [Performer] [Reason] | \$ |

| | |
|---|----|
| Total Contract Allowance Amount: | \$ |
| Amount of Previously Approved Allowance Expenditure Directive(s): | \$ |
| Amount of this Allowance Expenditure Directive: | \$ |

The undersigned Contractor approves the foregoing release of allowance for completion of each specified item, and agrees to furnish all labor, materials and services and perform all work necessary to complete any additional work specified for the consideration stated therein ("Work"). Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650, et seq.

This Allowance Expenditure Directive must be signed by an authorized District representative.

It is expressly understood that the authorized allowance expenditure granted herein represents a full accord and satisfaction for any and all cost impacts of the items herein, and Contractor waives any and all further compensation based on the items herein. The

value of the extra work or changes expressly includes any and all of the Contractor's costs and expenses, and its subcontractors, both direct and indirect. Any costs, expenses, or damages not included are deemed waived.

Signatures:

| | |
|---|---|
| <p>CONTRACTOR:</p> <p>_____</p> <p>Date: _____</p> <p>By: _____ [Print Name and Title here]</p> | <p>CONSTRUCTION MANAGER:</p> <p>_____</p> <p>Date: _____</p> <p>By: _____ [Print Name and Title here]</p> |
| <p>SCUSD MANAGER III, FACILITIES PM:</p> <p>_____</p> <p>Date: _____</p> <p>By: <u>Anthony Lea</u> [Print Name and Title here]</p> | <p>SCUSD DIRECTOR III FACILITIES MGMT:</p> <p>_____</p> <p>Date: _____</p> <p>By: <u>Chris Ralston</u> [Print Name and Title here]</p> |

END OF DOCUMENT

DAILY FORCE ACCOUNT REPORT

From: Contractor
[Name/Address]

To: Owner
[Name/Address]

Project: _____

Contractor hereby submits this Daily Force Account Report for Work performed, pursuant to Force Account Directive No. _____, on _____.
[Date of Work]

Contractor attests that the material, labor, and equipment itemized herein were used only on the force account work.

A. Material: *Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.*

| Description | Unit Price | Quantity | Cost |
|-------------|------------|----------|------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Daily subtotal (w/out markup): \$ _____

B. Labor: *Labor must be fully Burdened. Attach timesheets, if applicable, and complete the information below.*

| Name | Craft | Regular Hrs. | Rate | OT Hrs. | Rate |
|------|-------|--------------|------|---------|------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Daily subtotal (w/out markup): \$ _____

C. **Equipment:** Attach all applicable invoices not provided in prior Daily Force Account Reports and complete the information below.

| Type / Model | Hrs. Operated | Rate |
|--------------|------------------|------|
| | | |
| | | |
| | | |
| | | |
| | | |

Daily subtotal (w/out markup): \$ _____

Complete based on information reported above.

| | <u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u> | <u>ADD</u> |
|-----|---|------------|
| (a) | <u>Material</u> | |
| (b) | <u>Add Labor</u> | |
| (c) | <u>Add Equipment</u> | |
| (d) | <u>Subtotal</u> | |
| (e) | <u>Add overhead and profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d) | |
| (f) | <u>Subtotal</u> | |
| (g) | <u>Add Overhead and Profit for Contractor</u> , not to exceed five percent (5%) of Item (f) | |
| (h) | <u>Subtotal</u> | |
| (i) | <u>Add Bond and Insurance</u> , not to exceed two percent (2%) of Item (h) | |
| (j) | <u>TOTAL</u> | |

| | <u>WORK PERFORMED BY CONTRACTOR</u> | <u>ADD</u> |
|-----|---|------------|
| (a) | <u>Material</u> | |
| (b) | <u>Add Labor</u> | |
| (c) | <u>Add Equipment</u> | |
| (d) | <u>Subtotal</u> | |
| (e) | <u>Add Overhead and Profit for Contractor</u> , not to exceed fifteen percent (15%) of Item (d) | |
| (f) | <u>Subtotal</u> | |
| (g) | <u>TOTAL</u> | |

Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act (Gov. Code, § 12650 et seq.).

It is expressly understood that all force account work for the date stated above must be reported herein, and Contractor may not claim any labor, equipment, material or any other costs or expenses not reported herein. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, or damages not included are deemed waived.

SUBMITTED BY:

REVIEWED BY:

Contractor:

District:

[Name]

Date

[Name]

Date

District may require additional information from Contractor to review this Daily Force Account Report. Upon District's return of the Daily Force Account Report, Contractor may invoice the Work reflected therein. District's review and return of the Daily Force Account Report and/or payment for the force account work does not constitute acceptance of the Work or waiver of any Contract rights or criteria.

END OF DOCUMENT

PROPOSED CHANGE ORDER FORM

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

PCO NO.:

Project: _____
 Bid No.: _____
 RFI #: _____

Date: _____
 DSA File No.: _____
 DSA Appl. No.: _____

Contractor hereby submits for District's review and evaluation this Proposed Change Order ("PCO"), submitted in accordance with and subject to the terms of the Contract Documents, including Sections 17.7 and 17.8 of the General Conditions. Any spaces left blank below are deemed no change to cost or time.

Contractor understands and acknowledges that documentation supporting Contractor's PCO must be attached and included for District review and evaluation. Contractor further understands and acknowledges that failure to include documentation sufficient to, in District's discretion, support some or all of the PCO, shall result in a rejected PCO.

| | <u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u> | <u>ADD</u> | <u>DEDUCT</u> |
|-----|--|-----------------------------|----------------------|
| (h) | <u>Material</u> (attach suppliers' invoice or itemized quantity and unit cost plus sales tax) | | |
| (i) | <u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.) | | |
| (j) | <u>Add Equipment</u> (attach suppliers' invoice) | | |
| (k) | <u>Subtotal</u> | | |
| (l) | <u>Add overhead and profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d) | | |
| (m) | <u>Subtotal</u> | | |
| (n) | <u>Add General Conditions</u> (if Time is Compensable) (attach supporting documentation) | | |
| (o) | <u>Subtotal</u> | | |
| (p) | <u>Add Overhead and Profit for Contractor</u> , not to exceed five percent (5%) of Item (h) | | |
| (q) | <u>Subtotal</u> | | |
| (r) | <u>TOTAL</u> | | |
| (s) | <u>Time</u> (zero unless indicated; "TBD" not permitted) | <u>Calendar Days</u> | |

[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]

| | <u>WORK PERFORMED BY CONTRACTOR</u> | <u>ADD</u> | <u>DEDUCT</u> |
|------|--|--------------------------|----------------------|
| (t) | <u>Material</u> (attach itemized quantity and unit cost plus sales tax) | | |
| (u) | <u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.) | | |
| (v) | <u>Add Equipment</u> (attach suppliers' invoice) | | |
| (w) | <u>Add General Conditions</u> (if Time is Compensable) (attach supporting documentation) | | |
| (x) | <u>Subtotal</u> | | |
| (y) | <u>Add Overhead and Profit for Contractor</u> , not to exceed fifteen percent (15%) of Item (e) | | |
| (z) | <u>Subtotal</u> | | |
| (aa) | <u>TOTAL</u> | | |
| | | | |
| (bb) | <u>Time</u> (zero unless indicated; "TBD" not permitted) | ___ Calendar Days | |

The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. It is understood that the changes herein to the Contract shall only be effective when approved by the governing board of the District.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

SUBMITTED BY:

Contractor:

[Name]

Date

END OF DOCUMENT

CHANGE ORDER FORM

Sacramento City Unified School District
 5735 47th Avenue
 Sacramento, CA 95824

| |
|--------------------------|
| CHANGE ORDER NO.: |
| |

CHANGE ORDER

Project: _____
Bid No.: _____

Date: _____
DSA File No.: _____
DSA Appl. No.: _____

The following parties agree to the terms of this Change Order:

Owner: _____
 [Name / Address]

Contractor: _____
 [Name / Address]

Architect: _____
 [Name / Address]

Project Inspector: _____
 [Name / Address]

| Reference | Description | Cost | Days Ext. |
|---|---|--|-----------|
| PCO # Requested by: Performed by: Reason: | [Description of change] [Requester] [Performer] [Reason] | \$ | |
| PCO # Requested by: Performed by: Reason: | [Description of change] [Requester] [Performer] [Reason] | \$ | |
| PCO # Requested by: Performed by: Reason: | [Description of change] [Requester] [Performer] [Reason] | \$ | |
| Contract time will be adjusted as follows: Previous Completion Date: __[Date] _____[#] Calendar Days Extension (zero unless otherwise indicated) Current Completion Date: __[Date] | | Original Contract Amount: | \$ |
| | | Amount of Previously Approved Change Order(s): | \$ |
| | | Amount of this Change Order: | \$ |
| | | Contract Amount: | \$ |

The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for
SACRAMENTO CITY USD
Alice Birney Public Waldorf Campus
Renewal

CHANGE ORDER FORM
DOCUMENT 00 63 63-93

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

THIS AGREEMENT AND RELEASE OF CLAIMS ("Agreement and Release") IS MADE AND ENTERED INTO THIS _____ DAY OF _____, 20__ by and between the SACRAMENTO CITY UNIFIED SCHOOL DISTRICT ("District") and _____ ("Contractor"), whose place of business is _____.

RECITALS

WHEREAS, District and Contractor entered into PROJECT/CONTRACT NO.: _____ ("Contract" or "Project") in the County of Sacramento, California; and

WHEREAS, the Work under the Contract was completed on _____, and a Notice of Completion was recorded with the County Recorder on _____.

NOW, THEREFORE, it is mutually agreed between District and Contractor as follows:

AGREEMENT AND RELEASE

1. Contractor will only be assessed liquidated damages as detailed below:

| | |
|------------------------|----------|
| Original Contract Sum | \$ _____ |
| Modified Contract Sum | \$ _____ |
| Payment to Date | \$ _____ |
| Liquidated Damages | \$ _____ |
| Payment Due Contractor | \$ _____ |

2. Subject to the provisions hereof, District shall forthwith pay to Contractor the undisputed sum of _____ Dollars (\$ _____) under the Contract, less any amounts represented by any notice to withhold funds on file with District as of the date of such payment.

3. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against District arising from the performance of work under the Contract, except for the claims described in Paragraph 4 and continuing obligations described in Paragraph 6. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against District and all of its respective agents, employees, trustees, inspectors, assignees, consultants and transferees, except for any Disputed Claim that may be set forth in Paragraph 4 and the continuing obligations described in Paragraph 6 hereof.

4. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

| <u>Claim No.</u> | <u>Description of Claim</u> | <u>Amount of Claim</u> | <u>Date Claim Submitted</u> |
|------------------|-----------------------------|------------------------|-----------------------------|
| _____ | _____ | \$ _____ | _____ |
| _____ | _____ | \$ _____ | _____ |
| _____ | _____ | \$ _____ | _____ |
| _____ | _____ | \$ _____ | _____ |
| _____ | _____ | \$ _____ | _____ |
| _____ | _____ | \$ _____ | _____ |

[If further space is required, attach additional sheets showing the required information.]

5. Consistent with California Public Contract Code section 7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 hereof, Contractor hereby releases and forever discharges District, all its agents, employees, inspectors, assignees, and transferees from any and all liability, claims, demands, actions, or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.
6. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, including without limitation, the duty to defend, indemnify and hold harmless the District, shall remain in full force and effect as specified in the Contract Documents.
7. Contractor hereby waives the provisions of California Civil Code section 1542 which provides as follows:
- A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS THAT THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE AND THAT, IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.
8. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable. If any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal, or other law, ruling, or regulations, then such provision, or part thereof, shall remain in force and effect to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.

9. All rights of District shall survive completion of the Work or termination of Contract, and execution of this Release.

* * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * *

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

Signature: _____

Print Name: _____

Title: _____

CONTRACTOR: _____

Signature: _____

Print Name: _____

Title: _____

END OF DOCUMENT

GUARANTEE FORM
(Print on Contractor/Subcontractor Letterhead)

_____ **[Contractor's Name]** hereby unconditionally guarantees that the Work performed at **Alice Birney Public Waldorf Campus Renewal 0004-468** has been done in accordance with the requirements of the Contract therefore and further guarantees the Work of the contract to be and remain free of defects in workmanship and materials for a period of **two (2) years** from and after the recordation of the Notice of Completion of the Project and completion of all Contract obligations by the Contractor, including formal acceptance of the entire Project by the District, unless a longer guarantee period is called for by the Contract Documents, in which case the terms of the longer guarantee shall govern. The Contractor specifically waives any right to claim or rely on the statutory definition of completion set forth in Civil Code section 9200. The Contractor specifically acknowledges and agrees that completion shall mean the Contractor's complete performance of all Work required by the Contract Documents, amendments, change orders, construction change directives and punch lists, and the District's formal acceptance of the entire Project, without regard to prior occupancy, substantial completion doctrine, beneficial occupancy, or otherwise. The Contractor hereby agrees to repair or replace any and all Work, together with any adjacent Work which may have been damaged or displaced in so doing, that may prove to be not in accordance with the requirements of the Contract or that may be defective in its workmanship or materials within the guarantee period specified, without any expense whatsoever to the District, ordinary wear and tear and unusual abuse and neglect only excepted. The Contractor has provided contract bonds, which will remain in full force and effect during the guarantee period.

The Contractor further agrees that within ten (10) calendar days after being notified in writing by the District of any Work not in accordance with the requirements of the contract or any defects in the Work, it will commence and prosecute with due diligence all Work necessary to fulfill the terms of this guarantee, and to complete the Work within a period of time stipulated in writing. In the event it fails to so comply, Contractor does hereby authorize the District to proceed to have such Work done at the Contractor's expense and it will pay the cost thereof upon demand. The District shall be entitled to all costs, including reasonable attorneys' fees, necessarily incurred upon the Contractor's refusal to pay the above costs.

The guarantee period for corrected defective work shall continue for a duration equivalent to the original guarantee period.

Notwithstanding the foregoing paragraph, in the event of an emergency constituting an immediate hazard to the health or safety of the employees of the District, or its property or licensees, the District may undertake at the Contractor's expense without prior notice, all Work necessary to correct such hazardous condition when it was caused by the Work of the Contractor not being in accordance with the requirements of this contract, or being defective, and to charge the same to the Contractor as specified in the preceding paragraph.

The guarantee set forth herein is not intended by the parties, nor shall it be construed, as in any way limiting or reducing the District's rights to enforce all terms of the Contract referenced hereinabove or the time for enforcement thereof. This guarantee is provided in addition to, and not in lieu of, the District's rights on such contract.

_____ Spec Section(s): _____
CONTRACTOR'S SIGNATURE

PRINT NAME

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GENERAL CONDITIONS

1. **CONTRACT TERMS AND DEFINITIONS**

1.1 Definitions

Wherever used in the Contract Documents, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof:

1.1.1 Adverse Weather: Shall be only weather that satisfies all of the following conditions: (1) unusually severe precipitation, sleet, snow, hail, or extreme temperature conditions in excess of the norm for the location and time of year it occurred based on the closest weather station data averaged over the past five years, (2) that is unanticipated and would cause unsafe work conditions and/or is unsuitable for scheduled work that should not be performed during inclement weather (i.e., exterior finishes), and (3) at the Project.

1.1.2 Allowance Expenditure Directive: Written authorization for expenditure of allowance, if any.

1.1.3 Approval, Approved, and/or Accepted: Written authorization, unless stated otherwise.

1.1.4 Architect (or "Design Professional in General Responsible Charge"): The individual, partnership, corporation, joint venture, or any combination thereof, named as Architect, who will have the rights and authority assigned to the Architect in the Contract Documents. The term Architect means the Design Professional in General Responsible Charge as defined in DSA PR 13-02 on this Project or the Architect's authorized representative.

1.1.5 As-Builts: Reproducible blue line prints of drawings to be prepared on a monthly basis pursuant to the Contract Documents, that reflect changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed since the preceding monthly submittal. See **Record Drawings**.

1.1.6 Bidder: A contractor who intends to provide a proposal to the District to perform the Work of this Contract.

1.1.7 Burdened: The labor rate for Contractor or any Subcontractor inclusive of any and all burden costs including, but not limited to, health and welfare pay, vacation and holiday pay, pension contributions, training rates, benefits of any kind, insurance of any kind, workers' compensation, liability insurance, truck expenses, supply expenses of any kind, payroll taxes, and any other taxes of any kind.

1.1.8 Change Order: A written order to the Contractor authorizing an addition to, deletion from, or revision in the Work, and/or authorizing an adjustment in the Contract Price or Contract Time.

1.1.9 Claim: A Dispute that remains unresolved at the conclusion of the all the applicable Dispute Resolution requirements provided herein.

1.1.10 Construction Change Directive: A written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work.

1.1.11 Construction Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Construction Manager is used on the Project that is the subject of this Contract, then all references to Construction Manager herein shall be read to refer to District.

1.1.12 Construction Schedule: The progress schedule of construction of the Project as provided by Contractor and approved by District.

1.1.13 Contract, Contract Documents: The Contract consists exclusively of the documents evidencing the agreement of the District and Contractor, identified as the Contract Documents. The Contract Documents consist of the following documents as applicable:

- 1.1.13.1** Notice to Bidders
- 1.1.13.2** Instructions to Bidders
- 1.1.13.3** Bid Form and Proposal
- 1.1.13.4** Bid Bond
- 1.1.13.5** Designated Subcontractors List
- 1.1.13.6** Site Visit Certification (if a site visit was required)
- 1.1.13.7** Non-Collusion Declaration
- 1.1.13.8** Notice of Award
- 1.1.13.9** Notice to Proceed
- 1.1.13.10** Agreement
- 1.1.13.11** Escrow of Bid Documentation
- 1.1.13.12** Escrow Agreement for Security Deposits in Lieu of Retention (if applicable)
- 1.1.13.13** Performance Bond
- 1.1.13.14** Payment Bond (Contractor's Labor & Material Bond)
- 1.1.13.15** General Conditions
- 1.1.13.16** Special Conditions (if applicable)
- 1.1.13.17** Project Labor Agreement (if applicable)
- 1.1.13.18** Hazardous Materials Procedures and Requirements
- 1.1.13.19** Workers' Compensation Certification
- 1.1.13.20** Prevailing Wage Certification
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- 1.1.13.22** Drug-Free Workplace Certification (if applicable)
- 1.1.13.23** Tobacco-Free Environment Certification
- 1.1.13.24** Hazardous Materials Certification (if applicable)
- 1.1.13.25** Lead-Based Materials Certification (if applicable)
- 1.1.13.26** Imported Materials Certification (if applicable)
- 1.1.13.27** Criminal Background Investigation/Fingerprinting Certification
- 1.1.13.28** Buy American Certification (if certain federal funds used)
- 1.1.13.29** Roofing Project Certification (if applicable)

- 1.1.13.30** Registered Subcontractors List
- 1.1.13.31** Iran Contracting Act Certification (if applicable)
- 1.1.13.32** COVID-19 Vaccination/Testing Certification
- 1.1.13.33** Federal Debarment Certification (if applicable)
- 1.1.13.34** Federal Byrd Anti-Lobbying Certification (if applicable)
- 1.1.13.35** Post Bid Interview
- 1.1.13.36** All Plans, Technical Specifications, and Drawings
- 1.1.13.37** Any and all addenda to any of the above documents
- 1.1.13.38** Any and all change orders or written modifications to the above documents if approved in writing by the District

1.1.14 Contract Price: The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

1.1.15 Contract Time: The time period stated in the Agreement for the completion of the Work.

1.1.16 Contractor: The person or persons identified in the Agreement as contracting to perform the Work to be done under this Contract, or the legal representative of such a person or persons.

1.1.17 Daily Job Report(s): Daily Project reports prepared by the Contractor's employee(s) who are present on Site, which shall include the information required herein.

1.1.18 Day(s): Unless otherwise designated, day(s) means calendar day(s).

1.1.19 Department of Industrial Relations (or "DIR"): is responsible, among other things, for labor compliance monitoring and enforcement of California prevailing wage laws and regulations for public works contracts.

1.1.20 Design Professional in General Responsible Charge: See definition of **Architect** above.

1.1.21 Dispute: A separate demand by Contractor for a time extension, or payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or Contractor is not otherwise entitled to; or an amount of payment disputed by the District.

1.1.22 District: The public agency or the school district for which the Work is performed. The governing board of the District or its designees will act for the District in all matters pertaining to the Contract. The District may, at any time,

1.1.22.1 Direct the Contractor to communicate with or provide notice to the Construction Manager or the Architect on matters for which the Contract Documents indicate the Contractor will communicate with or provide notice to the District; and/or

1.1.22.2 Direct the Construction Manager or the Architect to communicate with or direct the Contractor on matters for which the Contract Documents indicate the District will communicate with or direct the Contractor.

1.1.23 Drawings (or "Plans"): The graphic and pictorial portions of the Contract Documents showing the design, location, scope and dimensions of the work, generally including plans, elevations, sections, details, schedules, sequence of operation, and diagrams.

1.1.24 DSA: Division of the State Architect.

1.1.25 Force Account Directive: A process that may be used when the District and the Contractor cannot agree on a price for a specific portion of work or before the Contractor prepares a price for a specific portion of work and whereby the Contractor performs the work as indicated herein on a time and materials basis.

1.1.26 Job Cost Reports: Any and all reports or records detailing the costs associated with work performed on or related to the Project that Contractor shall maintain for the Project. Specifically, Job Cost Reports shall contain, but are not limited by or to, the following information: a description of the work performed or to be performed on the Project; quantity, if applicable, of work performed (hours, square feet, cubic yards, pounds, etc.) for the Project; Project budget; costs for the Project to date; estimated costs to complete the Project; and expected costs at completion. The Job Cost Reports shall also reflect all Contract cost codes, change orders, elements of non-conforming work, back charges, and additional services.

1.1.27 Labor Commissioner's Office (or "Labor Commissioner", also known as the Division of Labor Standards Enforcement ("DLSE")): Division of the DIR responsible for adjudicating wage claims, investigating discrimination and public works complaints, and enforcing Labor Code statutes and Industrial Welfare Commission orders.

1.1.28 Municipal Separate Storm Sewer System (or "MS4"): A system of conveyances used to collect and/or convey storm water, including, without limitation, catch basins, curbs, gutters, ditches, man-made channels, and storm drains.

1.1.29 Plans: See **Drawings**.

1.1.30 Premises: The real property owned by the District on which the Site is located.

1.1.31 Product(s): New material, machinery, components, equipment, fixtures and systems forming the Work, including existing materials or components required and approved by the District for reuse.

1.1.32 Product Data: 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.

1.1.33 Program Manager: The individual, partnership, corporation, joint venture, or any combination thereof, or its authorized representative, named as such by the District. If no Program Manager is designated for Project that is the subject of this Contract, then all references to Project Manager herein shall be read to refer to District.

1.1.34 Project: The planned undertaking as provided for in the Contract Documents.

1.1.35 Project Inspector (or "Inspector"): The individual(s) retained by the District in accordance with title 24 of the California Code of Regulations to monitor and inspect the Project.

1.1.36 Project Labor Agreement (or "PLA"): a prehire collective bargaining agreement in accordance with Public Contract Code section 2500 et seq. that establishes terms and conditions of employment for a specific construction project or projects and/or is an agreement described in Section 158(f) of Title 29 of the United States Code.

1.1.37 Proposed Change Order (or "PCO"): a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

1.1.38 Provide: Shall include "provide complete in place," that is, "furnish and install," and "provide complete and functioning as intended in place" unless specifically stated otherwise.

1.1.39 Qualified SWPPP Practitioners (or "QSP"): certified personnel that attended a State Water Resources Control Board sponsored or approved training class and passed the qualifying exam.

1.1.40 Record Drawings: Reproducible drawings (or Plans) prepared pursuant to the requirements of the Contract Documents that reflect all changes made during the performance of the Work, recording differences between the original design of the Work and the Work as constructed upon completion of the Project. See also **As-Builts**.

1.1.41 Request for Information (or "RFI"): A written request prepared by the Contractor requesting that the Architect provide additional information necessary to clarify or amplify an item in the Contract Documents that the Contractor believes is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address problems that have arisen under field conditions.

1.1.42 Request for Substitution for Specified Item: A request by Contractor to substitute an equal or superior material, product, thing, or service for a specific material, product, thing, or service that has been designated in the Contract Documents by a specific brand or trade name.

1.1.43 Safety Orders: Written and/or verbal orders for construction issued by the California Division of Occupational Safety and Health ("CalOSHA") or by the United States Occupational Safety and Health Administration ("OSHA").

1.1.44 Safety Plan: Contractor's safety plan specifically adapted for the Project. Contractor's Safety Plan shall comply with all provisions regarding Project safety, including all applicable provisions in these General Conditions.

1.1.45 Samples: Physical examples that illustrate materials, products, equipment, finishes, colors, or workmanship and that, when approved in accordance with the Contract Documents, establish standards by which portions of the Work will be judged.

1.1.46 Shop Drawings: All drawings, prints, diagrams, illustrations, brochures, schedules, and other data that are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor, that illustrate how specific portions of the Work shall be fabricated or installed.

1.1.47 Site: The Project site as shown on the Drawings.

1.1.48 Specifications: That portion of the Contract Documents, Division 1 through Division 49, and all technical sections, and addenda to all of these, if any, consisting of written descriptions and requirements of a technical nature of materials, equipment, construction methods and systems, standards, and workmanship.

1.1.49 State: The State of California.

1.1.50 Storm Water Pollution Prevention Plan (or "SWPPP"): A document which identifies sources and activities at a particular facility that may contribute pollutants to storm water and contains specific control measures and time frames to prevent or treat such pollutants.

1.1.51 Subcontractor: A contractor and/or supplier who is under contract with the Contractor or with any other subcontractor, regardless of tier, to perform a portion of the Work of the Project.

1.1.52 Submittal Schedule: The schedule of submittals as provided by Contractor and approved by District.

1.1.53 Surety: The person, firm, or corporation that executes as surety the Contractor's Performance Bond and Payment Bond, and must be a California admitted surety insurer as defined in the Code of Civil Procedure section 995.120.

1.1.54 Work: All labor, materials, equipment, components, appliances, supervision, coordination, and services required by, or reasonably inferred from, the Contract Documents, that are necessary for the construction and completion of the Project.

1.2 Laws Concerning the Contract

Contract is subject to all provisions of the Constitution and laws of California and the United States governing, controlling, or affecting District, or the property, funds, operations, or powers of District, and such provisions are by this reference made a part hereof. Any provision required by law to be included in this Contract shall be deemed to be inserted.

1.3 No Oral Agreements

No oral agreement or conversation with any officer, agent, or employee of District, either before or after execution of Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract.

1.4 No Assignment

Contractor shall not assign this Contract or any part thereof including, without limitation, any Work or money to become due hereunder without the prior written consent of the District. Assignment without District's prior written consent shall be null and void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of work called for under this Contract in favor of all persons, firms, or corporations rendering services or supplying material to the extent that claims are filed pursuant to the Civil Code, Code of Civil Procedure, Government Code, Labor Code, and/or Public Contract Code, and shall also be subject to deductions for liquidated damages or withholding of payments as determined by District in accordance with this Contract. Contractor shall not assign or transfer in any manner to a Subcontractor or supplier the right to prosecute or maintain an action against the District.

1.5 Notice and Service Thereof

1.5.1 Any notice from one party to the other or otherwise under Contract shall be in writing and shall be dated and signed by the party giving notice or by a duly authorized representative of that party. Any notice shall not be effective for any purpose whatsoever unless served in one of the following manners:

1.5.1.1 If notice is given by personal delivery thereof, it shall be considered delivered on the day of delivery.

1.5.1.2 If notice is given by overnight delivery service, it shall be considered delivered one (1) day after date deposited, as indicated by the delivery service.

1.5.1.3 If notice is given by depositing same in United States mail, enclosed in a sealed envelope, it shall be considered delivered three (3) days after date deposited, as indicated by the postmarked date.

1.5.1.4 If notice is given by registered or certified mail with postage prepaid, return receipt requested, it shall be considered delivered on the day the notice is signed for.

1.5.1.5 Electronic mail may be used for convenience but is not a substitute for the notice and service requirements herein.

1.6 No Waiver

The failure of District in any one or more instances to insist upon strict performance of any of the terms of this Contract or to exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon any such terms or option on any future occasion. No action or failure to act by the District, Architect, or Construction Manager shall constitute a waiver of any right or duty afforded the District under the Contract, nor shall any action or failure to act constitute

an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

1.7 Substitutions for Specified Items

1.7.1 Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name, or by name of manufacturer, that Specification shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article that shall be substantially equal or better in every respect to that so indicated or specified.

1.7.1.1 If the material, process, or article offered by Contractor is not, in the opinion of the District, substantially equal or better in every respect to that specified, then Contractor shall furnish the material, process, or article specified in the Specifications without any additional compensation or change order.

1.7.1.2 This provision shall not be applicable with respect to any material, product, thing or service for which District made findings and gave notice in accordance with Public Contract Code section 3400(c); therefore, Contractor shall not be entitled to request a substitution with respect to those materials, products or services.

1.7.2 A request for a substitution shall be submitted as follows:

1.7.2.1 Contractor shall notify the District in writing of any request for a substitution at least ten (10) days prior to bid opening as indicated in the Instructions to Bidders.

1.7.2.2 Requests for Substitutions after award of the Contract shall be submitted within thirty-five (35) days of the date of the Notice of Award.

1.7.3 Within 35 days after the date of the Notice of Award, Contractor shall provide data substantiating a request for substitution of "an equal" item, including but not limited to the following:

1.7.3.1 All variations of the proposed substitute from the material specified including, but not limited to, principles of operation, materials, or construction finish, thickness or gauge of materials, dimensions, weight, and tolerances;

1.7.3.2 Available maintenance, repair or replacement services;

1.7.3.3 Increases or decreases in operating, maintenance, repair, replacement, and spare parts costs;

1.7.3.4 Whether or not acceptance of the substitute will require other changes in the Work (or in work performed by the District or others under Contract with the District); and

1.7.3.5 The time impact on any part of the Work resulting directly or indirectly from acceptance of the proposed substitute.

1.7.4 No substitutions shall be made until approved, in writing, by the District. The burden of proof as to equality of any material, process, or article shall rest with Contractor. The Contractor warrants that if substitutes are approved:

1.7.4.1 The proposed substitute is equal or superior in all respects to that specified, and that such proposed substitute is suitable and fit for the intended purpose and will perform adequately the function and achieve the results called for by the general design and the Contract Documents;

1.7.4.2 The Contractor provides the same warranties and guarantees for the substitute that would be provided for that specified;

1.7.4.3 The Contractor shall be fully responsible for the installation of the substitute and any changes in the Work required, either directly or indirectly, because of the acceptance of such substitute, with no increase in Contract Price or Contract Time. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time;

1.7.4.4 The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute; and

1.7.4.5 The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit.

1.7.5 In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.

1.7.6 In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.

1.7.7 Contractor shall be responsible for any costs the District incurs for professional services, DSA fees, or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods. District may deduct those costs from any amounts owing to the Contractor for the review of the request for substitution, even if the request for substitution is not approved. District, at its sole discretion, shall deduct from the payments due to and/or invoice Contractor for all the professional services and/or DSA fees or delay to the Project Schedule, if applicable, while DSA reviews changes for the convenience of Contractor and/or to accommodate Contractor's means and methods arising herein.

1.8 Materials and Work

1.8.1 Except as otherwise specifically stated in this Contract, Contractor shall provide and pay for all materials, labor, tools, equipment, transportation, supervision, temporary constructions of every nature, and all other services, management, and facilities of every nature whatsoever necessary to execute and complete this Contract, in a good and workmanlike manner, within the Contract Time.

1.8.2 Unless otherwise specified, all materials shall be new and of the best quality of their respective kinds and grades as noted or specified, workmanship shall

be of good quality, and Contractor shall use all diligence to inform itself fully as to the required manufacturer's instructions and to comply therewith.

1.8.3 Materials shall be furnished in ample quantities and at such times as to insure uninterrupted progress of Work and shall be stored properly and protected from the elements, theft, vandalism, or other loss or damage as required.

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

1.8.5 Contractor shall, after award of Contract by District and after relevant submittals have been reviewed, place orders for materials and/or equipment as specified so that delivery of same may be made without delays to the Work. Contractor shall, upon five (5) days' demand from District, present documentary evidence showing that orders have been placed.

1.8.6 District reserves the right but has no obligation, in response to Contractor's neglect or failure in complying with the above instructions, to place orders for such materials and/or equipment as the District may deem advisable in order that the Work may be completed at the date specified in the Contract, and all expenses incidental to the procuring of said materials and/or equipment shall be paid for by Contractor or deducted from payment(s) to Contractor.

1.8.7 Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver the Site to District, together with all improvements and appurtenances constructed or placed thereon by it, and free from any claims, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by the Contract shall have any right to lien any portion of the Premises or any improvement or appurtenance thereon, except that Contractor may install metering devices or other equipment of utility companies or of political subdivision, title to which is commonly retained by utility company or political subdivision. In the event of installation of any such metering device or equipment, Contractor shall advise District as to owner thereof.

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

1.8.7.2 If the Contractor fails to furnish to the District within ten (10) calendar days after demand by the District, satisfactory evidence that a lien or a claim

based on a stop payment notice has been so released, discharged, or secured, the District may discharge such indebtedness and deduct the amount required therefor, together with any and all losses, costs, damages, and attorney's fees and expense incurred or suffered by District from any sum payable to Contractor under the Contract.

1.8.8 Nothing contained in this Article, however, shall defeat or impair the rights of persons furnishing materials or labor under any bond given by Contractor for their protection or any rights under any law permitting such protection or any rights under any law permitting such persons to look to funds due Contractor in hands of District (e.g., stop payment notices), and this provision shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for work when no formal contract is entered into for such material.

1.8.9 Title to new materials and/or equipment for the Work of this Contract and attendant liability for its protection and safety shall remain with Contractor until incorporated in the Work of this Contract and accepted by District. No part of any materials and/or equipment shall be removed from its place of storage except for immediate installation in the Work of this Contract. Should the District, in its discretion, allow the Contractor to store materials and/or equipment for the Work off-site, Contractor will store said materials and/or equipment at a bonded warehouse and with appropriate insurance coverage at no cost to District. Contractor shall keep an accurate inventory of all materials and/or equipment in a manner satisfactory to District or its authorized representative and shall, at the District's request, forward it to the District.

2. [RESERVED]

3. ARCHITECT

3.1 The Architect shall represent the District during the Project and will observe the progress and quality of the Work on behalf of the District. Architect shall have the authority to act on behalf of District to the extent expressly provided in the Contract Documents and to the extent determined by District. Architect shall have authority to reject materials, workmanship, and/or the Work whenever rejection may be necessary, in Architect's reasonable opinion, to ensure the proper execution of the Contract.

3.2 Architect shall, with the District and on behalf of the District, determine the amount, quality, acceptability, and fitness of all parts of the Work, and interpret the Specifications, Drawings, and shall, with the District, interpret all other Contract Documents.

3.3 Architect shall have all authority and responsibility established by law, including title 24 of the California Code of Regulations.

3.4 Contractor shall provide District and the Construction Manager with a copy of all written communication between Contractor and Architect at the same time as that communication is made to Architect, including, without limitation, all RFIs, correspondence, submittals, claims, and proposed change orders.

4. CONSTRUCTION MANAGER

4.1 If a Construction Manager is used on this Project ("Construction Manager" or "CM"), the Construction Manager will provide administration of the Contract on the District's behalf. After execution of the Contract and Notice to Proceed, all correspondence and/or instructions from Contractor and/or District shall be forwarded through the Construction Manager. The Construction Manager will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences, or procedures or for safety precautions in connection with the Work, which shall all remain the Contractor's responsibility.

4.2 The Construction Manager, however, will have authority to reject materials and/or workmanship not conforming to the Contract Documents, as determined by the District, the Architect, and/or the Project Inspector. The Construction Manager shall also have the authority to require special inspection or testing of any portion of the Work, whether it has been fabricated, installed, or fully completed. Any decision made by the Construction Manager, in good faith, shall not give rise to any duty or responsibility of the Construction Manager to: the Contractor; any Subcontractor; the Contractor or Subcontractor's respective agents, employees; or other persons performing any of the Work. The Construction Manager shall have free access to any or all parts of Work at any time.

4.3 If the District does not use a Construction Manager on this Project, all references within the Contract Documents to Construction Manager or CM shall be read as District.

5. INSPECTOR, INSPECTIONS, AND TESTS

5.1 Project Inspector

5.1.1 One or more Project Inspector(s), including special Project Inspector(s), as required, will be assigned to the Work by District, in accordance with requirements of title 24, part 1, of the California Code of Regulations, to enforce the building code and monitor compliance with Plans and Specifications for the Project previously approved by the DSA. Duties of Project Inspector(s) are specifically defined in section 4-342 of said part 1 of title 24.

5.1.2 No Work shall be carried on except with the knowledge and under the inspection of the Project Inspector(s). The Project Inspector(s) shall have free access to any or all parts of Work at any time. Contractor shall furnish Project Inspector(s) reasonable opportunities for obtaining such information as may be necessary to keep Project Inspector(s) fully informed respecting progress and manner of work and character of materials, including, but not limited to, submission of form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector at least 48 hours in advance of the commencement and completion of construction of each and every aspect of the Work. Forms are available on the DSA's website at: <http://www.dgs.ca.gov/dsa/Forms.aspx>. Inspection of Work shall not relieve Contractor from an obligation to fulfill this Contract. Project Inspector(s) and the DSA are authorized to suspend work whenever the Contractor and/or its Subcontractor(s) are not complying with the Contract Documents. Any work

stoppage by the Project Inspector(s) and/or DSA shall be without liability to the District. Contractor shall instruct its Subcontractors and employees accordingly.

5.1.3 If Contractor and/or any Subcontractor requests that the Project Inspector(s) perform any inspection off-site, this shall only be done if it is allowable pursuant to applicable regulations and DSA approval, if the Project Inspector(s) agree to do so, and at the expense of the Contractor.

5.2 Tests and Inspections

5.2.1 Tests and Inspections shall comply with title 24, part 1, California Code of Regulations, group 1, article 5, section 4-335, and with the provisions of the Specifications.

5.2.2 The District will select an independent testing laboratory to conduct the tests. Selection of the materials required to be tested shall be by the laboratory or the District's representative and not by the Contractor. The Contractor shall notify the District's representative a sufficient time in advance of its readiness for required observation or inspection.

5.2.3 The Contractor shall notify the District's representative 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 District may arrange for the testing of same at the source of supply. This notice shall be provided, at a minimum, seventy-two (72) hours prior to the manufacture of the material that needs to be tested.

5.2.4 Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated into and/or onto the Project.

5.2.5 The District will select the testing laboratory and pay for the cost of all tests and inspections, excepting those inspections performed at Contractor's request and expense. Contractor shall reimburse the District for any and all laboratory costs or other testing costs for any materials found to be not in compliance with the Contract Documents. At the District's discretion, District may elect to deduct laboratory or other testing costs for noncompliant materials from the Contract Price, and such deduction shall not constitute a withholding.

5.3 Costs for After Hours and/or Off Site Inspections

If the Contractor performs Work outside the Inspector's regular working hours or requests the Inspector to perform inspections off Site, costs of any inspections required outside regular working hours or off Site shall be borne by the Contractor and may be invoiced to the Contractor by the District or the District may deduct those expenses from the next Progress Payment.

6. CONTRACTOR

Contractor shall construct and complete, in a good and workmanlike manner, the Work for the Contract Price including any adjustment(s) to the Contract Price pursuant to provisions

herein regarding changes to the Contract Price. Except as otherwise noted, Contractor shall provide and pay for all labor, materials, equipment, permits (excluding DSA), fees, licenses, facilities, transportation, taxes, bonds and insurance, and services necessary for the proper execution and completion of the Work, except as indicated herein.

6.1 Status of Contractor

6.1.1 Contractor is and shall at all times be deemed to be an independent contractor and shall be wholly responsible for the manner in which it and its Subcontractors perform the services required of it by the Contract Documents. Nothing herein contained shall be construed as creating the relationship of employer and employee, or principal and agent, between the District, or any of the District's employees or agents, and Contractor or any of Contractor's Subcontractors, agents or employees. Contractor assumes exclusively the responsibility for the acts of its agents, and employees as they relate to the services to be provided during the course and scope of their employment. Contractor, its Subcontractors, agents, and its employees shall not be entitled to any rights or privileges of District employees. District shall be permitted to monitor the Contractor's activities to determine compliance with the terms of this Contract.

6.1.2 As required by law, Contractor and all Subcontractors shall be properly licensed and regulated by the Contractors State License Board, 9821 Business Park Drive, Sacramento, California 95827, <http://www.cslb.ca.gov>.

6.1.3 As required by law, Contractor and all Subcontractors shall be properly registered as public works contractors by the Department of Industrial Relations at: <https://efiling.dir.ca.gov/PWCR/ActionServlet?action=displayPWCRRegistrationForm> or current URL.

6.1.4 Contractor represents that Contractor and all Subcontractors shall not be presently debarred, suspended, proposed for disbarment, declared ineligible or excluded pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7.

6.1.5 Contractor represents that it has no existing interest and will not acquire any interest, direct or indirect, which could conflict in any manner or degree with the performance of Work required under this Contract and that no person having any such interest shall be employed by Contractor.

6.1.6 If Contractor intends to make any change in the name or legal nature of the Contractor's entity, Contractor must first notify the District in writing prior to making any contemplated change. The District shall determine in writing if Contractor's intended change is permissible while performing this Contract.

6.2 Project Inspection Card(s)

Contractor shall verify that forms DSA 152 (or the current version applicable at the time the Work is performed) are issued for the Project prior to the commencement of construction.

6.3 Contractor's Supervision

6.3.1 During progress of the Work, Contractor shall keep on the Premises, and at all other locations where any Work related to the Contract is being performed, an experienced and competent project manager and construction superintendent who are employees of the Contractor, to whom the District does not object and at least one of whom shall be fluent in English, written and verbal.

6.3.2 The project manager and construction superintendent shall both speak fluently the predominant language of the Contractor's employees.

6.3.3 Before commencing the Work herein, Contractor shall give written notice to District of the name of its project manager and construction superintendent. Neither the Contractor's project manager nor construction superintendent shall be changed except with prior written notice to District. If the Contractor's project manager and/or construction superintendent proves to be unsatisfactory to Contractor, or to District, any of the District's employees, agents, the Construction Manager, or the Architect, the unsatisfactory project manager and/or construction superintendent shall be replaced. However, Contractor shall notify District in writing before any change occurs, but no less than two (2) business days prior. Any replacement of the project manager and/or construction superintendent shall be made promptly and must be satisfactory to the District. The Contractor's project manager and construction superintendent shall each represent Contractor, and all directions given to Contractor's project manager and/or construction superintendent shall be as binding as if given to Contractor.

6.3.4 Contractor shall give efficient supervision to Work, using its best skill and attention. Contractor shall carefully study and compare all Contract Documents, Drawings, Specifications, and other instructions and shall at once report to District, Construction Manager, and Architect any error, inconsistency, or omission that Contractor or its employees and Subcontractors may discover, in writing, with a copy to District's Project Inspector(s). The Contractor shall have responsibility for discovery of errors, inconsistencies, or omissions.

6.4 Duty to Provide Fit Workers

6.4.1 Contractor and Subcontractor(s) shall at all times enforce strict discipline and good order among their employees and shall not employ or work any unfit person or anyone not skilled in work assigned to that person. It shall be the responsibility of Contractor to ensure compliance with this requirement. District may require Contractor to permanently remove unfit persons from Project Site.

6.4.2 Any person in the employ of Contractor or Subcontractor(s) whom District may deem incompetent or unfit shall be excluded from working on the Project and shall not again be employed on the Project except with the prior written consent of District.

6.4.3 The Contractor shall furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work.

6.4.4 Fingerprinting

Contractor shall comply with the provisions of Education Code section 45125.2 regarding the submission of employee fingerprints to the California Department of Justice and the completion of criminal background investigations of its employees, its subcontractor(s), and its subcontractors' employees. Contractor shall not permit any employee to have any contact with District pupils until such time as Contractor has verified in writing to the governing board of the District, (A) that such employee has not been convicted of a violent or serious felony, as defined in Education Code section 45122.1 and/or (B) that the prohibition does not apply to an employee as provided by Education Code section 45125.1(e)(2) or (3). Contractor shall fully complete and perform all tasks required pursuant to the Criminal Background Investigation/ Fingerprinting Certification.

6.5 ~~Field Office~~

~~6.5.1 Contractor shall provide a temporary office on the Site for the District's use exclusively, during the term of the Contract.~~

6.6 Purchase of Materials and Equipment

The Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from District to assure that there will be no delays.

6.7 Documents on Work

6.7.1 Contractor shall at all times keep on the Site, or at another location as the District may authorize in writing, one legible copy of all Contract Documents, including Addenda and Change Orders, and Titles 19 and 24 of the California Code of Regulations, the specified edition(s) of the Uniform Building Code, all approved Drawings, Plans, Schedules, and Specifications, and all codes and documents referred to in the Specifications, and made part thereof. These documents shall be kept in good order and available to District, Construction Manager, Architect, Architect's representatives, the Project Inspector(s), and all authorities having jurisdiction. Contractor shall be acquainted with and comply with the provisions of these titles as they relate to this Project. (See particularly the duties of Contractor, Title 24, Part 1, California Code of Regulations, section 4-343.) Contractor shall also be acquainted with and comply with all California Code of Regulations provisions relating to conditions on this Project, particularly Titles 8 and 17. Contractor shall coordinate with Architect and Construction Manager and shall submit its verified report(s) according to the requirements of Title 24.

6.7.2 Daily Job Reports.

6.7.2.1 Contractor shall maintain, at a minimum, at least one (1) set of Daily Job Reports on the Project. These must be prepared by the Contractor's employee(s) who are present on Site, and must include, at a minimum, the following information:

- 6.7.2.1.1 A brief description of all Work performed on that day.
- 6.7.2.1.2 A summary of all other pertinent events and/or occurrences on that day.
- 6.7.2.1.3 The weather conditions on that day.

- 6.7.2.1.4 A list of all Subcontractor(s) working on that day, including DIR registration numbers.
- 6.7.2.1.5 A list of each Contractor employee working on that day and the total hours worked for each employee.
- 6.7.2.1.6 A complete list of all equipment on Site that day, whether in use or not.
- 6.7.2.1.7 A complete list of all materials, supplies, and equipment delivered on that day.
- 6.7.2.1.8 A complete list of all inspections and tests performed on that day.

6.7.2.2 Each day Contractor shall provide a copy of the previous day's Daily Job Report to the District or the Construction Manager.

6.8 Preservation of Records

Contractor shall maintain, and District shall have the right to inspect, Contractor's financial records for the Project, including, without limitation, Job Cost Reports for the Project in compliance with the criteria set forth herein. The District shall have the right to examine and audit all Daily Job Reports or other Project records of Contractor's project manager(s), project superintendent(s), and/or project foreperson(s), all certified payroll records and/or related documents including, without limitation, Job Cost Reports, payroll, payment, timekeeping and tracking documents; all books, estimates, records, contracts, documents, bid documents, bid cost data, subcontract job cost reports, and other data of the Contractor, any Subcontractor, and/or supplier, including computations and projections related to bidding, negotiating, pricing, or performing the Work or Contract modification, in order to evaluate the accuracy, completeness, and currency of the cost, manpower, coordination, supervision, or pricing data at no additional cost to the District. These documents may be duplicative and/or be in addition to any Bid Documents held in escrow by the District. The Contractor shall make available at its office at all reasonable times the materials described in this paragraph for the examination, audit, or reproduction until three (3) years after final payment under this Contract. Notwithstanding the provisions above, Contractor shall provide any records requested by any governmental agency, if available, after the time set forth above.

6.9 Integration of Work

6.9.1 Contractor shall do all cutting, fitting, patching, and preparation of Work as required to make its several parts come together properly, to fit it to receive or be received by work of other contractors, and to coordinate tolerances to various pieces of work, showing upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and shall conform them as District and/or Architect may direct.

6.9.2 Contractor shall make its own layout of lines and elevations and shall be responsible for the accuracy of both Contractor's and Subcontractors' work resulting therefrom.

6.9.3 Contractor and all Subcontractors shall take all field dimensions required in performance of the Work, and shall verify all dimensions and conditions on the Site. All dimensions affecting proper fabrication and installation of all Work must be

verified prior to fabrication by taking field measurements of the true conditions. If there are any discrepancies between dimensions in drawings and existing conditions which will affect the Work, Contractor shall bring such discrepancies to the attention of the District and Architect for adjustment before proceeding with the Work. In doing so, it is recognized that Contractor is not acting in the capacity of a licensed design professional, and that Contractor's examination is made in good faith to facilitate construction and does not create an affirmative responsibility of a design professional to detect errors, omissions or inconsistencies in the Contract Documents or to ascertain compliance with applicable laws, building codes or regulations. However, nothing in this provision shall abrogate Contractor's responsibilities for discovering and reporting any error, inconsistency, or omission pursuant to the Contract within the Contractor's standard of care including, without limitation, any applicable laws, ordinance, rules, or regulations. Following receipt of written notice from Contractor, the District and/or Architect shall inform Contractor what action, if any, Contractor shall take with regard to such discrepancies.

6.9.4 All costs caused by noncompliant, defective, or delayed Work shall be borne by Contractor, inclusive of repair work. Schedule delays resulting from unauthorized work shall be Contractor's responsibility.

6.9.5 Contractor shall not endanger any work performed by it or anyone else by cutting, excavating, or otherwise altering work and shall not cut or alter work of any other contractor except with consent of District.

6.10 Notifications

6.10.1 Contractor shall notify the Architect and Project Inspector, in writing, of the commencement of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or the most current version applicable at the time the Work is performed) to the Project Inspector. Forms are available on the DSA's website at: <http://www.dgs.ca.gov/dsa/Forms.aspx>.

6.10.2 Contractor shall notify the Architect and Project Inspector, in writing, of the completion of construction of each and every aspect of the Work at least 48 hours in advance by submitting form DSA 156 (or current version) to the Project Inspector.

6.11 Obtaining of Permits, Licenses and Registrations

6.11.1 Contractor shall secure and pay for all permits (except DSA), licenses, registrations, approvals and certificates necessary for prosecution of Work, including but not limited to those listed in the Special Conditions, if any, before the date of the commencement of the Work or before the permits, licenses, registrations, approvals and certificates are legally required to continue the Work without interruption. The Contractor shall obtain and pay, only when legally required, for all licenses, registrations, approvals, permits, inspections, and inspection certificates required to be obtained from or issued by any authority having jurisdiction over any part of the Work included in the Contract. All final permits, licenses, registrations, approvals and certificates shall be delivered to District before demand is made for final payment.

6.11.2 General Permit For Storm Water Discharges Associated With Construction and Land Disturbance Activities.

6.11.2.1 Contractor acknowledges that all California school districts are obligated to develop and implement the following requirements for the discharge of storm water to surface waters from its construction and land disturbance activities pursuant to the Clean Water Act and Porter Cologne Water Quality Act. District has determined that the construction of this Project requires enrollment in the Construction Storm Water Permit. District has filed certain submittals referred to as Permit Registration Documents ("PRDS") with the Regional Water Control Board ("Storm Water Pollution Prevention Plan" or "SWPPP").

6.11.2.2 Contractor shall comply with any District SWPPP that is approved by the District and applicable to the Project, at no additional cost to the District. Contractor shall pay any fees and any penalties that may imposed by a regulatory agency for its non-compliance with the SWPPP during the course of Work.

6.11.2.3 Contractor shall provide a Qualified Storm Water Practitioner ("QSP") at no additional cost to the District, who shall be onsite and implement and monitor any and all SWPPP requirements applicable to the Project, including but not limited to:

6.11.2.3.1 All required visual observations, sampling, analysis, reporting and record keeping, including any Numeric Action Levels ("NALs"), if applicable;

6.11.2.3.2 Rain Event Action Plan ("REAP") at least forty eight (48) hours prior to any forecasted rain event requiring implementation of the REAP, including any erosion and sediment control measures needed to protect all exposed portions of the site, if applicable;

6.11.2.3.3 Active Treatment System ("ATS"), if applicable; and

6.11.2.3.4 Best management practices ("BMPs").

6.12 Royalties and Patents

6.12.1 Contractor shall obtain and pay, only when legally required, all royalties and license fees necessary for prosecution of Work before the earlier of the date of the commencement of the Work or the date that the license is legally required to continue the Work without interruption. Contractor shall defend suits or claims of infringement of patent, copyright, or other rights and shall hold the District, the Architect, and the Construction Manager harmless and indemnify them from loss on account thereof except when a particular design, process, or make or model of product is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process, or product is an infringement of a patent or copyright, the Contractor shall indemnify and defend the District, Architect and Construction Manager against any loss or damage unless the Contractor promptly informs the District of its information.

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

6.13 Work to Comply with Applicable Laws and Regulations

6.13.1 Contractor shall give all notices and comply with the following specific laws, ordinances, rules, and regulations and all other applicable laws, ordinances, rules, and regulations bearing on conduct of Work as indicated and specified, including but not limited to the appropriate statutes and administrative code sections. If Contractor observes that Drawings and Specifications are at variance therewith, or should Contractor become aware of the development of conditions not covered by Contract Documents that may result in finished Work being at variance therewith, Contractor shall promptly notify District in writing and any changes deemed necessary by District shall be made as provided in Contract for changes in Work.

6.13.1.1 National Electrical Safety Code, U. S. Department of Commerce

6.13.1.2 National Board of Fire Underwriters' Regulations

6.13.1.3 International Building Code, latest addition, and the California Code of Regulations, title 24, and other amendments

6.13.1.4 Manual of Accident Prevention in Construction, latest edition, published by A.G.C. of America

6.13.1.5 Industrial Accident Commission's Safety Orders, State of California

6.13.1.6 Regulations of the State Fire Marshall (title 19, California Code of Regulations) and Pertinent Local Fire Safety Codes

6.13.1.7 Americans with Disabilities Act

6.13.1.8 Education Code of the State of California

6.13.1.9 Government Code of the State of California

6.13.1.10 Labor Code of the State of California, division 2, part 7, Public Works and Public Agencies

6.13.1.11 Public Contract Code of the State of California

6.13.1.12 California Art Preservation Act

6.13.1.13 U. S. Copyright Act

6.13.1.14 U. S. Visual Artists Rights Act

6.13.2 Contractor shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act (Public Resources Code section 21000 et seq.).

6.13.3 If Contractor performs any Work that it knew, or through exercise of reasonable care should have known, to be contrary to any applicable laws, ordinance, rules, or regulations, Contractor shall bear all costs arising therefrom and arising from the correction of said Work.

6.13.4 Where Specifications or Drawings state that materials, processes, or procedures must be approved by the DSA, State Fire Marshall, or other body or agency, Contractor shall be responsible for satisfying requirements of such bodies or agencies applicable at the time the Work is performed, and as determined by those bodies or agencies.

6.14 Safety/Protection of Persons and Property

6.14.1 The Contractor will be solely and completely responsible for conditions of the Site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours.

6.14.2 The wearing of hard hats will be mandatory at all times for all personnel on Site. Contractor shall supply sufficient hard hats to properly equip all employees and visitors.

6.14.3 Any construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the Site.

6.14.4 Implementation and maintenance of safety programs shall be the sole responsibility of the Contractor.

6.14.5 The Contractor shall furnish to the District a copy of the Contractor's safety plan within the time frame indicated in the Contract Documents and specifically adapted for the Project.

6.14.6 Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and completion and final acceptance by District. All Work shall be solely at Contractor's risk with the exception of damage to the Work caused by "acts of God" as defined in Public Contract Code section 7105.

6.14.7 Contractor shall take, and require Subcontractors to take, all necessary precautions for safety of workers on the Project and shall comply with all applicable federal, state, local, and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. Contractor shall furnish, erect, and properly maintain at all times, all necessary safety devices, safeguards, construction canopies, signs, nets, barriers,

lights, and watchmen for protection of workers and the public and shall post danger signs warning against hazards created by such features in the course of construction.

6.14.8 Hazards Control – Contractor shall store volatile wastes in covered metal containers and remove them from the Site daily. Contractor shall prevent accumulation of wastes that create hazardous conditions. Contractor shall provide adequate ventilation during use of volatile or noxious substances.

6.14.9 Contractor shall designate a responsible member of its organization on the Project, whose duty shall be to post information regarding protection and obligations of workers and other notices required under occupational safety and health laws, to comply with reporting and other occupational safety requirements, and to protect the life, safety, and health of workers. Name and position of person so designated shall be reported to District by Contractor.

6.14.10 Contractor shall correct any violations of safety laws, rules, orders, standards, or regulations. Upon the issuance of a citation or notice of violation by the Division of Occupational Safety and Health, Contractor shall correct such violation promptly.

6.14.11 Contractor shall comply with any District storm water requirements that are approved by the District and applicable to the Project, at no additional cost to the District.

6.14.12 In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization, shall act, at its discretion, to prevent such threatened loss or injury. Any compensation claimed by Contractor on account of emergency work shall be determined by agreement.

6.14.13 All salvage materials will become the property of the Contractor and shall be removed from the Site unless otherwise called for in the Contract Documents. However, the District reserves the right to designate certain items of value that shall be turned over to the District unless otherwise directed by District.

6.14.14 All connections to public utilities and/or existing on-site services, including, without limitation, internet, phone and data connections, shall be made and maintained in such a manner as to not interfere with the continuing use of same by the District during the entire progress of the Work.

6.14.15 Contractor shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions, such as extreme heat, cold, rain, snow, dry winds, flooding, or dampness.

6.14.16 The Contractor shall protect and preserve the Work from all damage or accident, providing any temporary roofs, window and door coverings, boxings, or other construction as required by the Architect. The Contractor shall be responsible for existing structures, walks, roads, trees, landscaping, and/or improvements in working areas; and shall provide adequate protection therefore. If temporary removal is necessary of any of the above items, or damage occurs due to the Work, the Contractor shall replace same at his expense with same kind, quality, and size of

Work or item damaged. This shall include any adjoining property of the District and others.

6.14.17 Contractor shall take adequate precautions to protect existing roads, sidewalks, curbs, pavements, utilities, adjoining property, and structures (including, without limitation, protection from settlement or loss of lateral support), and to avoid damage thereto, and repair any damage thereto caused by construction operations.

6.14.18 Contractor shall confine apparatus, the storage of materials, and the operations of workers to limits indicated by law, ordinances, permits, or directions of Architect, and shall not interfere with the Work or unreasonably encumber Premises or overload any structure with materials. Contractor shall enforce all instructions of District and Architect regarding signs, advertising, fires, and smoking, and require that all workers comply with all regulations while on Project Site.

6.14.19 Contractor, Contractor's employees, Subcontractors, Subcontractors' employees, or any person associated with the Work shall conduct themselves in a manner appropriate for a school site. No verbal or physical contact with neighbors, students, and faculty, profanity, or inappropriate attire and/or logos, or behavior will be permitted. District may require Contractor to temporarily or permanently remove non-complying persons from Project Site.

6.14.20 Contractor shall take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed, Contractor shall have a civil engineer, registered as a professional engineer in California, replace them at no cost to District.

6.14.21 In the event that the Contractor enters into any agreement with owners of any adjacent property to enter upon the adjacent property for the purpose of performing the Work, Contractor shall fully indemnify, defend, and hold harmless each person, entity, firm, or agency that owns or has any interest in adjacent property. The form and content of the agreement of indemnification shall be approved by the District prior to the commencement of any Work on or about the adjacent property. The Contractor shall also indemnify the District as provided in the indemnification provision herein. These provisions shall be in addition to any other requirements of the owners of the adjacent property.

6.15 Working Evenings and Weekends

Contractor may be required to work increased hours, evenings, and/or weekends at no additional cost to the District. Contractor shall give the District seventy-two (72) hours' notice prior to performing any evening and/or weekend work. Contractor shall perform all evening and/or weekend work only upon District's approval and in compliance with all applicable rules, regulations, laws, and local ordinances including, without limitation, all noise and light limitations. Contractor shall reimburse the District for any increased or additional Inspector charges as a result of Contractor's increased hours, or evening and/or weekend work.

6.16 Cleaning Up

6.16.1 The Contractor shall provide all services, labor, materials, and equipment necessary for protecting and securing the Work, all school occupants, furnishings,

equipment, and building structure from damage until its completion and final acceptance by District. Dust barriers shall be provided to isolate dust and dirt from construction operations. At completion of the Work and portions thereof, Contractor shall clean to the original state any areas beyond the Work area that become dust laden as a result of the Work. The Contractor must erect the necessary warning signs and barricades to ensure the safety of all school occupants. The Contractor at all times must maintain good housekeeping practices to reduce the risk of fire damage and must make a fire extinguisher, fire blanket, and/or fire watch, as applicable, available at each location where cutting, braising, soldering, and/or welding is being performed or where there is an increased risk of fire.

6.16.2 Contractor at all times shall keep Premises, including property immediately adjacent thereto, free from debris such as waste, rubbish (including personal rubbish of workers, e.g., food wrappers, etc.), and excess materials and equipment caused by the Work. Contractor shall not leave debris under, in, or about the Premises (or surrounding property or neighborhood), but shall promptly remove same from the Premises on a daily basis. If Contractor fails to clean up, District may do so and the cost thereof shall be charged to Contractor. If Contract is for work on an existing facility, Contractor shall also perform specific clean-up on or about the Premises upon request by the District as it deems necessary for continued operations. Contractor shall comply with all related provisions of the Specifications.

6.16.3 If the Construction Manager, Architect, or District observes the accumulation of trash and debris, the District will give the Contractor a 24-hour written notice to mitigate the condition.

6.16.4 Should the Contractor fail to perform the required clean-up, or should the clean-up be deemed unsatisfactory by the District, the District may, at its sole discretion, then perform the clean-up. All cost associated with the clean-up work (including all travel, payroll burden, and costs for supervision) will be deducted from the Contract Price.

6.17 No Relief from Obligations Based on Review by Other Persons

6.17.1 Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by act or omission of the District, Architect, Construction Manager, Project Inspector, or DSA or other entities having jurisdiction including, but not limited to, administration of the Contract, review of submittals, or by tests, observation, inspection, or permit/interconnection approvals.

7. SUBCONTRACTORS

7.1 Contractor shall provide the District with information for all Subcontracts as indicated in the Contractor's Submittals and Schedules Section herein.

7.2 No contractual relationship exists between the District and any Subcontractor, supplier, or sub-subcontractor by reason of this Contract.

7.3 Contractor agrees to bind every Subcontractor by terms of this Contract as far as those terms that are applicable to Subcontractor's work including, without limitation, all labor, wage & hour, apprentice and related provisions and requirements. If Contractor shall subcontract any part of this Contract, Contractor shall be as fully

responsible to District for acts and omissions of any Subcontractor and of persons either directly or indirectly employed by any Subcontractor, including Subcontractor caused Project delays, as it is for acts and omissions of persons directly employed by Contractor. The divisions or sections of the Specifications and/or the arrangement of the drawings are not intended to control the Contractor in dividing the Work among Subcontractors or limit the work performed by any trade.

7.4 District's consent to, or approval of, or failure to object to, any Subcontractor under this Contract shall not in any way relieve Contractor of any obligations under this Contract and no such consent shall be deemed to waive any provisions of this Contract.

7.5 Contractor is directed to familiarize itself with sections 4100 through 4114 of the Public Contract Code of the State of California, as regards subletting and subcontracting, and to comply with all applicable requirements therein. In addition, Contractor is directed to familiarize itself with sections 1720 through 1861 of the Labor Code of the State of California, as regards the payment of prevailing wages and related issues, and to comply with all applicable requirements therein including, without limitation, section 1775 and the Contractor's and Subcontractors' obligations and liability for violations of prevailing wage law and other applicable laws.

7.6 No Contractor whose Bid is accepted shall, without consent of the awarding authority and in full compliance with section 4100 et seq. of the Public Contract Code, including, without limitation, sections 4107, 4107.5, and 4109 of the Public Contract Code, and section 1771.1 of the Labor Code, either:

7.6.1 Substitute any person as a Subcontractor in place of the Subcontractor designated in the original Bid; or

7.6.2 Permit any Subcontract to be assigned or transferred, or allow any portion of the Work to be performed by anyone other than the original Subcontractor listed in the Bid; or

7.6.3 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 his original bid did not designate a Subcontractor.

7.7 The Contractor shall be responsible for the coordination of the trades, Subcontractors, sub-subcontractors, and material or equipment suppliers working on the Project.

7.7.1 If the Contract is valued at \$1 million or more and uses, or plans to use, state bond funds, then Contractor is responsible for ensuring that first tier Subcontractors holding C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and/or C-46 licenses are prequalified by the District to work on the Project pursuant to Public Contract Code section 20111.6.

7.7.2 Contractor is responsible for ensuring that all Subcontractors are properly registered as public works contractors by the Department of Industrial Relations.

7.8 Contractor is solely responsible for settling any differences between the Contractor and its Subcontractor(s) or between Subcontractors.

7.9 Contractor must include in all of its subcontracts the assignment provisions as indicated in the Termination section of these General Conditions.

8. OTHER CONTRACTS/CONTRACTORS

8.1 District reserves the right to let other contracts, and/or to perform work with its own forces, in connection with the Project. Contractor shall afford other contractors reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly coordinate and connect Contractor's Work with the work of other contractors.

8.2 In addition to Contractor's obligation to protect its own Work, Contractor shall protect the work of any other contractor that Contractor encounters while working on the Project.

8.3 If any part of Contractor's Work depends for proper execution or results upon work of District or any other contractor, the Contractor shall inspect and, before proceeding with its Work, promptly report to the District in writing any defects in District's or any other contractor's work that render Contractor's Work unsuitable for proper execution and results. Contractor shall be held accountable for damages to District for District's or any other contractor's work that Contractor failed to inspect or should have inspected. Contractor's failure to inspect and report shall constitute Contractor's acceptance of all District's or any other contractor's work as fit and proper for reception of Contractor's Work, except as to defects that may develop in District's or any other contractor's work after execution of Contractor's Work and not caused by execution of Contractor's Work.

8.4 To ensure proper execution of its subsequent work, Contractor shall measure and inspect work already in place and shall at once report to the District in writing any discrepancy between that executed work and the Contract Documents.

8.5 Contractor shall ascertain to its own satisfaction the scope of the Project and nature of District's or any other contracts that have been or may be awarded by District in prosecution of the Project to the end that Contractor may perform this Contract in light of the other contracts, if any.

8.6 Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy of the Site, the Premises, or of the Project. Contractor shall not cause any unnecessary hindrance or delay to the use and/or operation(s) of the Premises and/or to District or any other contractor working on the Project. If simultaneous execution of any contract or Premises operation is likely to cause interference with performance of Contractor's Contract, Contractor shall coordinate with those contractor(s), person(s), and/or entity(s) and shall notify the District of the resolution.

9. DRAWINGS AND SPECIFICATIONS

9.1 A complete list of all Drawings that form a part of the Contract is to be found as an index on the Drawings themselves, and/or may be provided to the Contractor and/or in the Table of Contents.

9.2 Materials or Work described in words that so applied have a well-known technical or trade meaning shall be deemed to refer to recognized standards, unless noted otherwise.

9.3 Trade Name or Trade Term. It is not the intention of this Contract to go into detailed descriptions of any materials and/or methods commonly known to the trade under "trade name" or "trade term." The mere mention or notation of "trade name" or "trade term" shall be considered a sufficient notice to Contractor that it will be required to complete the work so named, complete, finished, and operable, with all its appurtenances, according to the best practices of the trade.

9.4 The naming of any material and/or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and/or labor therefor, as per best practices of the trade(s) involved, unless specifically noted otherwise.

9.5 Contract Documents are complementary, and what is called for by one shall be binding as if called for by all. As such, Drawings and Specifications are intended to be fully cooperative and to agree. However, if Contractor observes that Drawings and Specifications are in conflict with the Contract Documents, Contractor shall promptly notify District and Architect in writing, and any necessary changes shall be made as provided in the Contract Documents.

9.6 In the case of discrepancy or ambiguity in the Contract Documents, the order of precedence in the Agreement shall prevail. However, in the case of discrepancy or ambiguity solely between and among the Drawings and Specifications, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide District with the functionally complete and operable Project described in the Drawings and Specifications. In case of ambiguity, conflict, or lack of information, District will furnish clarifications with reasonable promptness.

9.7 Drawings and Specifications are intended to comply with all laws, ordinances, rules, and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, the laws, ordinances, rules, and regulations shall be considered as a part of the Contract within the limits specified. Contractor shall bear all expense of correcting work done contrary to said laws, ordinances, rules, and regulations.

9.8 As required by Section 4-317(c), Part 1, Title 24, CCR: "Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA-approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a

separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.”

9.9 Ownership of Drawings

All copies of Plans, Drawings, Designs, Specifications, and copies of other incidental architectural and engineering work, or copies of other Contract Documents furnished by District, are the property of District. They are not to be used by Contractor in other work and, with the exception of signed sets of Contract Documents, are to be returned to District on request at completion of Work, or may be used by District as it may require without any additional costs to District. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect. District hereby grants the Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers a limited license to use applicable portions of the Drawings prepared for the Project in the execution of their Work under the Contract Documents.

10. CONTRACTOR’S SUBMITTALS AND SCHEDULES

Contractor’s submittals shall comply with the provisions and requirements of the Specifications including, without limitation Submittals.

10.1 Schedule of Work, Schedule of Submittals, and Schedule of Values

10.1.1 Within **TEN (10)** calendar days after the date of the Notice to Proceed (unless otherwise specified in the Specifications), the Contractor shall prepare and submit to the District for review, in a form supported by sufficient data to substantiate its accuracy as the District may require:

10.1.1.1 Preliminary Schedule. A preliminary schedule of construction indicating the starting and completion dates of the various stages of the Work, including any information and following any form as may be specified in the Specifications. Once approved by District, this shall become the Construction Schedule. This schedule shall include and identify all tasks that are on the Project’s critical path with a specific determination of the start and completion of each critical path task as well as all Contract milestones and each milestone’s completion date(s) as may be required by the District.

10.1.1.1.1 The District is not required to approve a preliminary schedule of construction with early completion, i.e., one that shows early completion dates for the Work and/or milestones. Contractor shall not be entitled to extra compensation if the District approves a Construction Schedule with an early completion date and Contractor completes the Project beyond the date shown in the schedule but within the Contract Time. A Construction Schedule showing the Work completed in less than the Contract Time, the time between the early completion date and the end of the Contract Time shall be Float.

10.1.1.2 Preliminary Schedule of Values. A preliminary schedule of values for all of the Work, which must include quantities and prices of items aggregating the Contract Price and must subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Unless

the Special Conditions contain different limits, this preliminary schedule of values shall include, at a minimum, the following information and the following structure:

10.1.1.2.1 Divided into at least the following categories:

- 10.1.1.2.1.1 Overhead and profit;
- 10.1.1.2.1.2 Supervision;
- 10.1.1.2.1.3 General conditions;
- 10.1.1.2.1.4 Layout;
- 10.1.1.2.1.5 Mobilization;
- 10.1.1.2.1.6 Submittals;
- 10.1.1.2.1.7 Bonds and insurance;
- 10.1.1.2.1.8 Close-out/Certification documentation;
- 10.1.1.2.1.9 Demolition;
- 10.1.1.2.1.10 Installation;
- 10.1.1.2.1.11 Rough-in;
- 10.1.1.2.1.12 Finishes;
- 10.1.1.2.1.13 Testing;
- 10.1.1.2.1.14 Punchlist and District acceptance.

10.1.1.2.2 And also divided by each of the following areas:

- 10.1.1.2.2.1 Site work;
- 10.1.1.2.2.2 By each building;
- 10.1.1.2.2.3 By each floor.

10.1.1.2.3 The preliminary schedule of values shall not provide for values any greater than the following percentages of the Contract value:

- 10.1.1.2.3.1 Mobilization and layout combined to equal not more than 1%;
- 10.1.1.2.3.2 Submittals, samples and shop drawings combined to equal not more than 3%;
- 10.1.1.2.3.3 Bonds and insurance combined to equal not more than 2%.
- 10.1.1.2.3.4 Punchlist/As-builts/Closeout documentation shall have a value in the preliminary schedule of not less than 5%.

10.1.1.2.4 Notwithstanding any provision of the Contract Documents to the contrary, payment of the Contractor's overhead, supervision, general conditions costs, and profit, as reflected in the Cost Breakdown, shall be paid based on percentage complete, with the disbursement of Progress Payments and the Final Payment.

10.1.1.2.5 Contractor shall certify that the preliminary schedule of values as submitted to the District is accurate and reflects the costs as developed in preparing Contractor's bid. For example, without limiting the foregoing, Contractor shall not "front-load" the preliminary schedule of values with dollar amounts greater than the value of activities performed early in the Project.

10.1.1.2.6 The preliminary schedule of values shall be subject to the District's review and approval of the form and content thereof. In the event that the District objects to any portion of the preliminary schedule of values, the District shall notify the Contractor, in writing, of the District's objection(s) to the preliminary schedule of values. Within five (5) calendar days of the date of the District's written objection(s), Contractor shall submit a revised preliminary schedule of values to the District for review and approval. The foregoing procedure for the preparation, review and approval of the preliminary schedule of values shall continue until the District has approved the entirety of the preliminary schedule of values.

10.1.1.2.7 Once the preliminary schedule of values is approved by the District, this shall become the Schedule of Values. The Schedule of Values shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, which may be granted or withheld in the sole discretion of the District.

10.1.1.3 Preliminary Schedule of Submittals. A preliminary schedule of submittals, including Shop Drawings, Product Data, and Samples submittals. Once approved by District, this shall become the Submittal Schedule. All submittals shall be forwarded to the District by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those submittals shall be forwarded to the District so as not to delay the Construction Schedule. Upon request by the District, Contractor shall provide an electronic copy of all submittals to the District. All submittals shall be submitted no later than 90 days after the Notice to Proceed.

10.1.1.4 Safety Plan.

10.1.1.5 Contractor's Safety Plan specifically adapted for the Project. Contractor's Safety Plan shall comply with the following requirements:

10.1.1.5.1 All applicable requirements of California Division of Occupational Safety and Health ("CalOSHA") and/or of the United States Occupational Safety and Health Administration ("OSHA").

10.1.1.5.2 All provisions regarding Project safety, including all applicable provisions in these General Conditions.

10.1.1.5.3 Contractor's Safety Plan shall be in English and in the language(s) of the Contractor's and its Subcontractors' employees.

10.1.1.6 Complete Registered Subcontractors List. The name, address, telephone number, facsimile number, California State Contractors License number, classification, DIR registration number and monetary value of all Subcontracts of any tier for parties furnishing labor, material, or equipment for completion of the Project.

10.1.2 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.1.3 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.1.4 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.1.5 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.2 Monthly Progress Schedule(s)

10.2.1 Contractor shall provide Monthly Progress Schedule(s) to the District. A Monthly Progress Schedule shall update the approved Construction Schedule or the last Monthly Progress Schedule, showing all work completed and to be completed as well as updating the Registered Subcontractors List. The monthly Progress Schedule shall be sent within the timeframe requested by the District and shall be in a format acceptable to the District and contain a written narrative of the progress of work that month and any changes, delays, or events that may affect the work. The process for District approval of the Monthly Progress Schedule shall be the same as the process for approval of the Construction Schedule.

10.2.2 Contractor shall submit Monthly Progress Schedule(s) with all payment applications.

10.2.3 Contractor must provide all schedules both in hard copy and electronically, in a format (e.g., Microsoft Project or Primavera) approved in advance by the District.

10.2.4 The District will review the schedules submitted and the Contractor shall make changes and corrections in the schedules as requested by the District and resubmit the schedules until approved by the District.

10.2.5 The District shall have the right at any time to revise the schedule of values if, in the District's sole opinion, the schedule of values does not accurately reflect the value of the Work performed.

10.2.6 All schedules must be approved by the District before Contractor can rely on them as a basis for payment.

10.3 Material Safety Data Sheets (MSDS)

Contractor is required to ensure Material Safety Data Sheets are available in a readily accessible place at the Site for any material requiring a Material Safety Data Sheet per the federal "Hazard Communication" standard, or employees' "right to know" law. The Contractor is also required to ensure proper labeling on substances brought onto the job site and that any person working with the material or within the general area of the material is informed of the hazards of the substance and follows proper handling and protection procedures. Two additional copies of the Material Safety Data Sheets shall also be submitted directly to the District.

10.4 Submittals

10.4.1 Architect's favorable 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 Architect's attention to the deviations at the time of submission and the Architect has given specific written response. "Favorable review" shall mean merely that Architect has no objection to Contractor using, upon Contractor's own full responsibility, plan or method of Work proposed, or furnishing materials or equipment proposed.

11. SITE ACCESS, CONDITIONS, AND REQUIREMENTS

11.1 Site Investigation

Before bidding on this Work, Contractor shall make a careful investigation of the Site and thoroughly familiarize itself with the requirements of the Contract. By the act of submitting a bid for the Work included in this Contract, Contractor shall be deemed to have made a complete study and investigation, and to be familiar with and accepted the existing conditions of the Site.

Prior to commencing the 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. This electronic record shall serve as a basis for determining any damages caused by the Contractor during the Project. The 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.

11.2 Soils Investigation Report

11.2.1 When a soils investigation report obtained from test holes at Site or for the Project is available, that report may be available to the Contractor but shall not be a part of this Contract and shall not alleviate or excuse the Contractor's obligation to perform its own investigation. Any information obtained from that report or any information given on Drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, does not form a part of this Contract, and Contractor may not rely thereon. By submitting its bid, Contractor acknowledges that it has made visual examination of Site and has made whatever tests Contractor deems appropriate to determine underground condition of soil. Although any such report is not a part of this Contract, recommendations from the report may be included in the Drawings, Specifications, or other Contract Documents. It is Contractor's sole responsibility to thoroughly review all Contract Documents, Drawings, and Specifications.

11.2.2 Contractor agrees that no claim against District will be made by Contractor for damages and hereby waives any rights to damages if, during progress of Work, Contractor encounters subsurface or latent conditions at Site materially differing from those shown on Drawings or indicated in Specifications, or for unknown conditions of an unusual nature that differ materially from those ordinarily

encountered in the work of the character provided for in Plans and Specifications, except as indicated in the provisions of these General Conditions regarding trenches, trenching, and/or existing utility lines.

11.3 Access to Work

District and its representatives shall at all times have access to Work wherever it is in preparation or progress, including storage and fabrication. Contractor shall provide safe and proper facilities for such access so that District's representatives may perform their functions.

11.4 Layout and Field Engineering

11.4.1 All field engineering required for layout of this Work and establishing grades for earthwork operations shall be furnished by Contractor at its expense. This Work shall be done by a qualified, California-registered civil engineer approved in writing by District and Architect. Any required Record and/or As-Built Drawings of Site development shall be prepared by the approved civil engineer.

11.4.2 The Contractor shall be responsible for having ascertained pertinent local conditions such as location, accessibility, and general character of the Site and for having satisfied itself as to the conditions under which the Work is to be performed. Contractor shall follow best practices, including but not limited to potholing to avoid utilities. District shall not be liable for any claim for allowances because of Contractor's error, failure to follow best practices, or negligence in acquainting itself with the conditions at the Site.

11.4.3 Contractor shall protect and preserve established benchmarks and monuments and shall make no changes in locations without the prior written approval of District. Contractor shall replace any benchmarks or monuments that are lost or destroyed subsequent to proper notification of District and with District's approval.

11.5 Utilities

Utilities shall be provided as indicated in the Specifications.

11.6 Sanitary Facilities

Sanitary facilities shall be provided as indicated in the Specifications.

11.7 Surveys

Contractor shall provide surveys done by a California-licensed civil engineer surveyor to determine locations of construction, grading, and site work as required to perform the Work.

11.8 Regional Notification Center

The Contractor, except in an emergency, shall contact the appropriate regional notification center at least two (2) days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement that is known, or

reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and/or carried out by the Contractor unless an inquiry identification number has been assigned to the Contractor or any Subcontractor and the Contractor has given the District the identification number. Any damages arising from Contractor's failure to make appropriate notification shall be at the sole risk and expense of the Contractor. Any delays caused by failure to make appropriate notification shall be at the sole risk of the Contractor and shall not be considered for an extension of the Contract Time.

11.9 Existing Utility Lines

11.9.1 Pursuant to Government Code section 4215, District assumes the responsibility for removal, relocation, and protection of main or trunk utility lines and facilities located on the construction Site at the time of commencement of construction under this Contract with respect to any such utility facilities that are not identified in the Plans and Specifications. Contractor shall not be assessed for liquidated damages for delay in completion of the Project caused by failure of District or the owner of a utility to provide for removal or relocation of such utility facilities.

11.9.2 Locations of existing utilities provided by District shall not be considered exact, but approximate within a reasonable margin and shall not relieve Contractor of responsibilities to exercise reasonable care or costs of repair due to Contractor's failure to do so. District shall compensate Contractor for the costs of locating, repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Plans and Specifications with reasonable accuracy, and for equipment necessarily idle during such work.

11.9.3 No provision herein shall be construed to preclude assessment against Contractor for any other delays in completion of the Work. Nothing in this Article shall be deemed to require District to indicate the presence of existing service laterals, appurtenances, or other utility lines, within the exception of main or trunk utility lines or whenever the presence of these utilities on the Site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter junction boxes, on or adjacent to the Site of the construction.

11.9.4 If Contractor, while performing Work under this Contract, discovers utility facilities not identified by District in Contract Plans and Specifications, Contractor shall immediately notify the District and the utility in writing. The cost of repair for damage to above-mentioned visible facilities without prior written notification to the District shall be borne by the Contractor.

11.10 Notification

Contractor understands, acknowledges and agrees that the purpose for prompt notification to the District pursuant to these provisions is to allow the District to investigate the condition(s) so that the District shall have the opportunity to decide how the District desires to proceed as a result of the condition(s). Accordingly, failure of Contractor to promptly notify the District in writing, pursuant to these provisions, shall constitute Contractor's waiver of any claim for damages or delay incurred as a result of the condition(s).

11.11 Hazardous Materials

Contractor shall comply with all provisions and requirements of the Contract Documents related to hazardous materials including, without limitation, Hazardous Materials Procedures and Requirements.

11.12 No Signs

Neither the Contractor nor any other person or entity shall display any signs not required by law or the Contract Documents at the Site, fences trailers, offices, or elsewhere on the Site without specific prior written approval of the District.

12. TRENCHES

12.1 Trenches Greater Than Five Feet

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

12.2 Excavation Safety

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

12.3 No Tort Liability of District

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

12.4 No Excavation without Permits

The Contractor shall not commence any excavation Work until it has secured all necessary permits including the required CalOSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

12.5 Discovery of Hazardous Waste and/or Unusual Conditions

12.5.1 Pursuant to Public Contract Code section 7104, if the Work involves digging trenches or other excavations that extend deeper than four feet below the Surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:

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

12.5.1.2 Subsurface or latent physical conditions at the Site differing from those indicated.

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

12.5.2 The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, shall issue a Change Order under the procedures described herein.

12.5.3 In the event that a dispute arises between District 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 that pertain to the resolution of disputes and protests.

13. INSURANCE AND BONDS

13.1 Insurance

Unless different provisions and/or limits are indicated in the Special Conditions, all insurance required of Contractor and/or its Subcontractor(s) shall be at least as broad as the amounts and include the provisions set forth herein.

13.1.1 Commercial General Liability and Automobile Liability Insurance

13.1.1.1 Contractor shall procure and maintain, during the life of this Contract, Commercial General Liability Insurance and Automobile Liability Insurance that shall protect Contractor, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, personal injury, death, advertising injury, and medical payments arising from, or in connection with, operations under this Contract. This coverage shall be provided in a form at least as broad as Insurance Services (ISO) Form CG 0001 11188. Contractor shall ensure that Products Liability and Completed Operations coverage, Fire Damage Liability coverage, and Automobile Liability Insurance coverage including owned, non-owned, and hired automobiles, are included within the above policies and at the required limits, or Contractor shall procure and maintain these coverages separately.

13.1.1.2 Contractor's deductible or self-insured retention for its Commercial General Liability Insurance policy shall not exceed \$25,000 unless approved in writing by District.

13.1.1.3 All such policies shall be written on an occurrence form.

13.1.2 Excess Liability Insurance

13.1.2.1 If Contractor's underlying policy limits are less than required, subject to the District's sole discretion, Contractor may procure and maintain, during the life of this Contract, an Excess Liability Insurance Policy to meet the policy limit requirements of the required policies in order to satisfy, in the aggregate with its underlying policy, the insurance requirements herein.

13.1.2.2 There shall be no gap between the per occurrence amount of any underlying policy and the start of the coverage under the Excess Liability Insurance Policy. Any Excess Liability Insurance Policy shall be written on a following form and shall protect Contractor, District, State, Construction Manager(s), Project Manager(s), and Architect(s) in amounts and including the provisions as set forth in the Supplementary Conditions (if any) and/or Special Conditions, and that complies with all requirements for Commercial General Liability and Automobile Liability and Employers' Liability Insurance.

13.1.2.3 The District, in its sole discretion, may accept the Excess Liability Insurance Policy that brings Contractor's primary limits to the minimum requirements herein.

13.1.3 Subcontractor(s):

Contractor shall require its Subcontractor(s), if any, to procure and maintain Commercial General Liability Insurance, Automobile Liability Insurance, and Excess Liability Insurance (if Subcontractor elects to satisfy, in part the insurance required herein by procuring and maintaining an Excess Liability Insurance Policy) with forms of coverage and limits equal to the amounts required of the Contractor.

13.1.4 Workers' Compensation and Employers' Liability Insurance

13.1.4.1 In accordance with provisions of section 3700 of the California Labor Code, the Contractor and every Subcontractor shall be required to secure the payment of compensation to its employees.

13.1.4.2 Contractor shall procure and maintain, during the life of this Contract, Workers' Compensation Insurance and Employers' Liability Insurance for all of its employees engaged in work under this Contract, on/or at the Site of the Project. This coverage shall cover, at a minimum, medical and surgical treatment, disability benefits, rehabilitation therapy, and survivors' death benefits. Contractor shall require its Subcontractor(s), if any, to procure and maintain Workers' Compensation Insurance and Employers' Liability Insurance for all employees of Subcontractor(s). Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by Contractor's insurance. If any class of employee or employee engaged in Work under this Contract, on or at the Site of the Project, is not protected under the Workers' Compensation Insurance,

Contractor shall provide, or shall cause a Subcontractor to provide, adequate insurance coverage for the protection of any employee(s) not otherwise protected before any of those employee(s) commence work.

13.1.5 Builder's Risk Insurance: Builder's Risk "All Risk" Insurance

Contractor shall procure and maintain, during the life of this Contract, Builder's Risk (Course of Construction), or similar first party property coverage acceptable to the District, issued on a replacement cost value basis. The cost shall be consistent with the total replacement cost of all insurable Work of the Project included within the Contract Documents. Coverage is to insure against all risks of accidental physical loss and shall include without limitation the perils of vandalism and/or malicious mischief (both without any limitation regarding vacancy or occupancy), sprinkler leakage, civil authority, theft, sonic disturbance, earthquake, flood, collapse, wind, rain, dust, fire, war, terrorism, lightning, smoke, and rioting. Coverage shall include debris removal, demolition, increased costs due to enforcement of all applicable ordinances and/or laws in the repair and replacement of damaged and undamaged portions of the property, and reasonable costs for the Architect's and engineering services and expenses required as a result of any insured loss upon the Work and Project, including completed Work and Work in progress, to the full insurable value thereof.

13.1.6 Pollution Liability Insurance

13.1.6.1 Contractor shall procure and maintain Pollution Liability Insurance that shall protect Contractor, District, State, Construction Manager(s), Project Inspector(s), and Architect(s) from all claims for bodily injury, property damage, including natural resource damage, cleanup costs, removal, storage, disposal, and/or use of the pollutant arising from operations under this Contract, and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims. Coverage shall apply to sudden and/or gradual pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. This coverage shall be provided in a form at least as broad as Insurance Services Offices, Inc. (ISO) Form CG 2415, or Contractor shall procure and maintain these coverages separately.

13.1.6.2 Contractor warrants that any retroactive date applicable to coverage under the policy shall predate the effective date of the Contract and that continuous coverage will be maintained or an extended reporting or discovery period will be exercised for a period of three (3) years, beginning from the time that the Work under the Contract is completed.

13.1.6.3 If Contractor is responsible for removing any pollutants from a site, then Contractor shall ensure that Any Auto, including owned, non-owned, and hired, is included within the above policies and at the required limits, to cover its automobile exposure from transporting the pollutants from the site to an approved disposal site. This coverage shall include the Motor Carrier Act Endorsement, MCS 90.

13.1.7 Proof of Insurance and Other Requirements: Endorsements and Certificates

13.1.7.1 Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract, until Contractor and its Subcontractor(s) have procured all required insurance and Contractor has delivered in duplicate to the District complete endorsements (or entire insurance policies) and certificates indicating the required coverages have been obtained, and the District has approved these documents.

13.1.7.2 Endorsements, certificates, and insurance policies shall include the following:

13.1.7.2.1 A clause stating the following, or other language acceptable to the District:

“This policy shall not be canceled until written notice to District, Architect, and Construction Manager stating date of the cancellation by the insurance carrier. Date of cancellation may not be less than thirty (30) days after date of mailing notice.”

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

13.1.7.2.3 All endorsements, certificates and insurance policies shall state that District, its trustees, employees and agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s) and Architect(s) are named additional insureds under all policies except Workers’ Compensation Insurance and Employers’ Liability Insurance.

13.1.7.2.4 All endorsements shall waive any right to subrogation against any of the named additional insureds.

13.1.7.2.5 Contractor’s and Subcontractors’ insurance policy(s) shall be primary and non-contributory to any insurance or self-insurance maintained by District, its trustees, employees and/or agents, the State of California, Construction Manager(s), Project Manager(s), Inspector(s), and/or Architect(s).

13.1.7.2.6 Contractor’s insurance limit shall apply separately to each insured against whom a claim is made or suit is brought.

13.1.7.3 No policy shall be amended, canceled or modified, and the coverage amounts shall not be reduced, until Contractor or Contractor’s broker has provided written notice to District, Architect(s), and Construction Manager(s) stating date of the amendment, modification, cancellation or reduction, and a description of the change. Date of amendment, modification, cancellation or reduction may not be less than thirty (30) days after date of mailing notice.

13.1.7.4 Insurance written on a "claims made" basis shall be retroactive to a date that coincides with or precedes Contractor's commencement of Work, including subsequent policies purchased as renewals or replacements. Said policy is to be renewed by the Contractor and all Subcontractors for a period of five (5) years following completion of the Work or termination of this Agreement. Such insurance must have the same coverage and limits as the policy that was in effect during the term of this Agreement, and will cover the Contractor and all Subcontractors for all claims made.

13.1.7.5 Unless otherwise stated in the Special Conditions, all of Contractor's insurance shall be with insurance companies with an A.M. Best rating of no less than **A: VII**.

13.1.7.6 The insurance requirements set forth herein shall in no way limit the Contractor's liability arising out of or relating to the performance of the Work or related activities.

13.1.7.7 Failure of Contractor and/or its Subcontractor(s) to comply with the insurance requirements herein shall be deemed a material breach of the Contract.

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13.1.8 Insurance Policy Limits

13.1.8.1 Unless different limits are indicated in the Special Conditions, the limits of insurance shall not be less than the following amounts:

| | | |
|--|---|--|
| Commercial General Liability | Product Liability and Completed Operations, Fire Damage Liability – Split Limit | \$2,000,000 per occurrence; \$4,000,000 aggregate |
| Automobile Liability – Any Auto | Combined Single Limit | Personal vehicles: \$500,000 Commercial vehicles: \$1,000,000 |
| Workers’ Compensation | | Statutory limits pursuant to State law |
| Employer’s Liability | | \$1,000,000 |
| Builder’s Risk (Course of Construction) | | Issued for the value and scope of Work indicated herein |
| Pollution Liability | | \$1,000,000 per claim; \$2,000,000 aggregate |

13.1.8.2 If Contractor normally carries insurance in an amount greater than the minimum amounts required by District, that greater amount shall become the minimum required amount of insurance for purposes of the Contract. Therefore, Contractor hereby acknowledges and agrees that all insurance carried by it shall be deemed liability coverage for all actions it performs in connection with the Contract.

13.2 Contract Security - Bonds

13.2.1 Contractor shall furnish two surety bonds issued by a California admitted surety insurer as follows:

13.2.1.1 Performance Bond: A bond in an amount at least equal to one hundred percent (100%) of Contract Price as security for faithful performance of this Contract.

13.2.1.2 Payment Bond: A bond in an amount at least equal to one hundred percent (100%) of the Contract Price as security for payment of persons performing labor and/or furnishing materials in connection with this Contract.

13.2.2 Cost of bonds shall be included in the Bid and Contract Price.

13.2.3 All bonds related to this Project shall be in the forms set forth in these Contract Documents and shall comply with all requirements of the Contract Documents, including, without limitation, the bond forms.

14. WARRANTY/GUARANTEE/INDEMNITY

14.1 Warranty/Guarantee

14.1.1 The Contractor shall obtain and preserve for the benefit of the District, manufacturer's warranties on materials, fixtures, and equipment incorporated into the Work.

14.1.2 In addition to guarantees required elsewhere, Contractor shall, and hereby does guarantee and warrant all Work furnished on the job against all defects for a period of **TWO (2)** years after the later of the following dates, unless a longer period is provided for in the Contract Documents:

14.1.2.1 The acceptance by the District's governing board of the Work, subject to these General Conditions, or

14.1.2.2 The date that commissioning for the Project, if any, was completed.

At the District's sole option, Contractor shall repair or replace any and all of that Work, together with any other Work that may be displaced in so doing, that may prove defective in workmanship and/or materials within a **TWO (2)** year period from date of completion as defined above, unless a longer period is provided for in the Contract Documents, without expense whatsoever to District. In the event of failure of Contractor and/or Surety to commence and pursue with diligence said replacements or repairs within ten (10) days after being notified in writing, Contractor and Surety hereby acknowledge and agree that District is authorized to proceed to have defects repaired and made good at expense of Contractor and/or Surety who hereby agree to pay costs and charges therefore immediately on demand.

14.1.3 If, in the opinion of District, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to District or to prevent interruption of District operations, District will attempt to give the notice required above. If Contractor or Surety cannot be contacted or neither complies with District's request for correction within a reasonable time as determined by District, District may, notwithstanding the above provision, proceed to make any and all corrections and/or provide attentions the District believes are necessary. The costs of correction or attention shall be charged against Contractor and Surety of the guarantees provided in this Article or elsewhere in this Contract.

14.1.4 The above provisions do not in any way limit the guarantees on any items for which a longer guarantee is specified or on any items for which a manufacturer gives a guarantee for a longer period. Contractor shall furnish to District all appropriate guarantee or warranty certificates as indicated in the Specifications or upon request by District.

14.1.5 Nothing herein shall limit any other rights or remedies available to District.

14.2 Indemnity and Defense

14.2.1 To the furthest extent permitted by California law, the Contractor shall indemnify, keep and hold harmless the District, the Architect(s), and the Construction Manager(s), their respective consultants, separate contractors, board members, officers, representatives, agents, and employees, in both individual and official capacities ("Indemnitees"), against all suits, claims, injury, damages, losses, and expenses ("Claims"), including but not limited to attorney's fees, caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, the Contractor's indemnification and hold harmless obligation shall be reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent the Claim(s) is/are caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. This indemnification and hold harmless obligation of the Contractor shall not be construed to negate, abridge, or otherwise reduce any right or obligation of indemnity that would otherwise exist or arise as to any Indemnitee or other person described herein. This indemnification and hold harmless obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR.

14.2.2 To the furthest extent permitted by California law, Contractor shall also defend Indemnitees, at its own expense, including but not limited to attorneys' fees and costs, against all Claims caused by, arising out of, resulting from, or incidental to, in whole or in part, the performance of the Work under this Contract by the Contractor, its Subcontractors, vendors, or suppliers. However, without impacting Contractor's obligation to provide an immediate and ongoing defense of Indemnitees, the Contractor's defense obligation shall be retroactively reduced by the proportion of the Indemnitees' and/or Architect's liability to the extent caused by the sole negligence, active negligence, or willful misconduct of the Indemnitees, and/or defects in design furnished by the Architect, as found by a court or arbitrator of competent jurisdiction. The District shall have the right to accept or reject any legal representation that Contractor proposes to defend the Indemnitees. If any Indemnitee provides its own defense due to failure to timely respond to tender of defense, rejection of tender of defense, or conflict of interest of proposed counsel, Contractor shall reimburse such Indemnitee for any expenditures. Contractor's defense obligation shall not be construed to negate, abridge, or otherwise reduce any right or obligation of defense that would otherwise exist as to any Indemnitee or other person described herein. Contractor's defense obligation includes, but is not limited to, any failure or alleged failure by Contractor to comply with any provision of law, any failure or alleged failure to timely and properly fulfill all of its obligations under the Contract Documents in strict accordance with their terms, and without limitation, any failure or alleged failure of Contractor's obligations regarding any stop payment notice actions or liens, including Civil Wage and Penalty Assessments and/or Orders by the DIR. The Contractor shall give prompt notice to the District in the event of any Claim(s).

14.2.3 Without limitation of the provisions herein, if the Contractor's obligation to indemnify and hold harmless the Indemnitees or its obligation to defend Indemnitees as provided herein shall be determined to be void or unenforceable, in whole or in part, it is the intention of the parties that these circumstances shall not otherwise affect the validity or enforceability of the Contractor's agreement to indemnify, defend, and hold harmless the rest of the Indemnitees, as provided herein. Further, the Contractor shall be and remain fully liable on its agreements and obligations herein to the fullest extent permitted by law.

14.2.4 Pursuant to Public Contract Code section 9201, the District shall provide timely notification to Contractor of the receipt of any third-party Claim relating to this Contract. The District shall be entitled to recover its reasonable costs incurred in providing said notification.

14.2.5 In any and all Claims against any of the Indemnitees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the Contractor's indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

14.2.6 The District may retain so much of the moneys due the Contractor as shall be considered necessary, until disposition of any such Claims or until the District, Architect(s) and Construction Manager(s) have received written agreement from the Contractor that they will unconditionally defend the District, Architect(s) and Construction Manager(s), their respective officers, agents and employees, and pay any damages due by reason of settlement or judgment.

14.2.7 The Contractor's defense and indemnification obligations hereunder shall survive the completion of Work, the warranty/guarantee period, and the termination of the Contract.

15. TIME

15.1 Notice to Proceed

15.1.1 District may issue a Notice to Proceed within ninety (90) days from the date of the Notice of Award. Once Contractor has received the Notice to Proceed, Contractor shall complete the Work within the period of time indicated in the Contract Documents.

15.1.2 In the event that the District desires to postpone issuing the Notice to Proceed beyond ninety (90) days from the date of the Notice of Award, it is expressly understood that with reasonable notice to the Contractor, the District may postpone issuing the Notice to Proceed. It is further expressly understood by Contractor that Contractor shall not be entitled to any claim of additional compensation as a result of the postponement of the issuance of the Notice to Proceed.

15.1.3 If the Contractor believes that a postponement of issuance of the Notice to Proceed will cause a hardship to Contractor, Contractor may terminate the Contract. Contractor's termination due to a postponement shall be by written notice to District

within ten (10) days after receipt by Contractor of District's notice of postponement. It is further understood by Contractor that in the event that Contractor terminates the Contract as a result of postponement by the District, the District shall only be obligated to pay Contractor for the Work that Contractor had performed at the time of notification of postponement. Should Contractor terminate the Contract as a result of a notice of postponement, District shall have the authority to award the Contract to the next lowest responsive responsible bidder.

15.2 Computation of Time / Adverse Weather

15.2.1 The Contractor will only be allowed a time extension for Adverse Weather conditions if requested by Contractor in compliance with the time extension request procedures and only if all the following conditions are met:

15.2.1.1 The weather conditions constitute Adverse Weather, as defined herein;

15.2.1.2 Contractor can verify that the Adverse Weather caused delays in excess of five (5) hours of the indicated labor required to complete the scheduled tasks of Work on the day affected by the Adverse Weather;

15.2.1.3 The Contractor’s crew is dismissed as a result of the Adverse Weather;

15.2.1.4 Said delay adversely affects the critical path in the Construction Schedule; and

15.2.1.5 The number of days of Adverse Weather exceeds the following parameters:

| | | | |
|----------|-----------|-----------|----------|
| January | <u>10</u> | July | <u>0</u> |
| February | <u>8</u> | August | <u>0</u> |
| March | <u>7</u> | September | <u>0</u> |
| April | <u>4</u> | October | <u>4</u> |
| May | <u>2</u> | November | <u>6</u> |
| June | <u>0</u> | December | <u>8</u> |

15.2.2 If the aforementioned conditions are met, a non-compensable day-for-day extension will only be allowed for those days in excess of those indicated herein.

15.2.3 The Contractor shall work seven (7) days per week, if necessary, irrespective of inclement weather, to maintain access and the Construction Schedule, and to protect the Work under construction from the effects of Adverse Weather, all at no further cost to the District.

15.2.4 The Contract Time has been determined with consideration given to the average climate weather conditions prevailing in the County in which the Project is located.

15.3 Hours of Work

15.3.1 Sufficient Forces

Contractor and Subcontractors shall continuously furnish sufficient and competent work forces with the required levels of familiarity with the Project and skill, training and experience to ensure the prosecution of the Work in accordance with the Construction Schedule.

15.3.2 Performance During Working Hours

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

15.3.3 No Work during State Testing

Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests. The District or District's Representative will provide Contractor with a schedule of test dates concurrent with the District's issuance of the Notice to Proceed, or as soon as test dates are made available to the District.

15.4 Progress and Completion

15.4.1 Time of the Essence

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

15.4.2 No Commencement Without Insurance or Bonds

The Contractor shall not commence operations on the Project or elsewhere prior to the effective date of insurance and bonds. The date of commencement of the Work shall not be changed by the effective date of such insurance or bonds. If Contractor commences Work without insurance and bonds, all Work is performed at Contractor's peril and shall not be compensable until and unless Contractor secures bonds and insurance pursuant to the terms of the Contract Documents and subject to District claim for damages.

15.5 Schedule

Contractor shall provide to District, Construction Manager, and Architect a schedule in conformance with the Contract Documents and as required in the Notice to Proceed and the Contractor's Submittals and Schedules section of these General Conditions.

15.6 Expeditious Completion

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

16. EXTENSIONS OF TIME – LIQUIDATED DAMAGES

16.1 Liquidated Damages

Contractor and District hereby agree that the exact amount of damages for failure to complete the Work within the time specified is extremely difficult or impossible to determine. If the Work is not completed within the time specified in the Contract Documents, it is understood that the District will suffer damage. It being impractical and unfeasible to determine the amount of actual damage, it is agreed the Contractor shall pay to District as fixed and liquidated damages, and not as a penalty, the amount set forth in the Agreement for each calendar day of delay in completion. Contractor and its Surety shall be liable for the amount thereof pursuant to Government Code section 53069.85.

16.2 Excusable Delay

16.2.1 Contractor shall not be charged for liquidated damages because of any delays in completion of the Work which are not the fault of Contractor or its Subcontractors, including acts of God as defined in Public Contract Code section 7105, acts of enemy, epidemics, and quarantine restrictions. Contractor shall, within five (5) calendar days of beginning of any delay, notify District in writing of causes of delay including documentation and facts explaining the delay and the direct correlation between the cause and effect. District shall review the facts and extent of any delay and shall grant extension(s) of time for completing Work when, in its judgment, the findings of fact justify an extension. Extension(s) of time shall apply only to that portion of Work affected by delay, and shall not apply to other portions of Work not so affected. An extension of time may only be granted if Contractor has timely submitted the Construction Schedule as required herein.

16.2.2 Contractor shall notify the District pursuant to the claims provisions in these General Conditions of any anticipated delay and its cause. Following submission of a claim, the District may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the Work might be delayed thereby.

16.2.3 In the event the Contractor requests an extension of Contract Time for unavoidable delay, such request shall be submitted in accordance with the provisions in the Contract Documents governing changes in Work. When requesting time, requests must be submitted with full justification and documentation. If the Contractor fails to submit justification, it waives its right to a time extension at a later date. Such justification must be based on the official Construction Schedule as updated at the time of occurrence of the delay or execution of Work related to any changes to the Scope of Work. Any claim for delay must include the following information as support, without limitation:

16.2.3.1 The duration of the activity relating to the changes in the Work and the resources (manpower, equipment, material, etc.) required to perform the activities within the stated duration.

16.2.3.2 Specific logical ties to the Contract Schedule for the proposed changes and/or delay showing the activity/activities in the Construction Schedule that are affected by the change and/or delay. In particular, Contractor must show an actual impact to the schedule, after making a good faith effort to mitigate the delay by rescheduling the work, by providing an analysis of the schedule ("Time Impact Analysis"). Such Time Impact Analysis shall describe in detail the cause and effect of the delay and the impact on the critical dates in the Project schedule. (A portion of any delay of seven (7) days or more must be provided.)

16.2.3.3 A recovery schedule must be submitted within twenty (20) calendar days of written notification to the District of causes of delay.

16.3 No Additional Compensation for Delays Within Contractor's Control

16.3.1 Contractor is aware that governmental agencies, including, without limitation, the Division of the State Architect, the Department of General Services, gas companies, electrical utility companies, water districts, and other agencies may have to approve Contractor-prepared drawings or approve a proposed installation. Accordingly, Contractor shall include in its bid, time for possible review of its drawings and for reasonable delays and damages that may be caused by such agencies. Thus, Contractor is not entitled to make a claim for damages or delays arising from the review of Contractor's drawings.

16.3.2 Contractor shall only be entitled to compensation for delay when all of the following conditions are met:

16.3.2.1 The District is responsible for the delay;

16.3.2.2 The delay is unreasonable under the circumstances involved;

16.3.2.3 The delay was not within the contemplation of the District and Contractor;

16.3.2.4 The delay could not have been avoided or mitigated by Contractor's reasonable diligence; and

16.3.2.5 Contractor timely complies with the claims procedure of the Contract Documents.

16.3.3 Where a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct costs, provided that Contractor can demonstrate such additional costs are:

16.3.3.1 Actually incurred performing the Work;

16.3.3.2 Not compensated by the Markup allowed; and

16.3.3.3 Directly result from the extended Contract Time.

Contractor shall comply with all required procedures, documentation and time requirements in the Contract Documents. Contractor may not seek or recover such costs using formulas (e.g. Eichleay, labor factors).

16.4 Float or Slack in the Schedule

Float or slack is the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule. Float or slack is not for the exclusive use of or benefit of either the District or the Contractor, but its use shall be determined solely by the District.

17. CHANGES IN THE WORK

17.1 No Changes Without Authorization

17.1.1 There shall be no change whatsoever in the Drawings, Specifications, or in the Work without an executed Change Order or a written Construction Change Directive authorized by the District as herein provided. District shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the District's governing board has authorized the same and the cost thereof has been approved in writing by Change Order or Construction Change Directive in advance of the changed Work being performed. 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 and approved in writing in the Change Order or Construction Change Directive. Contractor shall be responsible for any costs incurred by the District for professional services and DSA fees and/or delay to the Project Schedule, if any, for DSA to review any request for changes to the DSA approved plans and specifications for the convenience of the Contractor and/or to accommodate the Contractor's means and methods. 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.

17.1.2 Contractor shall perform immediately all work that has been authorized by a fully executed Change Order or Construction Change Directive. Contractor shall be fully responsible for any and all delays and/or expenses caused by Contractor's failure to expeditiously perform this Work.

17.1.3 Should any Change Order result in an increase in the Contract Price or extend the Contract Time, the cost of or length of extension in that Change Order shall be agreed to, in writing, by the District in advance of the Work by Contractor, and shall be subject to the monetary limitations set forth in Public Contract Code section 20118.4. In the event that Contractor proceeds with any change in Work without a Change Order executed by the District or Construction Change Directive, Contractor waives any claim of additional compensation or time for that additional work. Under no circumstances shall Contractor be entitled to any claim of additional compensation or time not expressly requested by Contractor in a Proposed Change Order or approved by District in an executed Change Order.

17.1.4 A Change Order or Construction Change Directive will become effective when approved by the Board, notwithstanding that Contractor has not signed it. A Change Order or Construction Change Directive will become effective without

Contractor's signature provided District indicates it as a "Unilateral Change Order". Any dispute as to the adjustment in the Contract Price or Contract Time, if any, of the Unilateral Change Order shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

17.1.5 Contractor understands, acknowledges, and agrees that the reason for District authorization is so that District may have an opportunity to analyze the Work and decide whether the District shall proceed with the Change Order or alter the Project so that a change in Work becomes unnecessary.

17.2 Architect Authority

The Architect will have authority to order minor changes in the Work not involving any adjustment in the Contract Price, or an extension of the Contract Time, or a change that is inconsistent with the intent of the Contract Documents. These changes shall be effected by written Change Order, Construction Change Directive, by Architect's response(s) to RFI(s), or by Architect's Supplemental Instructions ("ASI").

17.3 Change Orders

17.3.1 A Change Order is a written instrument prepared and issued by the District and/or the Architect and signed by the District (as authorized by the District's Governing Board), the Contractor, the Architect, and approved by the Project Inspector (if necessary) and DSA (if necessary), stating their agreement regarding all of the following:

17.3.1.1 A description of a change in the Work;

17.3.1.2 The amount of the adjustment in the Contract Price, if any; and

17.3.1.3 The extent of the adjustment in the Contract Time, if any.

17.4 Allowance Expenditure Draw/Construction Change Directives

17.4.1 A Allowance Expenditure Draw/Construction Change Directive is a written order prepared and issued by the District, the Construction Manager, and/or the Architect and signed by the District and the Architect, directing a change in the Work. The District may, as provided by law, by Allowance Expenditure Draw/Construction Change Directive and without invalidating the Contract, order changes in the Work consisting of additions, deletions, or other revisions. The adjustment to the Contract Price or Time, if any, is subject to the provisions of this section regarding Changes in the Work. If all or a portion of the Project is being funded by funds requiring approval by the State Allocation Board ("SAB"), these revisions may be subject to compensation once approval of same is received and funded by the SAB, and funds are released by the Office of Public School Construction ("OPSC"). Any dispute as to the adjustment in the Contract Price, if any, of the Allowance Expenditure Draw/Construction Change Directive or timing of payment shall be resolved pursuant to the Payment and Claims and Disputes provisions herein.

17.4.2 The District may issue a Allowance Expenditure Draw/Construction Change Directive in the absence of agreement on the terms of a Change Order.

17.5 Force Account Directives

17.5.1 When work, for which a definite price has not been agreed upon in advance, is to be paid for on a force account basis, all direct costs necessarily incurred and paid by the Contractor for labor, material, and equipment used in the performance of that Work, shall be subject to the approval of the District and compensation will be determined as set forth herein.

17.5.2 The District will issue a Force Account Directive to proceed with the Work on a force account basis, and a not-to-exceed budget will be established by the District.

17.5.3 All requirements regarding direct cost for labor, labor burden, material, equipment, and markups on direct costs for overhead and profit described in this section shall apply to Force Account Directives. However, the District will only pay for actual costs verified in the field by the District or its authorized representative(s) on a daily basis.

17.5.4 The Contractor shall be responsible for all cost related to the administration of Force Account Directive. The markup for overhead and profit for Contractor modifications shall be full compensation to the Contractor to administer Force Account Directive, and Contractor shall not be entitled to separately recover additional amounts for overhead and/or profit.

17.5.5 The Contractor shall notify the District or its authorized representative(s) at least twenty-four (24) hours prior to proceeding with any of the force account work. Furthermore, the Contractor shall notify the District when it has consumed eighty percent (80%) of the budget, and shall not exceed the budget unless specifically authorized in writing by the District. The Contractor will not be compensated for force account work in the event that the Contractor fails to timely notify the District regarding the commencement of force account work, or exceeding the force account budget.

17.5.6 The Contractor shall diligently proceed with the work, and on a daily basis, submit a daily force account report using Document 00 63 47, "Daily Force Account Report," no later than 5:00 p.m. each day. The report shall contain a detailed itemization of the daily labor, material, and equipment used on the force account work only. The names of the individuals performing the force account work shall be included on the daily force account reports. The type and model of equipment shall be identified and listed. The District will review the information contained in the reports, and sign the reports no later than the next work day, and return a copy of the report to the Contractor for their records. The District will not sign, nor will the Contractor receive compensation for work the District cannot verify. The Contractor will provide a weekly force account summary indicating the status of each Force Account Directive in terms of percent complete of the not-to-exceed budget and the estimated percent complete of the work.

17.5.7 In the event the Contractor and the District reach a written agreement on a set cost for the work while the work is proceeding based on a Force Account Directive, the Contractor's signed daily force account reports shall be discontinued and all previously signed reports shall be invalid.

17.6 Price Request

17.6.1 Definition of Price Request

A Price Request is a written request prepared by the Architect requesting the Contractor to submit to the District and the Architect an estimate of the effect of a proposed change in the Work on the Contract Price and the Contract Time.

17.6.2 Scope of Price Request

A Price Request shall contain adequate information, including any necessary Drawings and Specifications, to enable Contractor to provide the cost breakdowns required herein. The Contractor shall not be entitled to any additional compensation for preparing a response to a Price Request, whether ultimately accepted or not.

17.7 Proposed Change Order

17.7.1 Definition of Proposed Change Order

A Proposed Change Order ("PCO") is a written request prepared by the Contractor requesting that the District and the Architect issue a Change Order based upon a proposed change to the Work.

17.7.2 Changes in Contract Price

A PCO shall include breakdowns and backup documentation pursuant to the revisions herein and sufficient, in the District's judgment, to validate any change in Contract Price. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional compensation for Change Order Work.

17.7.3 Changes in Time

A PCO shall also include any changes in 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 Construction Schedule as defined in the Contract Documents. The Contractor shall justify the proposed change in time by submittal of a schedule analysis that accurately shows the impact of the change on the critical path of the Construction Schedule ("Time Impact Analysis"). If Contractor fails to request a time extension in a PCO, including the Time Impact Analysis, then the Contractor is thereafter precluded from requesting, and waives any right to request, additional time and/or claim a delay. In no case shall Contractor or any of its Subcontractors be permitted to reserve rights for additional time for Change Order Work. A PCO that leaves the amount of time requested blank, or states that such time requested is "to be determined", is not permitted and shall also constitute a waiver of any right to request additional time and/or claim a delay.

17.7.4 Unknown and/or Unforeseen Conditions

If there is an Allowance, then Contractor must submit a Request for Allowance Expenditure Directive, including supporting documentation as described below, to receive authorization for the release of funds from the Allowance. Allowance Expenditure Directives shall be based on Contractor's costs, without overhead and

profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from this Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive. If cost of the unforeseen condition(s) exceed the Allowance, Contractor must submit a PCO for amounts in excess of the Allowance requesting an increase in Contract Price and/or Contract Time that is based at least partially on Contractor's assertion that Contractor has encountered unknown and/or unforeseen condition(s) on the Project, then Contractor shall base the PCO on provable information that, beyond a reasonable doubt and to the District's satisfaction, demonstrates that the unknown and/or unforeseen condition(s) were actually unknown and/or unforeseen and that the condition(s) were reasonably unknown and/or unforeseen. If not, the District shall deny the PCO as unsubstantiated, and the Contractor shall complete the Project without any increase in Contract Price and/or Contract Time based on that PCO.

17.7.5 Time to Submit Proposed Change Order

Contractor shall submit its PCO within five (5) working days of the date Contractor discovers, or reasonably should have discovered, the circumstances giving rise to the PCO, unless additional time to submit a PCO is granted in writing by the District. Time is of the essence in Contractor's submission of PCOs so that the District can promptly investigate the basis for the PCO. Accordingly, if Contractor fails to submit its PCO within this timeframe, Contractor waives, releases, and discharges any right to assert or claim any entitlement to an adjustment of the Contract Price and/or Time based on circumstances giving rise to the PCO.

17.7.6 Proposed Change Order Certification

In submitting a PCO, Contractor certifies and affirms that the cost and/or time request is submitted in good faith, that the cost and/or time request is accurate and in accordance with the provisions of the Contract Documents, and the Contractor submits the cost and/or request for extension of time recognizing the significant civil penalties and treble damages which follow from making a false claim or presenting a false claim under Government Code section 12650 et seq.

It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

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17.8 Format for Proposed Change Order

17.8.1 The following format shall be used as applicable by the District and the Contractor (e.g. Change Orders, PCO’s) to communicate proposed additions and deductions to the Contract, supported by attached documentation. Any spaces left blank will be deemed no change to cost or time.

| | <u>WORK PERFORMED OTHER THAN BY CONTRACTOR</u> | <u>ADD</u> | <u>DEDUCT</u> |
|-----|--|--------------------------|----------------------|
| (a) | <u>Material</u> (attach suppliers’ invoice or itemized quantity and unit cost plus sales tax) | | |
| (b) | <u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.) | | |
| (c) | <u>Add Equipment</u> (attach suppliers’ invoice) | | |
| (d) | <u>Subtotal</u> | | |
| (e) | <u>Add Overhead and Profit for any and all tiers of Subcontractor</u> , the total not to exceed ten percent (10%) of Item (d) | | |
| (f) | <u>Subtotal</u> | | |
| (g) | <u>Add General Conditions Cost</u> (if Time is Compensable) (attach supporting documentation) | | |
| (h) | <u>Subtotal</u> | | |
| (i) | <u>Add Overhead and Profit for Contractor</u> , not to exceed five percent (5%) of Item (h) | | |
| (j) | <u>Subtotal</u> | | |
| (k) | <u>Add Bond and Insurance</u>, not to exceed two percent (2%) of Item (j) | | |
| (l) | <u>TOTAL</u> | | |
| (m) | <u>Time</u> (zero unless indicated; “TBD” not permitted) | ___ Calendar Days | |

| | <u>WORK PERFORMED BY CONTRACTOR</u> | <u>ADD</u> | <u>DEDUCT</u> |
|-----|--|--------------------------|----------------------|
| (n) | <u>Material</u> (attach itemized quantity and unit cost plus sales tax) | | |
| (o) | <u>Add Labor</u> (attach itemized hours and rates, fully Burdened, and specify the hourly rate for each additional labor burden, for example, payroll taxes, fringe benefits, etc.) | | |
| (p) | <u>Add Equipment</u> (attach suppliers’ invoice) | | |
| (q) | <u>Add General Conditions Cost</u> (if Time is Compensable) (attach supporting documentation) | | |
| (r) | <u>Subtotal</u> | | |
| (s) | <u>Add Overhead and Profit for Contractor</u> , not to exceed fifteen percent (15%) of Item (e) | | |
| (t) | <u>Subtotal</u> | | |
| (u) | <u>TOTAL</u> | | |
| (v) | <u>Time</u> (zero unless indicated; “TBD” not permitted) | ___ Calendar Days | |

17.8.2 Labor.

Contractor shall be compensated for the costs of labor actually and directly utilized in the performance of the Work. Such labor costs shall be the actual cost, use of any formulas (e.g. labor factors) is not allowed, not to exceed prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Work, fully Burdened. Labor costs shall exclude costs incurred by the Contractor in preparing estimate(s) of the costs of the change in the Work, in the maintenance of records relating to the costs of the change in the Work, coordination and assembly of materials and information relating to the change in the Work or performance thereof, or the supervision and other overhead and general conditions costs associated with the change in the Work or performance thereof, including but not limited to the cost for the job superintendent. If applicable, District will pay Contractor the reasonable costs for room and board, supported with appropriate backup documentation, without markup for profit or overhead as provided by U.S. General Services Administration per diem rates for California lodging, meals and incidentals, <https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup>.

17.8.3 Materials.

Contractor shall be compensated for the costs of materials necessarily and actually used or consumed in connection with the performance of the change in the Work. Costs of materials may include reasonable costs of transportation from a source closest to the Site of the Work and delivery to the Site. If discounts by material suppliers are available for materials necessarily used in the performance of the change in the Work, they shall be credited to the District. If materials necessarily used in the performance of the change in the Work are obtained from a supplier or source owned in whole or in part by the Contractor, compensation therefor shall not exceed the current wholesale price for such materials. If, in the reasonable opinion of the District, the costs asserted by the Contractor for materials in connection with any change in the Work are excessive, or if the Contractor fails to provide satisfactory evidence of the actual costs of such materials from its supplier or vendor of the same, the costs of such materials and the District's obligation to pay for the same shall be limited to the then lowest wholesale price at which similar materials are available in the quantities required to perform the change in the Work. The District may elect to furnish materials for the change in the Work, in which event the Contractor shall not be compensated for the costs of furnishing such materials or any mark-up thereon.

17.8.4 Equipment.

As a precondition to the District's duty to pay for Equipment rental or loading and transportation, Contractor shall provide satisfactory evidence of the actual costs of Equipment from the supplier, vendor or rental agency of same. Contractor shall be compensated for the actual cost of the necessary and direct use of Equipment in the performance of the change in the Work. Use of such Equipment in the performance of the change in the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Equipment moved by its own power shall include time required to move such Equipment to the site of the Work from the nearest available rental source of the same. If Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of

rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Equipment is used for performance of any portion of the Work other than the change in the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, the Project Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. Contractor shall not be entitled to an allowance or any other compensation for Equipment or tools used in the performance of change in the Work where such Equipment or tools have a replacement value of \$500.00 or less. Equipment costs claimed by the Contractor in connection with the performance of any Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the Project Inspector and the District, the allowable rate for the use of Equipment in connection with the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Equipment operator), and any and all other costs incurred by the Contractor incidental to the use of such Equipment.

17.8.5 General Conditions Cost.

The phrase "General Conditions Cost" shall mean, other than expressly limited or excluded herein, the costs of Contractor during the construction phase, including but not limited to: payroll costs for project manager for Work conducted at the Site, payroll costs for the superintendent and full-time general foremen, workers not included as direct labor costs engaged in support functions (e.g., loading/unloading, clean-up), costs of offices and temporary facilities including office materials, office supplies, office equipment, minor expenses, utilities, fuel, sanitary facilities and telephone services at the Site, costs of consultants not in the direct employ of Contractor or Subcontractors, and fees for permits and licenses.

17.8.6 Overhead and Profit.

The phrase "Overhead and Profit" shall include field and office supervisors and assistants, watchperson, use of small tools, consumable, insurance other than construction bonds and insurance required herein, general conditions costs and home office expenses.

17.9 Change Order Certification

17.9.1 All Change Orders and PCOs include the following certification by the Contractor, either in the form specifically or incorporated by this reference:

17.9.1.1 The undersigned Contractor approves the foregoing as to the changes, if any, to the Contract Price specified for each item, and as to the extension of time allowed, if any, for completion of the entire Work as stated herein, and agrees to furnish all labor, materials, and service, and perform all work necessary to complete any additional work specified for the consideration stated herein. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq. It is understood that

the changes herein to the Contract shall only be effective when approved by the governing board of the District.

17.9.1.2 It is expressly understood that the value of the extra Work or changes expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from additional time required on the Project or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor is not entitled to separately recover amounts for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

17.9.2 Accord and Satisfaction: Contractor's execution of any Change Order shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim.

17.10 Determination of Change Order Cost

17.10.1 The amount of the increase or decrease in the Contract Price from a Change Order, if any, shall be determined in one or more of the following ways as applicable to a specific situation and at the District's discretion:

17.10.1.1 District acceptance of a PCO;

17.10.1.2 By unit prices contained in Contractor's original bid;

17.10.1.3 By agreement between District and Contractor.

17.11 Deductive Change Orders

All deductive Change Order(s) must be prepared pursuant to the provisions herein. Where a portion of the Work is deleted from the Contract, the reasonable value of the deducted work less the value of work performed shall be considered the appropriate deduction. The value submitted on the Schedule of Values shall be used to calculate the credit amount unless the bid documentation is being held in escrow as part of the Contract Documents. Unit Prices, if any, may be used in District's discretion in calculating reasonable value. If Contractor offers a proposed amount for a deductive Change Order(s), Contractor shall include a minimum of five percent (5%) total profit and overhead to be deducted with the amount of the work of the Change Order(s). If Subcontractor work is involved, Subcontractors shall also include a minimum of five percent (5%) profit and overhead to be deducted with the amount of its deducted work. Any deviation from this provision shall not be allowed.

17.12 Addition or Deletion of Alternate Bid Item(s)

If the Bid Form and Proposal includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect to add or delete any such Alternate Bid Item(s) if not included in the Contract at the time of award. If the District elects to add or delete Alternate Bid Item(s) after Contract award, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Bid Form and Proposal unless the

parties agree to a different price and the Contract Time shall be adjusted by the number of days allocated in the Contract Documents. If days are not allocated in the Contract Documents, the Contract Time shall be equitably adjusted.

17.13 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 omission in the Work as provided herein.

17.14 Accounting Records

With respect to portions of the Work performed by Change Orders and Construction Change Directives, the Contractor shall keep and maintain cost-accounting records satisfactory to the District, including, without limitation, Job Cost Reports as provided in these General Conditions, which shall be available to the District on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents. Such records shall include without limitation hourly records for Labor and Equipment and itemized records of materials and Equipment used that day in connection with the performance of any Work. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect or the Project Inspector upon request. In the event that the Contractor fails or refuses, for any reason, to maintain or make available for inspection, review and/or reproduction such records, the District's reasonable good faith determination of the extent of adjustment to the Contract Price shall be final, conclusive, dispositive and binding upon Contractor.

17.15 Notice Required

If the Contractor desires to make a claim for an increase in the Contract Price, or any extension in the Contract Time for completion, it shall notify the District pursuant to the provisions herein, including the Article on Claims and Disputes. No claim shall be considered unless made in accordance with this subparagraph. Contractor shall proceed to execute the Work even though the adjustment may not have been agreed upon. Any change in the Contract Price or extension of the Contract Time resulting from such claim shall be authorized by a Change Order.

17.16 Applicability to Subcontractors

Any requirements under this Article shall be equally applicable to Change Orders or Construction Change Directives issued to Subcontractors by the Contractor to the extent as required by the Contract Documents.

17.17 Alteration to Change Order Language

Contractor shall not alter Change Orders or reserve time in Change Orders. Change Orders altered in violation of this provision, if in conflict with the terms set forth herein, shall be construed in accordance with the terms set forth herein. Contractor shall

execute finalized Change Orders and proceed under the provisions herein with proper notice.

17.18 Failure of Contractor to Execute Change Order

Contractor shall be in default of the Contract if Contractor fails to execute a Change Order when the Contractor agrees with the addition and/or deletion of the Work in that Change Order.

18. REQUEST FOR INFORMATION

18.1 Any Request for Information shall reference all applicable Contract Document(s), including Specification section(s), detail(s), page number(s), drawing number(s), and sheet number(s), etc. The Contractor shall make suggestions and interpretations of the issue raised by each Request for Information. A Request for Information cannot modify the Contract Price, Contract Time, or the Contract Documents. Upon request by the District, Contractor shall provide an electronic copy of the Request for Information in addition to the hard copy.

18.2 The Contractor shall be responsible for any costs incurred for professional services that District may deduct from any amounts owing to the Contractor, if a Request for Information requests an interpretation or decision of a matter where the information sought is equally available to the party making the request. District, at its sole discretion, shall deduct from and/or invoice Contractor for all the professional services arising herein.

19. PAYMENTS

19.1 Contract Price

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

19.2 Applications for Progress Payments

19.2.1 Procedure for Applications for Progress Payments

19.2.1.1 Application for Progress Payment

19.2.1.1.1 Not before the fifth (5th) day of each calendar month during the progress of the Work, Contractor shall submit to the District and 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 each portion thereof unless waived by the District in writing:

19.2.1.1.1.1 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;

- 19.2.1.1.1.2 The amount being requested under 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;
- 19.2.1.1.1.3 The balance that will be due to each of such entities after said payment is made;
- 19.2.1.1.1.4 A certification that the As-Built Drawings and annotated Specifications are current;
- 19.2.1.1.1.5 Itemized breakdown of work done for the purpose of requesting partial payment;
- 19.2.1.1.1.6 An updated and acceptable construction schedule in conformance with the provisions herein;
- 19.2.1.1.1.7 The additions to and subtractions from the Contract Price and Contract Time;
- 19.2.1.1.1.8 A total of the retentions held;
- 19.2.1.1.1.9 Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the District may require from time to time;
- 19.2.1.1.1.10 The percentage of completion of the Contractor's Work by line item;
- 19.2.1.1.1.11 Schedule of Values updated from the preceding Application for Payment;
- 19.2.1.1.1.12 A duly completed and executed conditional waiver and release upon progress payment compliant with Civil Code section 8132 from the Contractor and each subcontractor of any tier and supplier to be paid from the current progress payment;
- 19.2.1.1.1.13 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134 from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payment(s); and

19.2.1.1.1.14 A certification by the Contractor of the following:

The Contractor warrants title to all Work performed as of the date of this payment application has been completed in accordance with the Contract Documents for the Project. The Contractor further warrants that all amounts have been paid for work which previous Certificates for Payment were issued and payments received and all Work performed as of the date of this payment application is free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, workers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work, except those of which the District has been informed. Submission of sums which have no basis in fact or which Contractor knows are false are at the sole risk of Contractor and may be a violation of the False Claims Act set forth under Government Code section 12650 et seq.

19.2.1.1.1.15 The Contractor shall be subject to the False Claims Act set forth in Government Code section 12650 et seq. for information provided with any Application for Progress Payment.

19.2.1.1.1.16 All remaining certified payroll records ("CPR(s)") for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work for the period of the Application for Payment. As indicated herein, the District shall not make any payment to Contractor until:

19.2.1.1.1.16.1 Contractor and/or its Subcontractor(s) provide electronic CPRs directly to the DIR on no less than every 30 days while Work is being performed and within 30 days after the final day of Work performed on the Project for any journeyman, apprentice, worker or other employee was employed in connection with the Work, or within ten (10) days of any request by the District or the DIR to the requesting entity, and

19.2.1.1.1.16.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs in a timely manner may directly delay the Contractor's payment.

19.2.1.1.2 Applications received after June 20th will not be paid until the second week of July and applications received after December 12th will not be paid until the first week of January.

19.2.2 Prerequisites for Progress Payments

19.2.2.1 First Payment Request: The following items, if applicable, must be completed before the District will accept and/or process the Contractor's first payment request:

19.2.2.1.1 Installation of the Project sign;

~~19.2.2.1.2 Installation of field office;~~

- 19.2.2.1.3 Installation of temporary facilities and fencing;
- 19.2.2.1.4 Schedule of Values;
- 19.2.2.1.5 Contractor's Construction Schedule;
- 19.2.2.1.6 Schedule of unit prices, if applicable;
- 19.2.2.1.7 Submittal Schedule;
- 19.2.2.1.8 Receipt by Architect of all submittals due as of the date of the payment application;
- 19.2.2.1.9 Copies of necessary permits;
- 19.2.2.1.10 Copies of authorizations and licenses from governing authorities;
- 19.2.2.1.11 Initial progress report;
- 19.2.2.1.12 Surveyor qualifications;
- 19.2.2.1.13 Written acceptance of District's survey of rough grading, if applicable;
- 19.2.2.1.14 List of all Subcontractors, with names, license numbers, telephone numbers, and Scope of Work;
- 19.2.2.1.15 All bonds and insurance endorsements; and
- 19.2.2.1.16 Resumes of Contractor's project manager, and if applicable, job site secretary, record documents recorder, and job site superintendent.

19.2.2.2 Second Payment Request:

The District will not process the second payment request until and unless all submittals and Shop Drawings have been accepted for review by the Architect.

19.2.2.3 No Waiver of Criteria:

Any payments made to Contractor where criteria set forth herein have not been met shall not constitute a waiver of said criteria by District. Instead, such payment shall be construed as a good faith effort by District to resolve differences so Contractor may pay its Subcontractors and suppliers. Contractor agrees that failure to submit such items may constitute a breach of contract by Contractor and may subject Contractor to termination.

19.3 Progress Payments

19.3.1 District's Approval of Application for Payment

19.3.1.1 Upon receipt of an Application for Payment, The District shall act in accordance with both of the following:

19.3.1.1.1 Each Application for Payment shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the Application for Payment is a proper Application for Payment.

19.3.1.1.2 Any Application for Payment determined not to be a proper Application for Payment suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) days, after receipt. An Application for Payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the Application for Payment is not proper. The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds this seven-day return requirement.

19.3.1.1.3 An Application for Payment shall be considered properly executed if funds are available for payment of the Application for Payment, and payment is not delayed due to an audit inquiry by the financial officer of the District.

19.3.1.2 The District's review of the Contractor's Application for Payment will be based on the District's and 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 District's and 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:

19.3.1.2.1 Observation of the Work for general conformance with the Contract Documents,

19.3.1.2.2 Results of subsequent tests and inspections,

19.3.1.2.3 Minor deviations from the Contract Documents correctable prior to completion, and

19.3.1.2.4 Specific qualifications expressed by the Architect.

19.3.1.3 District's approval of the certified Application for Payment shall be based on Contractor complying with all requirements for a fully complete and valid certified Application for Payment.

19.3.2 Payments to Contractor

19.3.2.1 Within thirty (30) days after approval of the Application for Payment, Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of the Work performed (as verified by Architect and Inspector and certified by Contractor) up to the last day of the previous month, less the aggregate of previous payments and amount to be withheld. The value of the Work completed shall be Contractor's best estimate. No inaccuracy or error in said estimate shall operate to release the Contractor, or any Surety upon any bond, from damages

arising from such Work, or from the District's right to enforce each and every provision of this Contract, and the District shall have the right subsequently to correct any error made in any estimate for payment.

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

19.3.2.3 If the District fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted Application for Payment from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

19.3.3 No Waiver

No payment by District hereunder shall be interpreted so as to imply that District has inspected, approved, or accepted any part of the Work. Notwithstanding any payment, the District may enforce each and every provision of this Contract. The District may correct or require correction of any error subsequent to any payment.

19.4 Decisions to Withhold Payment

19.4.1 Reasons to Withhold Payment

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

19.4.1.1 Defective Work not remedied within **FORTY-EIGHT (48)** hours of written notice to Contractor.

19.4.1.2 Stop Payment Notices or other liens served upon the District as a result of the Contract. Contractor agrees that the District may withhold up to 125% of the amount claimed in the Stop Payment Notice to answer the claim and to provide for the District's reasonable cost of any litigation pursuant to the stop payment notice.

19.4.1.3 Written notice to withhold payment from Contractor by payment and/or performance bond surety(ies).

19.4.1.4 Liquidated damages assessed against the Contractor.

19.4.1.5 The cost of completion of the Contract if there exists a reasonable doubt that the Work can be completed for the unpaid balance of the Contract Price or by the completion date.

19.4.1.6 Damage to the District or other contractor(s).

19.4.1.7 Unsatisfactory prosecution of the Work by the Contractor.

19.4.1.8 Failure to store and properly secure materials.

19.4.1.9 Failure of the Contractor to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, a Construction Schedule, Schedule of Submittals, Schedule of Values, Monthly Progress Schedules, Shop Drawings, Product Data and samples, Proposed product lists, executed Change Orders, and/or verified reports.

19.4.1.10 Failure of the Contractor to maintain As-Built Drawings.

19.4.1.11 Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment.

19.4.1.12 Unauthorized deviations from the Contract Documents.

19.4.1.13 Failure of the Contractor to prosecute the Work in a timely manner in compliance with the Construction Schedule, established progress schedules, and/or completion dates.

19.4.1.14 Failure to provide acceptable electronic certified payroll records, as required by the Labor Code, by these Contract Documents, or by written request; for each journeyman, apprentice, worker, or other employee employed by the Contractor and/or by each Subcontractor in connection with the Work for the period of the Application for Payment or if payroll records are delinquent or inadequate.

19.4.1.15 Failure to properly pay prevailing wages as required in Labor Code section 1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with labor compliance monitoring and enforcement by the DIR.

19.4.1.16 Allowing an unregistered subcontractor, as described in Labor Code section 1725.5, to engage in the performance of any work under this Contract.

19.4.1.17 Failure to comply with any applicable federal statutes and regulations regarding minimum wages, withholding, payrolls and basic records, apprentice and trainee employment requirements, equal employment opportunity requirements, Copeland Act requirements, Davis-Bacon Act and related requirements, Contract Work Hours and Safety Standards Act requirements, if applicable.

19.4.1.18 Failure to properly maintain or clean up the Site.

19.4.1.19 Failure to timely indemnify, defend, or hold harmless the District.

19.4.1.20 Any payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits.

19.4.1.21 Failure to pay Subcontractor(s) or supplier(s) as required by law and by the Contract Documents.

19.4.1.22 Failure to pay any royalty, license or similar fees.

19.4.1.23 Contractor is otherwise in breach, default, or in substantial violation of any provision of this Contract.

19.4.1.24 Failure to perform any implementation and/or monitoring required by any SWPPP for the Project and/or the imposition of any penalties or fines therefore whether imposed on the District or Contractor.

19.4.2 Reallocation of Withheld Amounts

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

19.4.2.2 If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision thereof, District may, after **FORTY-EIGHT (48)** hours' written notice to the Contractor and, without prejudice to any other remedy, make good such deficiencies. The District shall adjust the total Contract Price by reducing the amount thereof by the cost of making good such deficiencies. If District deems it inexpedient to correct Work that is damaged, defective, or not done in accordance with Contract provisions, an equitable reduction in the Contract Price (of at least one hundred fifty percent (150%) of the estimated reasonable value of the nonconforming Work) shall be made therefor.

19.4.3 Payment After Cure

When Contractor removes the grounds for declining approval, 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.

19.5 Subcontractor Payments

19.5.1 Payments to Subcontractors

No later than seven (7) days after receipt, or pursuant to Business and Professions Code section 7108.5 and Public Contract Code section 7107, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to its Sub-subcontractors in a similar manner.

19.5.2 No Obligation of District for Subcontractor Payment

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

19.5.3 Joint Checks

District shall have the right in its sole discretion, if necessary for the protection of the District, 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. In no event shall any joint check payment be construed to create any contract between the District and a Subcontractor of any tier, or a material or equipment supplier, any obligation from the District to such Subcontractor or a material or equipment supplier, or rights in such Subcontractor or a material or equipment supplier against the District.

20. COMPLETION OF THE WORK

20.1 Completion

20.1.1 District will accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District.

20.1.2 The Work may only be accepted as complete by action of the governing board of the District.

20.1.3 District, at its sole option, may accept completion of Contract and have the Notice of Completion recorded when the entire Work shall have been completed to the satisfaction of District, except for minor corrective items, as distinguished from incomplete items. If Contractor fails to complete all minor corrective items within fifteen (15) days after the date of the District's acceptance of completion, District shall withhold from the final payment one hundred fifty percent (150%) of an estimate of the amount sufficient to complete the corrective items, as determined by District, until the item(s) are completed.

20.1.4 At the end of the 15-day period, if there are any items remaining to be corrected, District may elect to proceed as provided herein related to adjustments to Contract Price, and/or District's right to perform the Work of the Contractor.

20.2 Close-Out/Certification Procedures

20.2.1 Punch List

The Contractor shall notify the Architect when Contractor considers the Work complete. Upon notification, Architect will prepare a 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 Punch List. Failure to include an item on Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

20.2.2 Close-Out/Certification Requirements

20.2.2.1 Utility Connections

Buildings shall be connected to water, gas, sewer, and electric services, complete and ready for use. Service connections shall be made and existing services reconnected.

20.2.2.2 Record Drawings and Record Specifications

20.2.2.2.1 Contractor shall provide exact Record Drawings of the Work ("As-Builts") and Record Specifications upon completion of the Project and as a condition precedent to approval of final payment.

20.2.2.2.2 Contractor shall obtain the Inspector's approval of the corrected prints and employ a competent draftsman to transfer the Record Drawings information to the most current version of AutoCAD that is, at that time, currently utilized for plan check submission by either the District, the Architect, OPSC, and/or DSA, and print a complete set of transparent sepias. When completed, Contractor shall deliver corrected sepias and diskette/CD/other data storage device acceptable to District with AutoCAD file to the District.

20.2.2.2.3 Contractor is liable and responsible for any and all inaccuracies in the Record Drawings and Record Specifications, even if inaccuracies become evident at a future date.

20.2.2.3 Construction Storm Water Permit, if applicable

Contractor shall submit to District all electronic or hard copy records required by the Construction Storm Water Permit, if applicable, within seven (7) days of Completion of the Project.

20.2.2.4 Maintenance Manuals: Contractor shall prepare all operation and maintenance manuals and date as indicated in the Specifications.

20.2.2.5 Source Programming: Contractor shall provide all source programming for all items in the Project.

20.2.2.6 Verified Reports: Contractor shall completely and accurately fill out and file forms DSA 6-C or DSA 152 (or current form), as appropriate. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

20.3 Final Inspection

20.3.1 Contractor shall comply with Punch List procedures as provided herein, and maintain the presence of a Project Superintendent and Project Manager until the Punch List is complete to ensure proper and timely completion of the Punch List. Under no circumstances shall Contractor demobilize its forces prior to completion of the Punch List without District's prior written approval. 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 District acceptance, Architect and Project Inspector will inspect the Work and shall submit to Contractor and District a final inspection report noting the Work, if any, required in order to complete in accordance with the Contract Documents. Absent unusual circumstances, this report shall consist of the Punch List items not yet satisfactorily completed.

20.3.2 Upon Contractor's completion of all items on the Punch List and any other uncompleted portions of the Work, the Contractor shall notify the District and Architect, who shall again inspect such Work. If the Architect finds the Work complete and acceptable under the Contract Documents, the Architect will notify Contractor, who shall then jointly submit to the Architect and the District its final Application for Payment.

20.3.3 Final Inspection Requirements

20.3.3.1 Before calling for final inspection, Contractor shall determine that the following have been performed:

- 20.3.3.1.1 The Work has been completed.
- 20.3.3.1.2 All life safety items are completed and in working order.
- 20.3.3.1.3 Mechanical and electrical Work including, without limitation, security system, data, and fire alarm, are complete and tested, fixtures are in place, connected, and ready for tryout.
- 20.3.3.1.4 Electrical circuits scheduled in panels and disconnect switches labeled.
- 20.3.3.1.5 Painting and special finishes complete.
- 20.3.3.1.6 Doors complete with hardware, cleaned of protective film, relieved of sticking or binding, and in working order.
- 20.3.3.1.7 Tops and bottoms of doors sealed.
- 20.3.3.1.8 Floors waxed and polished as specified.
- 20.3.3.1.9 Broken glass replaced and glass cleaned.
- 20.3.3.1.10 Grounds cleared of Contractor's equipment, raked clean of debris, and trash removed from Site.
- 20.3.3.1.11 Work cleaned, free of stains, scratches, and other foreign matter, and damaged and broken material replaced.
- 20.3.3.1.12 Finished and decorative work shall have marks, dirt, and superfluous labels removed.
- 20.3.3.1.13 Final cleanup, as provided herein.

20.4 Costs of Multiple Inspections

More than two (2) requests of the District to make a final inspection shall be considered an additional service of District, Architect, Construction Manager, and/or Project Inspector, and all subsequent costs will be invoiced to Contractor and if funds are available, withheld from remaining payments.

20.5 Partial Occupancy or Use Prior to Completion

20.5.1 District's Rights to Occupancy

The District may occupy or use any completed or partially completed portion of the Work at any stage, and such occupancy shall not constitute the District's Final Acceptance of any part of the Work. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein. In the event that the District occupies or uses any completed or partially completed portion of the Work, the Contractor shall remain responsible 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 unless the Contractor requests in writing, and the District agrees, to otherwise divide those responsibilities. Any dispute as to responsibilities shall be resolved pursuant to the Claims and Disputes provisions herein, with the added provision that during the dispute process, the District shall have the right to occupy or use any portion of the Work that it needs or desires to use.

20.5.2 Inspection Prior to Occupancy or Use

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

20.5.3 No Waiver

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

21. FINAL PAYMENT AND RETENTION

21.1 Final Payment

Upon receipt and approval of a valid and final Application for Payment, the Architect will issue a final Certificate of Payment. The District shall thereupon jointly inspect the Work and either accept the Work as complete or notify the Architect and the Contractor in writing of reasons why the Work is not complete. Upon District's acceptance of the Work of the Contractor as fully complete by the Governing Board of the District (that, absent unusual circumstances, will occur when the Punch List items have been satisfactorily

completed), the District shall record a Notice of Completion with the County Recorder, and the Contractor shall, upon receipt of final payment from the District, pay the amount due Subcontractors.

21.2 Prerequisites for Final Payment

The following conditions must be fulfilled prior to Final Payment:

21.2.1 A full release of all Stop Payment Notices served in connection with the Work shall be submitted by Contractor.

21.2.2 A duly completed and executed conditional waiver and release upon final payment compliant with Civil Code section 8136, from the Contractor and each subcontractor of any tier and supplier to be paid from the final payment.

21.2.3 A duly completed and executed unconditional waiver and release upon progress payment compliant with Civil Code section 8134, from the Contractor and each subcontractor of any tier and supplier that was paid from the previous progress payments.

21.2.4 A duly completed and executed Document 00 65 19.26, "AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS" from the Contractor.

21.2.5 The Contractor shall have made all corrections to the Work that 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 District required under the Contract Documents.

21.2.6 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.

21.2.7 Contractor must have completed all requirements set forth under "Close-Out/Certification Procedures," including, without limitation, submission of an approved set of complete Record Drawings.

21.2.8 Architect shall have issued its written approval that final payment can be made.

21.2.9 The Contractor shall have delivered to the District all manuals and materials required by the Contract Documents, which must be approved by the District.

21.2.10 The Contractor shall have completed final clean-up as provided herein.

21.3 Retention

21.3.1 The retention, less any amounts disputed by the District or that the District has the right to withhold pursuant to provisions herein, shall be paid:

21.3.1.1 After approval by the Architect of the Application and Certificate of Payment,

21.3.1.2 After the satisfaction of the conditions set forth herein, and

21.3.1.3 After forty-five (45) days after the recording of the Notice of Completion by District.

21.3.2 No interest shall be paid on any retention, or on any amounts withheld due to a failure of the Contractor to perform, in accordance with the terms and conditions of the Contract Documents, except as provided to the contrary in any Escrow Agreement between the District and the Contractor pursuant to Public Contract Code section 22300.

21.4 Substitution of Securities

The District will permit the substitution of securities in accordance with the provisions of Public Contract Code section 22300.

22. UNCOVERING OF WORK

If a portion of the Work is covered without Inspector or Architect approval or not in compliance with the Contract Documents, it must, if required in writing by the District, the Project Inspector, or the Architect, be uncovered for the Project Inspector's or the Architect's observation and be corrected, replaced, and/or recovered at the Contractor's expense without change in the Contract Price or Contract Time.

23. NONCONFORMING WORK AND CORRECTION OF WORK

23.1 Nonconforming Work

23.1.1 Contractor shall promptly remove from Premises all Work identified by District as failing to conform to the Contract Documents whether incorporated or not. Contractor shall promptly replace and re-execute its own Work to comply with the Contract Documents without additional expense to the District and shall bear the expense of making good all work of other contractors destroyed or damaged by any removal or replacement pursuant hereto and/or any delays to the District or other Contractors caused thereby.

23.1.2 If Contractor does not remove Work that District has identified as failing to conform to the Contract Documents within a reasonable time, not to exceed **FORTY-EIGHT (48)** hours, District may remove it and may store any material at Contractor's expense. If Contractor does not pay expense(s) of that removal within ten (10) days' time thereafter, District may, upon ten (10) days' written notice, sell any material at auction or at private sale and shall deduct all costs and expenses incurred by the District and/or District may withhold those amounts from payment(s) to Contractor.

23.2 Correction of Work

23.2.1 Correction of Rejected Work

Pursuant to the notice provisions herein, the Contractor shall immediately correct the Work rejected by the District, the Architect, or the Project Inspector as failing to conform to the requirements of the Contract Documents, whether observed before or

after Completion and whether or not fabricated, installed, or completed. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Inspector's or the Architect's services and expenses made necessary thereby.

23.2.2 Two-Year Warranty Corrections

If, within two (2) years after the date of Completion of the Work or a designated portion thereof, or after the date for commencement of warranties established hereunder, or by the terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the District to do so. This period of two (2) years 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 hereunder shall survive District's acceptance of the Work under the Contract and termination of the Contract. The District shall give such notice promptly after discovery of the condition.

23.3 District's Right to Perform Work

23.3.1 If the Contractor should neglect to prosecute the Work properly or fail to perform any provisions of this contract, the District, after **FORTY-EIGHT (48)** hours' written notice to the Contractor, may, without prejudice to any other remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

23.3.2 If it is found at any time, before or after completion of the Work, that Contractor has varied from the Drawings and/or Specifications, including, but not limited to, variation in material, quality, form, or finish, or in the amount or value of the materials and labor used, District may require at its option:

23.3.2.1 That all such improper Work be removed, remade or replaced, and all work disturbed by these changes be made good by Contractor at no additional cost to the District;

23.3.2.2 That the District deduct from any amount due Contractor the sum of money equivalent to the difference in value between the work performed and that called for by the Drawings and Specifications; or

23.3.2.3 That the District exercise any other remedy it may have at law or under the Contract Documents, including but not limited to the District hiring its own forces or another contractor to replace the Contractor's nonconforming Work, in which case the District shall either issue a deductive Change Order, a Construction Change Directive, or invoice the Contractor for the cost of that work. Contractor shall pay any invoices within thirty (30) days of receipt of same or District may withhold those amounts from payment(s) to Contractor.

24. TERMINATION AND SUSPENSION

24.1 District's Request for Assurances

If District at any time reasonably believes Contractor is or may be in default under this Contract, District may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of Work and a written plan from Contractor to remedy any potential default under the terms this Contract that the District may advise Contractor of in writing. Contractor shall, within ten (10) calendar days of District's request, deliver a written cure plan that meets the District's requirements in its request for assurances. Contractor's failure to provide such written assurances of performance and the required written plan, within ten (10) calendar days of request, will constitute a material breach of this Contract sufficient to justify termination for cause.

24.2 District's Right to Terminate Contractor for Cause

24.2.1 Grounds for Termination: The District, in its sole discretion, may terminate the Contract and/or terminate the Contractor's right to perform the work of the Contract based upon any of the following:

24.2.1.1 Contractor refuses or fails to execute the Work or any separable part thereof with sufficient diligence as will ensure its completion within the time specified or any extension thereof, or

24.2.1.2 Contractor fails to complete said Work within the time specified or any extension thereof, or

24.2.1.3 Contractor persistently fails or refuses to perform Work or provide material of sufficient quality as to be in compliance with Contract Documents; or

24.2.1.4 Contractor persistently refuses, or repeatedly fails, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the Work in the time specified; or

24.2.1.5 Contractor fails to make prompt payment to Subcontractors, or for material, or for labor; or

24.2.1.6 Contractor persistently disregards laws, or ordinances, or instructions of District; or

24.2.1.7 Contractor fails to supply labor, including that of Subcontractors, that is sufficient to prosecute the Work or that can work in harmony with all other elements of labor employed or to be employed on the Work; or

24.2.1.8 Contractor or its Subcontractor(s) is/are otherwise in breach, default, or in substantial violation of any provision of this Contract, including but not limited to a lapse in licensing or registration.

24.2.2 Notification of Termination

24.2.2.1 Upon the occurrence at District's sole determination of any of the above conditions, District may, without prejudice to any other right or remedy, serve written notice upon Contractor and its Surety of District's termination of this Contract and/or the Contractor's right to perform the work of the Contract. This notice will contain the reasons for termination. Unless, within three (3) days after the service of the notice, any and all condition(s) shall cease, and any and all violation(s) shall cease, or arrangement satisfactory to District for the correction of the condition(s) and/or violation(s) be made, this Contract and/or the Contractor's right to perform the Work of the Contract shall cease and terminate. Upon termination, Contractor shall not be entitled to receive any further payment until the entire Work is finished.

24.2.2.2 Upon termination, District may immediately serve written notice of tender upon Surety whereby Surety shall have the right to take over and perform this Contract only if Surety:

24.2.2.2.1 Within three (3) days after service upon it of the notice of tender, gives District written notice of Surety's intention to take over and perform this Contract; and

24.2.2.2.2 Commences performance of this Contract within three (3) days from date of serving of its notice to District.

24.2.2.3 Surety shall not utilize Contractor in completing the Project if the District notifies Surety of the District's objection to Contractor's further participation in the completion of the Project. Surety expressly agrees that any contractor which Surety proposes to fulfill Surety's obligations is subject to District's approval. District's approval shall not be unreasonably withheld, conditioned or delayed.

24.2.2.4 If Surety fails to notify District or begin performance as indicated herein, District may take over the Work and execute the Work to completion by any method it may deem advisable at the expense of Contractor and/or its Surety. Contractor and/or its Surety shall be liable to District for any excess cost or other damages the District incurs thereby. Time is of the essence in this Contract. If the District takes over the Work as herein provided, District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plan, and other property belonging to Contractor as may be on the Site of the Work, in bonded storage, or previously paid for.

24.3 Termination of Contractor for Convenience

24.3.1 District in its sole discretion may terminate the Contract in whole or in part upon three (3) days' written notice to the Contractor.

24.3.2 Upon notice, Contractor shall:

24.3.2.1 Cease operations as directed by the District in the notice;

24.3.2.2 Take necessary actions for the protection and preservation of the Work as soon as possible; and

24.3.2.3 Terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

24.3.3 Within 30 days of the notice, Contractor submit to the District a payment application for the actual cost for labor, materials, and services performed, including all Contractor's and Subcontractor(s)' mobilization and/or demobilization costs, that is unpaid. Contractor shall have no claims against the District except for the actual cost for labor, materials, and services performed that adequately documented through timesheets, invoices, receipts, or otherwise. District shall pay all undisputed invoice(s) for work performed until the notice of termination.

24.3.4 Under a termination for convenience, the District retains the right to all the options available to the District if there is a termination for cause.

24.4 Effect of Termination

24.4.1 Contractor shall, only if ordered to do so by the District, immediately remove from the Site all or any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The District retains the right, but not the obligation, to keep and use any materials and personal property belonging to Contractor that have not been incorporated in the construction of the Work, or which are not in place in the Work. The Contractor and its Surety shall be liable upon the Performance Bond for all damages caused to the District by reason of the Contractor's failure to complete the Contract.

24.4.2 In the event that the District shall perform any portion of, or the whole of the Work, pursuant to the provisions of the General Conditions, the District shall not be liable nor account to the Contractor in any way for the time within which, or the manner in which, the Work is performed by the District or for any changes the District may make in the Work or for the money expended by the District in satisfying claims and/or suits and/or other obligations in connection with the Work.

24.4.3 In the event termination for cause is determined to have not been for cause, the termination shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

24.4.4 In the event that the Contract is terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the Contractor or any impact or impairment of Contractor's bonding capacity.

24.4.5 If the expense to the District to finish the Work exceeds the unpaid Contract Price, Contractor and Surety shall pay difference to District within twenty-one (21) days of District's request.

24.4.6 The District shall have the right (but shall have no obligation) to assume and/or assign to a general contractor or construction manager or other third party who is qualified and has sufficient resources to complete the Work, the rights of the Contractor under its subcontracts with any or all Subcontractors. In the event of an assumption or assignment by the District, no Subcontractor shall have any claim against the District or third party for Work performed by Subcontractor or other matters arising prior to termination of the Contract. The District or any third party,

as the case may be, shall be liable only for obligations to the Subcontractor arising after assumption or assignment. Should the District so elect, the Contractor shall execute and deliver all documents and take all steps, including the legal assignment of its contractual rights, as the District may require, for the purpose of fully vesting in the District the rights and benefits of its Subcontractor under Subcontracts or other obligations or commitments. All payments due the Contractor hereunder shall be subject to a right of offset by the District for expenses and damages suffered by the District as a result of any default, acts, or omissions of the Contractor. Contractor must include this assignment provision in all of its contracts with its Subcontractors.

24.4.7 The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to District.

24.5 Emergency Termination of Public Contracts Act of 1949

24.5.1 This Contract is subject to termination as provided by sections 4410 and 4411 of the Government Code of the State of California, being a portion of the Emergency Termination of Public Contracts Act of 1949.

24.5.1.1 Section 4410 of the Government Code states:

In the event a national emergency occurs, and public work, being performed by contract, is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the public agency and the contractor may, by written agreement, terminate said contract.

24.5.1.2 Section 4411 of the Government Code states:

Such an agreement shall include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any, which either party shall pay to the other or any other person, under the facts and circumstances in the case.

24.5.2 Compensation to the Contractor shall be determined at the sole discretion of District on the basis of the reasonable value of the Work done, including preparatory work. As an exception to the foregoing and at the District's discretion, in the case of any fully completed separate item or portion of the Work for which there is a separate previously submitted unit price or item on the accepted schedule of values, that price shall control. The District, at its sole discretion, may adopt the Contract Price as the reasonable value of the work done or any portion thereof.

24.6 Suspension of Work

24.6.1 District in its sole discretion may suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine upon three (3) days written notice to the Contractor.

24.6.1.1 An adjustment may be made for changes in the cost of performance of the Work caused by any such suspension, delay or interruption. No adjustment shall be made to the extent:

24.6.1.1.1 That performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or

24.6.1.1.2 That an equitable adjustment is made or denied under another provision of the Contract; or

24.6.1.1.3 That the suspension of Work was the direct or indirect result of Contractor's failure to perform any of its obligations hereunder.

24.6.1.2 Any adjustments in cost of performance may have a fixed or percentage fee as provided in the section on Format for Proposed Change Order herein. This amount shall be full compensation for all Contractor's and its Subcontractor(s)' changes in the cost of performance of the Contract caused by any such suspension, delay or interruption.

25. CLAIMS PROCESS

25.1 Obligation to File Claims for Disputed Work

25.1.1 Should Contractor otherwise seek extra time or compensation for any reason whatsoever ("Disputed Work"), then Contractor shall first follow procedures set forth in the Contract Documents including, without limitation, Articles 15, 16 and 17, all of which are conditions precedent to submitting a Claim pursuant to Article 25. A Notice of Delay or Proposed Change Order are less formal procedures that proceed the formal claim and do not constitute a Claim. A Claim also does not include correspondence, RFIs, vouchers, invoices, progress payment applications, or other routine or authorized form of requests for progress payments in compliance with the Contract. If a dispute remains, then Contractor shall give written notice to District that expressly invokes this Article 25 within the time limits set forth herein.

25.1.2 Contractor's sole and exclusive remedy for Disputed Work is to file a written claim setting forth Contractor's position as required herein within the time limits set forth herein.

25.2 Duty to Perform during Claim Process

Contractor and its subcontractors shall continue to perform its Work under the Contract including the disputed work, and shall not cause a delay of the Work during any dispute, claim, negotiation, mediation, or arbitration proceeding, except by written agreement by the District.

25.3 Definition of Claim

25.3.1 Pursuant to Public Contract Code section 9204, the term "Claim" means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

25.3.1.1 A time extension, including without limitation, for relief of damages or penalties for delay assessed by the District under the Contract;

25.3.1.2 Payment by the District of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or to which Contractor is not otherwise entitled to; or

25.3.1.3 An amount of payment disputed by the District.

25.4 Claims Presentation

25.4.1 Form and Contents of Claim

25.4.1.1 If Contractor intends to submit a Claim for an increase in the Contract Price and/or Contract Time for any reason including, without limitation, the acts of District or its agents, Contractor shall, within thirty (30) days after the event giving rise to the Claim, give notice of the Claim ("Notice of Potential Claim") in writing specifically identifying Contractor is invoking this Article 25 Claims Presentation. The Notice of Potential Claim shall provide Contractor's preliminary request for an adjustment to the Contract Price and/or Contract Time, with a description of the grounds therefore.

25.4.1.2 Within thirty (30) days after serving the written Notice of Potential Claim, Contractor shall provide a Claim including an itemized statement of the details and amounts of its Claim for any increase in the Contract Price of Contract Time as provided below, including a Time Impact Analysis and any and all other documentation substantiating Contractor's claimed damages:

25.4.1.2.1 The issues, events, conditions, circumstances and/or causes giving rise to the dispute, and shall show, in detail, the cause and effect of same;

25.4.1.2.2 Citation to provisions in the Contract Documents, statute sections, and/or case law entitling Contractor to an increase in the Contract Price or Contract Time;

25.4.1.2.3 The pertinent dates and/or durations and actual and/or anticipated effects on the Contract Price, Contract Schedule milestones and/or Contract Time adjustments;

25.4.1.2.4 The Time Impact Analysis of all time delays that shows actual time impact on the critical path; and

25.4.1.2.5 The line-item costs for labor, material, and/or equipment, if applicable, for all cost impacts priced like a change order according to Article 17 and must be updated monthly as to cost and entitlement if a continuing claim.

25.4.1.3 The Claim shall include the following certification by the Contractor:

25.4.1.3.1 The undersigned Contractor certifies under penalty of perjury that the attached dispute is made in good faith; that the supporting data is accurate and complete to the best of my knowledge and belief; that the amount requested accurately reflects the adjustment for which Contractor believes the District is liable; and that I am duly authorized to certify the dispute on behalf of the Contractor.

25.4.1.3.2 Furthermore, Contractor understands that the value of the attached dispute expressly includes any and all of the Contractor's costs and expenses, direct and indirect, resulting from the Work performed on the Project, additional time required on the Project and/or resulting from delay to the Project including, without limitation, cumulative impacts. Contractor may not separately recover for overhead or other indirect costs. Any costs, expenses, damages, or time extensions not included are deemed waived.

25.4.2 Contractor shall bear all costs incurred in the preparation and submission of a Claim.

25.4.3 Failure to timely submit a Claim and the requisite supporting documentation shall constitute a waiver of Contractor's claim(s) against the District and Contractor's Claim(s) for compensation or an extension of time shall be deemed waived, released, and discharged as to any entitlement for adjustment to Contract Price and/or Contract Time.

25.5 Claim Resolution pursuant to Public Contract Code section 9204

Contractor may request to waive the claims procedure under Public Contract Code section 9204 and proceed directly to the commencement of a civil action or binding arbitration. If Contractor chooses to proceed, Contractor shall comply with the following steps:

25.5.1 STEP 1:

25.5.1.1 Upon receipt of a Claim by registered or certified mail, return receipt requested, including the documents necessary to substantiate it, the District shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of a Claim, the District and Contractor may, by mutual agreement, extend the time period to provide a written statement. If the District needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of Claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion.

25.5.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written

statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.5.1.2 Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. In this instance, District and Contractor must comply with the sections below regarding Public Contract Code section 20104 et seq. and Government Code Claim Act Claims.

25.5.1.3 If the District fails to issue a written statement, or to otherwise meet the time requirements of this section, this shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the District's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of Contractor.

25.5.2 STEP 2:

25.5.2.1 If Contractor disputes the District's written response, or if the District fails to respond to a Claim within the time prescribed, Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute. Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed.

25.5.2.1.1.1 Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the District issues its written statement. Amounts not paid in a timely manner as required by this section, section 25.4, shall bear interest at seven percent (7%) per annum.

25.5.3 STEP 3:

25.5.3.1 Any disputed portion of the Claim, as identified by Contractor in writing, shall be submitted to nonbinding mediation, with the District and Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

25.5.3.1.1 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in

dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

25.5.3.2 Unless otherwise agreed to by the District and Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code section 20104.4 to mediate after litigation has been commenced.

25.5.4 STEP 4:

25.5.4.1 If mediation under this section does not resolve the parties' dispute, the District may, but does not require arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program.

25.6 Subcontractor Pass-Through Claims

25.6.1 If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a District because privity of contract does not exist, the contractor may present to the District a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the District shall furnish reasonable documentation to support the Claim.

25.6.2 Within 45 days of receipt of this written request from a subcontractor, Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the District and, if Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

25.6.3 The Contractor shall bind all its Subcontractors to the provisions of this section and will hold the District harmless against Claims by Subcontractors.

25.7 Government Code Claim Act Claim

25.7.1 If a claim, or any portion thereof, remains in dispute upon satisfaction of all applicable Claim Resolution requirements the Contractor shall comply with all claims presentation requirements as provided in Chapter 1 (commencing with section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of Government Code as a condition precedent to the Contractor's right to bring a civil action against the District.

25.7.2 Contractor shall bear all costs incurred in the preparation, submission and administration of a Claim. Any claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein of the claims asserted.

25.7.3 For purposes of those provisions, the running of the time within which a claim pursuant to Public Contract Code section 20104.2 only must be presented to the District shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet

and confer process, including any period of time utilized by the meet and confer process.

25.8 Claim Resolution pursuant to Public Contract Code section 20104 et seq.

25.8.1 In the event of a disagreement between the parties as to performance of the Work, the interpretation of this Contract, or payment or nonpayment for Work performed or not performed, the parties shall attempt to resolve all claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between Contractor and District by those procedures set forth in Public Contract Code section 20104, et seq., to the extent applicable.

25.8.1.1 Contractor shall file with the District any written Claim, including the documents necessary to substantiate it, upon the application for final payment.

25.8.1.2 For claims of less than fifty thousand dollars (\$50,000), the District shall respond in writing within forty-five (45) days of receipt of the Claim or may request in writing within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.2.1 If additional information is required, it shall be requested and provided by mutual agreement of the parties.

25.8.1.2.2 District's written response to the documented Claim shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor to produce the additional information, whichever is greater.

25.8.1.3 For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the District shall respond in writing to all written Claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or claims the District may have against the Contractor.

25.8.1.3.1 If additional information is required, it shall be requested and provided upon mutual agreement of the District and the Contractor.

25.8.1.3.2 The District's written response to the Claim, as further documented, shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor to produce the additional information or requested documentation, whichever is greater.

25.8.1.4 If Contractor disputes the District's written response, or the District fails to respond within the time prescribed, Contractor may so notify the District, in writing, either within fifteen (15) days of receipt of the District's response or within fifteen (15) days of the District's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the District shall

schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

25.8.1.5 Following the meet and confer conference, if the Claim or any portion of it remains in dispute, the Contractor may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions the running of the time within which a claim must be filed shall be tolled from the time the Contractor submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet and confer process.

25.8.1.6 For any civil action filed to resolve claims filed pursuant to this section, within sixty (60) days, but no earlier than thirty (30) days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within fifteen (15) days by both parties of a disinterested third person as mediator, shall be commenced within thirty (30) days of the submittal, and shall be concluded within fifteen (15) days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

25.8.1.7 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of the Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986, (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

25.8.1.8 The District shall not fail to pay money as to any portion of a Claim which is undisputed except as otherwise provided in the Contract Documents. In any suit filed pursuant to this section, the District shall pay interest due at the legal rate on any arbitration award or judgment. Interest shall begin to accrue on the date the suit is filed in a court of law.

25.8.2 Contractor shall bind its Subcontractors to the provisions of this Section and will hold the District harmless against disputes by Subcontractors.

25.9 Claim Procedure Compliance

25.9.1 Failure to submit and administer claims as required in Article 25 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) not raised in a timely protest and timely claim submitted under this Article 25 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.

25.9.2 District shall not be deemed to waive any provision under this Article 25, if at District's sole discretion, a claim is administered in a manner not in accord with this Article 25. Waivers or modifications of this Article 25 may only be made by a

signed change order approved as to form by legal counsel for both District and Contractor; oral or implied modifications shall be ineffective.

25.10 Claim Resolution Non-Applicability

25.10.1 The procedures for dispute and claim resolutions set forth in this Article shall not apply to the following:

25.10.1.1 Personal injury, wrongful death or property damage claims;

25.10.1.2 Latent defect or breach of warranty or guarantee to repair;

25.10.1.3 Stop payment notices;

25.10.1.4 District's rights set forth in the Article on Suspension and Termination;

25.10.1.5 Disputes arising out of labor compliance enforcement by the Department of Industrial Relations; or

25.10.1.6 District rights and obligations as a public entity set forth in applicable statutes; provided, however, that penalties imposed against a public entity by statutes, including, but not limited to, Public Contract Code sections 20104.50 and 7107, shall be subject to the Claim Resolution requirements provided in this Article.

25.11 Attorney's Fees

25.11.1 Should litigation be necessary to enforce any terms or provisions of this Agreement, then each party shall bear its own litigation and collection expenses, witness fees, court costs, and attorney's fees.

26. STATE LABOR, WAGE & HOUR, APPRENTICE, AND RELATED PROVISIONS

26.1 Labor Compliance and Enforcement

Since this Project is subject to labor compliance and enforcement by the Department of Industrial Relations ("DIR"), Contractor specifically acknowledges and understands that it shall perform the Work of this Agreement while complying with all the applicable provisions of Division 2, Part 7, Chapter 1, of the Labor Code and Title 8 of the California Code of Regulations, including, without limitation, the requirement that the Contractor and all Subcontractors shall timely furnish complete and accurate electronic certified payroll records directly to the DIR. The District may not issue payment if this requirement is not met.

26.2 Wage Rates, Travel, and Subsistence

26.2.1 Pursuant to the provisions of Article 2 (commencing at section 1770), Chapter 1, Part 7, Division 2, of the Labor Code, 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 to execute this Contract are on file at the District's principal

office and copies will be made available to any interested party on request. Contractor shall obtain and post a copy of these wage rates at the job site.

26.2.2 Holiday and overtime work, when permitted by law, shall be paid for at the general prevailing rate of per diem wages for holiday and overtime work on file with the Director of the Department of Industrial Relations, unless otherwise specified. The holidays upon which those rates shall be paid need not be specified by the District, but shall be all holidays recognized in the applicable collective bargaining agreement. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code.

26.2.3 Contractor shall pay and shall cause to be paid each worker engaged in Work on the Project the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations, regardless of any contractual relationship which may be alleged to exist between Contractor or any Subcontractor and such workers.

26.2.4 If during the period this bid is required to remain open, the Director of the Department of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which the Work under the Contract is to be performed, such change shall not alter the wage rates in the Notice to Bidders or the Contract subsequently awarded.

26.2.5 Pursuant to Labor Code section 1775, Contractor shall, as a penalty to District, forfeit the statutory amount (believed by the District to be currently up to two hundred dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates, determined by the District and/or the Director, for the work or craft in which that worker is employed for any public work done under Contract by Contractor or by any Subcontractor under it. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Contractor.

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

26.2.7 Pursuant to Labor Code section 1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time, subsistence pay, and apprenticeship or other training programs authorized by Labor Code section 3093, and similar purposes.

26.2.8 Contractor shall post at appropriate conspicuous points on the Site of Project, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned. In addition, Contractor shall post a sign-in log for all workers and visitors to the Site, a list of all subcontractors of any tier on the Site, and the required Equal Employment Opportunity poster(s).

26.3 Hours of Work

26.3.1 As provided in article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by 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 shall be limited and restricted by Contractor to eight (8) hours per day, and forty (40) hours during any one week, except as hereinafter provided. Notwithstanding the provisions hereinabove set forth, Work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon this public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half times the basic rate of pay.

26.3.2 Contractor shall keep and shall cause each Subcontractor to keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by Contractor in connection with the Work or any part of the Work contemplated by this Contract. The record shall be kept open at all reasonable hours to the inspection of District and to the Division of Labor Standards Enforcement of the DIR.

26.3.3 Pursuant to Labor Code section 1813, Contractor shall as a penalty to the District forfeit the statutory amount (believed by the District to be currently twenty-five dollars (\$25)) for each worker employed in the execution of this Contract by Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of article 3 (commencing at section 1810), chapter 1, part 7, division 2, of the Labor Code.

26.3.4 Any Work necessary to be performed after regular working hours, or on Sundays or other holidays shall be performed without additional expense to the District.

26.4 Payroll Records

26.4.1 Contractor shall upload, and shall cause each Subcontractor performing any portion of the Work under this Contract to upload, an accurate and complete certified payroll record ("CPR") electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online on no less than every 30 days while Work is being performed and within 30 days after the final day of Work performed on the Project and within ten (10) days of any request by the District or Labor Commissioner at <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html> or current application and URL, showing the name, address, social security number, work classification, straight-time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each Subcontractor in connection with the Work.

26.4.1.1 The CPRs enumerated hereunder shall be filed directly with the DIR on a weekly basis or to the requesting party, whether the District or DIR, within ten (10) days after receipt of each written request. The CPRs from the Contractor

and each Subcontractor for each week shall be provided on or before Wednesday of the week following the week covered by the CPRs. District may not make any payment to Contractor until:

26.4.1.1.1 Contractor and/or its Subcontractor(s) provide CPRs acceptable to the DIR; and

26.4.1.1.2 Any delay in Contractor and/or its Subcontractor(s) providing CPRs to the DIR in a timely manner may directly delay Contractor's payment.

26.4.2 All CPRs shall be available for inspection at all reasonable hours at the principal office of Contractor on the following basis:

26.4.2.1 A certified copy of an employee's CPR shall be made available for inspection or furnished to the employee or his/her authorized representative on request.

26.4.2.2 CPRs shall be made available for inspection or furnished upon request to a representative of District, Division of Labor Standards Enforcement, Division of Apprenticeship Standards, and/or the DIR.

26.4.2.3 CPRs shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through the District, Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested CPRs have not been provided pursuant to the provisions herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by Contractor, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of Contractor.

26.4.3 Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by District, Division of Apprenticeship Standards, or 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 Contractor awarded Contract or performing Contract shall not be marked or obliterated.

26.4.4 Contractor shall inform District of the location of the records enumerated hereunder, including the street address, city, and county, and shall, within five (5) working days, provide a notice of change of location and address.

26.4.5 In the event of noncompliance with the requirements of this section, Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects Contractor must comply with this section. Should noncompliance still be evident after the ten (10) day period, Contractor shall, as a penalty to District, forfeit up to one hundred dollars (\$100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Labor Commissioner, these penalties shall be withheld from progress payments then due.

26.4.6 As Contractor and its subcontractors have agreed to be bound by the terms of the PLA entered into by the District [on or about / dated] June 30, 2022,

Contractor and its subcontractors may be excused from uploading CPRs electronically using DIR's eCPR System by uploading the CPRs by electronic XML file or entering each record manually using the DIR's iform (or current form) online at <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html> , or by using a more current application and URL. However, within ten (10) days of any request by the District or Labor Commissioner, Contractor and its subcontractors shall provide CPRs showing the name, address, social security number, work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor and/or each subcontractor in connection with the Work.

26.5 Apprentices

26.5.1 Contractor acknowledges and agrees that, if this Contract involves a dollar amount greater than, or a number of working days greater than that specified in Labor Code section 1777.5, then this Contract is governed by the provisions of Labor Code Section 1777.5. It shall be the responsibility of Contractor to ensure compliance with this Article and with Labor Code section 1777.5 for all apprenticeship occupations.

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

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

26.5.4 Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprentice agreements under chapter 4 (commencing at section 3070), division 3, of the Labor Code, are eligible to be employed. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

26.5.5 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractors employing workers in any apprenticeable craft or trade in performing any Work under this Contract shall apply to the applicable joint apprenticeship committee for a certificate approving the Contractor or Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

26.5.6 Pursuant to Labor Code section 1777.5, if that section applies to this Contract as indicated above, Contractor and any Subcontractor may be required to make contributions to the apprenticeship program.

26.5.7 If Contractor or Subcontractor willfully fails to comply with Labor Code section 1777.5, then, upon a determination of noncompliance by the Administrator of Apprenticeship, it shall:

26.5.7.1 Be denied the right to bid on any subsequent project for one (1) year from the date of such determination;

26.5.7.2 Forfeit as a penalty to District the full amount as stated in Labor Code section 1777.7. Interpretation and enforcement of these provisions shall be in accordance with the rules and procedures of the California Apprenticeship Council and under the authority of the Chief of the Division of Apprenticeship Standards.

26.5.8 Contractor and all Subcontractors shall comply with Labor Code section 1777.6, which section forbids certain discriminatory practices in the employment of apprentices.

26.5.9 Contractor shall become fully acquainted with the law regarding apprentices prior to commencement of the Work. Special attention is directed to sections 1777.5, 1777.6, and 1777.7 of the Labor Code, and title 8, California Code of Regulations, section 200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, 9th floor, San Francisco, California 94102.

26.6 Non-Discrimination

26.6.1 Contractor herein agrees to comply with the provisions of the California Fair Employment and Housing Act as set forth in part 2.8 of division 3 of the California Government Code, commencing at section 12900; the Federal Civil Rights Act of 1964, as set forth in Public Law 88-352, and all amendments thereto; Executive Order 11246; and all administrative rules and regulations found to be applicable to Contractor and Subcontractor.

26.6.2 Special requirements for Federally Assisted Construction Contracts: During the performance of this Contract, Contractor agrees to incorporate in all subcontracts the provisions set forth in Chapter 60-1.4(b) of Title 41 published in Volume 33 No. 104 of the Federal Register dated May 28, 1968.

26.7 Labor First Aid

Contractor shall maintain emergency first aid treatment for Contractor's workers on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.) and the California Occupational Safety and Health Act of 1973 (Lab. Code, § 6300 et seq.; 8 Cal. Code of Regs., § 330 et seq.).

27. RESERVED

28. MISCELLANEOUS

28.1 Assignment of Antitrust Actions

28.1.1 Section 7103.5(b) of the Public Contract Code states:

In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, which 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.

28.1.2 Section 4552 of the Government Code states:

In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

28.1.3 Section 4553 of the Government Code states:

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

28.1.4 Section 4554 of the Government Code states:

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

28.1.5 Under this Article, "public purchasing body" is District and "bidder" is Contractor.

28.2 Excise Taxes

If, under Federal Excise Tax Law, any transaction hereunder constitutes a sale on which a Federal Excise Tax is imposed and the sale is exempt from such Federal Excise Tax because it is a sale to a State or Local Government for its exclusive use, District, upon request, will execute documents necessary to show (1) that District is a political subdivision of the State for the purposes of such exemption, and (2) that the sale is for the exclusive use of District. No Federal Excise Tax for such materials shall be included in any Contract Price.

28.3 Taxes

Contract Price is to include any and all applicable sales taxes or other taxes that may be due in accordance with section 7051 et seq. of the Revenue and Taxation Code, Regulation 1521 of the State Board of Equalization or any other tax code that may be applicable.

28.4 Shipments

Contractor is responsible for any or all damage or loss to shipments until delivered and accepted on Site, as indicated in the Contract Documents. There must be no charge for containers, packing, unpacking, drayage, or insurance. The total Contract Price shall be all inclusive (including sales tax) and no additional costs of any type will be considered.

28.5 Compliance with Government Reporting Requirements

If this Contract is subject to federal or other governmental reporting requirements because of federal or other governmental financing in whole or in part for the Project of which it is part, or for any other reason, Contractor shall comply with those reporting requirements at the request of the District at no additional cost.

END OF DOCUMENT

SPECIAL CONDITIONS

1. Mitigation Measures

Contractor as applicable shall comply with all applicable mitigation measures, if any, adopted by any public agency with respect to this Project pursuant to the California Environmental Quality Act. (Public Resources Code section 21000 *et seq.*)

2. Modernization Projects

A. Access. Access to the school buildings and entry to buildings, classrooms, restrooms, mechanical rooms, electrical rooms, or other rooms, for construction purposes, must be coordinated with District and onsite District personnel before Work is to start. Unless agreed to otherwise in writing, only a school custodian will be allowed to unlock and lock doors in existing building(s). The custodian will be available only while school is in session. If a custodian is required to arrive before 7:00 a.m. or leave after 3:30 p.m. to accommodate Contractor's Work, the overtime wages for the custodian will be paid by the Contractor, unless at the discretion of the District, other arrangements are made in advance.

B. Keys. Upon request, the District may, at its own discretion, provide keys to the school site for the convenience of the Contractor. The Contractor agrees to pay all expenses to re-key the entire school site and all other affected District buildings if the keys are lost or stolen, or if any unauthorized party obtains a copy of the key or access to the school.

C. Maintaining Services. The Contractor is advised that Work is to be performed in spaces regularly scheduled for instruction. Interruption and/or periods of shutdown of public access, electrical service, water service, lighting, or other utilities shall be only as arranged in advance with the District. Contractor shall provide temporary services to all facilities interrupted by Contractor's Work.

D. Maintaining Utilities. The Contractor shall maintain in operation during duration of Contract, drainage lines, storm drains, sewers, water, gas, electrical, steam, and other utility service lines within working area.

E. Confidentiality. Contractor shall maintain the confidentiality of all information, documents, programs, procedures and all other items that Contractor encounters while performing the Work. This requirement shall be ongoing and shall survive the expiration or termination of this Contract and specifically includes, without limitation, all student, parent, and employee disciplinary information and health information.

F. Work during Instructional Time. By submitting its bid, Contractor affirms that Work may be performed during ongoing instruction in existing facilities. If so, Contractor agrees to cooperate to the best of its ability to minimize any

disruption to school operations and any use of school facilities by the public up to, and including, rescheduling specific work activities, at no additional cost to District.

G. No Work during Student Testing. Contractor shall, at no additional cost to the District and at the District's request, coordinate its Work to not disturb District students including, without limitation, not performing any Work when students at the Site are taking State or Federally-required tests.

3. Badge Policy for Contractors

All Contractors doing work for the District will provide their workers with identification badges. These badges will be worn by all members of the Contractor's staff who are working in a District facility.

A. Badges must be filled out in full and contain the following information:

3.1.1 Name of Contractor

3.1.2 Name of Employee

3.1.3 Contractor's address and phone number

B. Badges are to be worn when the Contractor or his/her employees are on site and must be visible at all times. Contractors must inform their employees that they are required to allow District employees, the Architect, the Construction Manager, the Program Manager, or the Project Inspector to review the information on the badges upon request.

C. Continued failure to display identification badges as required by this policy may result in the individual being removed from the Project or assessment of fines against the Contractor.

4. Permits, Certificates, Licenses, Fees, Approvals

A. Payment for Permits, Certificates, Licenses, Fees, and Approvals. As required in the General Conditions, the Contractor shall secure and pay for all permits, licenses, approvals, and certificates necessary for the prosecution of the Work with the exception of the following: n/a

With respect to the above-listed items, Contractor shall be responsible for securing such items; however, District will be responsible for payment of these charges or fees. Contractor shall notify the District of the amount due with respect to such items and to whom the amount is payable. Contractor shall provide the District with an invoice and receipt with respect to such charges or fees.

5. As-Builts and Record Drawings

A. When called for by Division 1, Contractor shall submit As-Built Drawings pursuant to the Contract Documents consisting of one set of computer-

aided design and drafting ("CADD") files, PDF format , plus one set of As-Built Drawings in Hard Copy.

B. Contractor shall submit Record Drawings pursuant to the Contract Documents consisting of one set of computer-aided design and drafting ("CADD") files, PDF format, plus one set of Record Drawings in Hard Copy.

6. Construction Manager

The District will use a Construction Manager on the Project that is the subject of this Contract. **Innovative Construction Services, Inc. (ICS), Dave Fukui** is the Construction Manager for this Project.

7. Program Manager

Anthony Lea and/or Chris Ralston, Sac City Unified School District is the Program Manager designated for the Project that is the subject of this Contract.

8. Disabled Veteran Business Enterprises

This Project uses or may plan to use funds allocated pursuant to the State of California School Facility Program ("Program") for the construction and/or modernization of school buildings. Therefore, Section 17076.11 of the Education Code requires the District to have a participation goal for disabled veteran business enterprises ("DVBE") of at least three percent (3%), per year, of the overall dollar amount expended each year by the District on projects that receive state funding. The Contractor must submit the Disabled Veteran Business Enterprise Participation Certification to the District with its executed Agreement, identifying the steps Contractor took to solicit DVBE participation in conjunction with this Contract.

9. COVID-19 Safety Requirements

As required, Contractor shall, at its cost, timely comply with all applicable federal, State, and local requirements relating to COVID-19 or other public health emergency/epidemic/pandemic. Further, except to the extent the Order provides otherwise, Contractor and Contractor's personnel, subcontractors and suppliers shall continue to comply with all applicable terms in the California Department of Public Health's State Public Health Officer Orders.

Title: _____

END OF DOCUMENT

HAZARDOUS MATERIALS
PROCEDURES & REQUIREMENTS

1. Summary

This document includes information applicable to hazardous materials and hazardous waste abatement.

2. Notice of Hazardous Waste or Materials

- a. Contractor shall give notice in writing to the District, the Construction Manager, and the Architect promptly, before any of the following materials are disturbed, and in no event later than twenty-four (24) hours after first observance, of any:
 - (1) Material that Contractor believes may be a material that is hazardous waste or hazardous material, as defined in section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;
 - (2) Other material that may present a substantial danger to persons or property exposed thereto in connection with Work at the site.
- b. Contractor's written notice shall indicate whether the hazardous waste or material was shown or indicated in the Contract Documents to be within the scope of Work, and whether the materials were brought to the site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible. As used in this section the term "hazardous materials" shall include, without limitation, asbestos, lead, Polychlorinated biphenyl (PCB), petroleum and related hydrocarbons, and radioactive material.
- c. In response to Contractor's written notice, the District shall investigate the identified conditions.
- d. If the District determines that conditions do not involve hazardous materials or that no change in terms of Contract is justified, the District shall so notify Contractor in writing, stating reasons. If the District and Contractor cannot agree on whether conditions justify an adjustment in Contract Price or Contract Time, or on the extent of any adjustment, Contractor shall proceed with the Work as directed by the District.
- e. If after receipt of notice from the District, Contractor does not agree to resume Work based on a reasonable belief it is unsafe, or does not agree to resume Work under special conditions, then District may order such portion of Work that is in connection with such hazardous condition or such affected area to be deleted from the Work, or performed by others, or District may invoke its rights to terminate the Contract in whole or in part. District will determine entitlement to or the amount or extent of an adjustment, if any, in

Contract Price or Contract Time as a result of deleting such portion of Work, or performing the Work by others.

- f. If Contractor stops Work in connection with any hazardous condition and in any area affected thereby, Contractor shall immediately redeploy its workers, equipment, and materials, as necessary, to other portions of the Work to minimize delay and disruption.

3. Additional Warranties and Representations

- a. Contractor represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have the required levels of familiarity with the Site and the Work, training, and ability to comply fully with all applicable laws and contractual requirements for safe and expeditious performance of the Work, including whatever training is or may be required regarding the activities to be performed (including, but not limited to, all training required to address adequately the actual or potential dangers of Contract performance).
- b. Contractor represents and warrants that it, its employees, and its subcontractors and their employees, shall at all times have and maintain in good standing any and all certifications and licenses required by applicable federal, state, and other governmental and quasi-governmental requirements applicable to the Work.
- c. Contractor represents and warrants that it has studied carefully all requirements of the Specifications regarding procedures for demolition, hazardous waste abatement, or safety practices, specified in the Contract, and prior to submitting its bid, has either (a) verified to its satisfaction that the specified procedures are adequate and sufficient to achieve the results intended by the Contract Documents, or (b) by way of approved "or equal" request or request for clarification and written Addenda, secured changes to the specified procedures sufficient to achieve the results intended by the Contract Documents. Contractor accepts the risk that any specified procedure will result in a completed Project in full compliance with the Contract Documents.

4. Monitoring and Testing

- a. District reserves the right, in its sole discretion, to conduct air monitoring, earth monitoring, Work monitoring, and any other tests (in addition to testing required under the agreement or applicable law), to monitor Contract requirements of safe and statutorily compliant work methods and (where applicable) safe re-entry level air standards under state and federal law upon completion of the job, and compliance of the work with periodic and final inspection by public and quasi-public entities having jurisdiction.
- b. Contractor acknowledges that District has the right to perform, or cause to be performed, various activities and tests including, but not limited to, pre-abatement, during abatement, and post-abatement air monitoring, that District shall have no obligation to perform said activities and tests, and that a portion of said activities and tests may take place prior to the completion of

the Work by Contractor. In the event District elects to perform these activities and tests, Contractor shall afford District ample access to the Site and all areas of the Work as may be necessary for the performance of these activities and tests. Contractor will include the potential impact of these activities or tests by District in the Contract Price and the Scheduled Completion Date.

- c. Notwithstanding District's rights granted by this paragraph, Contractor may retain its own industrial hygiene consultant at Contractor's own expense and may collect samples and may perform tests including, but not limited to, pre-abatement, during abatement, and post-abatement personal air monitoring, and District reserves the right to request documentation of all such activities and tests performed by Contractor relating to the Work and Contractor shall immediately provide that documentation upon request.

5. Compliance with Laws

- a. Contractor shall perform safe, expeditious, and orderly work in accordance with the best practices and the highest standards in the hazardous waste abatement, removal, and disposal industry, the applicable law, and the Contract Documents, including, but not limited to, all responsibilities relating to the preparation and return of waste shipment records, all requirements of the law, delivering of all requisite notices, and obtaining all necessary governmental and quasi-governmental approvals.
- b. Contractor represents that it is familiar with and shall comply with all laws applicable to the Work or completed Work including, but not limited to, all federal, state, and local laws, statutes, standards, rules, regulations, and ordinances applicable to the Work relating to:
 - (1) The protection of the public health, welfare and environment;
 - (2) Storage, handling, or use of asbestos, PCB, lead, petroleum based products, radioactive material, or other hazardous materials;
 - (3) The generation, processing, treatment, storage, transport, disposal, destruction, or other management of asbestos, PCB, lead, petroleum, radioactive material, or hazardous waste materials or other waste materials of any kind; and
 - (4) The protection of environmentally sensitive areas such as wetlands and coastal areas.

6. Disposal

- a. Contractor has the sole responsibility for determining current waste storage, handling, transportation, and disposal regulations for the job Site and for each waste disposal facility. Contractor must comply fully at its sole cost and expense with these regulations and any applicable law. District may, but is not obligated to, require submittals with this information for it to review consistent with the Contract Documents.

- b. Contractor shall develop and implement a system acceptable to District to track hazardous waste from the Site to disposal, including appropriate "Hazardous Waste Manifests" on the EPA form, so that District may track the volume of waste it put in each landfill and receive from each landfill a certificate of receipt.
- c. Contractor shall provide District with the name and address of each waste disposal facility prior to any disposal, and District shall have the express right to reject any proposed disposal facility. Contractor shall not use any disposal facility to which District has objected. Contractor shall document actual disposal or destruction of waste at a designated facility by completing a disposal certificate or certificate of destruction forwarding the original to the District.

7. Permits

- a. Before performing any of the Work, and at such other times as may be required by applicable law, Contractor shall deliver all requisite notices and obtain the approval of all governmental and quasi-governmental authorities having jurisdiction over the Work. Contractor shall submit evidence satisfactory to District that it and any disposal facility:
 - (1) have obtained all required permits, approvals, and the like in a timely manner both prior to commencement of the Work and thereafter as and when required by applicable law; and
 - (2) are in compliance with all such permits, approvals and the regulations.

For example, before commencing any work in connection with the Work involving asbestos-containing materials, or PCBs, or other hazardous materials subject to regulation, Contractor agrees to provide the required notice of intent to renovate or demolish to the appropriate state or federal agency having jurisdiction, by certified mail, return receipt requested, or by some other method of transmittal for which a return receipt is obtained, and to send a copy of that notice to District. Contractor shall not conduct any Work involving asbestos-containing materials or PCBs unless Contractor has first confirmed that the appropriate agency having jurisdiction is in receipt of the required notification. All permits, licenses, and bonds that are required by governmental or quasi-governmental authorities, and all fees, deposits, tap fees, offsite easements, and asbestos and PCB disposal facilities expenses necessary for the prosecution of the Work, shall be procured and paid for by Contractor. Contractor shall give all notices and comply with the all applicable laws bearing on the conduct of the Work as drawn and specified. If Contractor observes or reasonably should have observed that Plans and Specifications and other Contract Documents are at variance therewith, it shall be responsible for promptly notifying District in writing of such fact. If Contractor performs any Work contrary to applicable laws, it shall bear all costs arising therefrom.

- b. In the case of any permits or notices held in District's name or of necessity to be made in District's name, District shall cooperate with Contractor in securing the permit or giving the notice, but the Contractor shall prepare for District review and execution upon approval, all necessary applications, notices, and other materials.

8. Indemnification

To the fullest extent permitted by law, the indemnities and limitations of liability expressed throughout the Contract Documents apply with equal force and effect to any claims or liabilities imposed or existing by virtue of the removal, abatement, and disposal of hazardous waste. This includes, but is not limited to, liabilities connected to the selection and use of a waste disposal facility, a waste transporter, personal injury, property damage, loss of use of property, damage to the environment or natural resources, or "disposal" and "release" of materials associated with the Work (as defined in 42 U.S.C. § 9601 *et seq.*).

9. Termination

District shall have an absolute right to terminate for default immediately without notice and without an opportunity to cure should Contractor knowingly or recklessly commit a material breach of the terms of the Contract Documents, or any applicable law, on any matter involving the exposure of persons or property to hazardous waste. However, if the breach of contract exposing persons or property to hazardous waste is due solely to an ordinary, unintentional, and non-reckless failure to exercise reasonable care, then the procedures for termination for cause shall apply without modification.

END OF DOCUMENT

EXHIBIT A – Site Logistics Plan

To be coordinated post-award with the District/District Representative

EXHIBIT B - Hazardous Materials Procedures and Requirements

**Attached – Entek Report dated 12/20/2023 included in the bidding documents
and as part of this project manual.**

EXHIBIT C – Geohazard and Geotechnical Engineering Report

Attached – UES Report dated 12/14/2023 included in the bidding documents and as part of this project manual.

EXHIBIT D - DSA Structural Test & Inspection Requirements (DSA 103)

TBD

EXHIBIT E – Storm Water Pollution Prevention Plan (SWPPP)

(NOT USED)

EXHIBIT F – Mitigation Measures

(NOT USED)

SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Site Access Conditions and Requirements;
- B. Special Conditions.

1.02 SUMMARY OF WORK COVERED BY CONTRACT DOCUMENTS

- Re-roofing of all older campus buildings (not including the high multi-purpose roof).
- Campus-wide exterior paint of existing painted surfaces.
- Campus-wide interior paint with custom colors per grade level.
- Campus-wide security fencing including access controls at the main entry gate.
- Traffic / Parking signage.
- Minor / select areas of concrete removal and replacement to meet ADA
- New ADA passenger-loading zone.
- Additional door thresholds and sweeps where replacement concrete is done.
- Removal and replacement of (e) hardcourt play area and all hardcourt play poles. New striping throughout.
- Replacement of underground water, sewer, and storm drain utilities located below paving to be replaced.
- New kinder play apparatuses within existing woodchip fall protection to remain.
- New main play area apparatuses with new concrete perimeter curb and poured-in-place fall-protection.
- New concrete perimeter curb and poured-in-place fall-protection around existing upper-elementary exercise play equipment to remain.
- Patch-back repair and replacement of landscape and irrigation as required around new work.
- Remove and salvage (e) ceiling panels from the admin area to be used to replaced damaged panels at existing classrooms. Provide new ceiling panels at the admin area.
- Replacement hood at kitchen and associated exhaust and makeup air, with associated electrical connections and structural retrofitting as required for additional rooftop equipment.
- Additive Alternate for the Kitchen Electrification: with required health department and code-required upgrades; including new kitchen equipment, added electrical, revised electrical, added plumbing, revised plumbing, new grease-waste interceptor, new walk-in cooler unit, replacement flooring, replacement light fixtures, and adjustments to existing overhead doors at existing service countertop openings, patch back gyp bd ceiling, paint.

Included but not limited to:

1. Furnish and install all labor, material and equipment for all Work shown and/or specified in accordance with the Contract Documents, except as excluded below.
2. This scope of work Section 1.02 also applies to all applicable awarded alternates.
3. Information provided under "Also Included" points out some items which may be considered less obvious or "unconventional", but which are included in the Scope of Work.
4. This Bid Package Description is intended to clarify scope to the Contractor, but is in no way intended to limit scope that is reasonable inferable as being required by the Work included in this description. Work required under the Bid Package may be shown as specified anywhere in the Contract Documents.

Also Included but not limited to:

1. Coordination with other Contractors working on this campus
2. Weather protection during the course of construction
3. Temporary barricades, signs, pedestrian protection, temporary facilities, and traffic control Work.
4. Daily and Final Clean-up.
5. Qualified/Certified Technicians must perform the replacement and/or repair of all landscape, irrigation asphalt/concrete surfaces and above or below grade utilities disturbed during construction, and the District must be given the opportunity to test and accept the Work prior to covering it up.
6. Patching, repairing, painting and/or replacement of all finished surfaces disturbed during construction.
7. Provide temporary means of operation for existing storm, water, sewer, gas, mechanical, electrical, and low voltage systems during construction.
8. Perform an electronic underground existing utility survey by a qualified underground utility locator service company in all areas where trenching operations will be performed. An as-built record drawing (one hard copy and one copy on electronic media prepared in AutoCAD is required to be submitted at the conclusion of the underground scope of Work.
9. Contractor to perform ball/flush/camera of all affected sanitary sewer and/or storm drains prior to and post construction. Video shall be turned over to the District and should include audio and locations.
10. Any campus utility interruptions require a minimum of a 48-hour notice to the District Representative for coordination purposes.
11. A full-time superintendent shall be provided.
12. All demolition and removal and/or replacement of Work associated with this Bid Package.
13. Contractor to provide its own water for its grading activities. Onsite water (hose bibs) will not be sufficient for grading activities.

1.03 CONTRACTS

- A. Perform the Work under a single, fixed-price Contract.

1.04 WORK BY OTHERS

- A. Work on the Project that will be performed and completed prior to the start of the Work of this Contract.
- B. Work on the Project that will be performed by others concurrent with the Work of this Contract.

1.05 CODES, REGULATIONS, AND STANDARDS

- A. The codes, regulations, and standards adopted by the state and federal agencies having jurisdiction shall govern minimum requirements for this Project. Where codes, regulations, and standards conflict with the Contract Documents, these conflicts shall be brought to the immediate attention of the District and the Architect.
- B. Codes, regulations, and standards shall be as published effective as of date of bid opening, unless otherwise specified or indicated.

1.06 PROJECT RECORD DOCUMENTS

- A. Contractor shall maintain on Site one set of the following record documents; Contractor shall record actual revisions to the Work:
 - (1) Contract Drawings.
 - (2) Specifications.
 - (3) Addenda.
 - (4) Change Orders and other modifications to the Contract.
 - (5) Reviewed shop drawings, product data, and samples.
 - (6) Field test records.
 - (7) Inspection certificates.
 - (8) Manufacturer's certificates.
- B. Contractor shall store Record Documents separate from documents used for construction. Provide files, racks, and secure storage for Record Documents and samples.
- C. Contractor shall record information concurrent with construction progress.
- D. Specifications: Contractor shall legibly mark and record at each product section of the Specifications the description of the actual product(s) installed, including the following:
 - (1) Manufacturer's name and product model and number.

- (2) Product substitutions or alternates utilized.
- (3) Changes made by Addenda and Change Orders and written directives.

1.07 EXAMINATION OF EXISTING CONDITIONS

- A. Contractor shall be held to have examined the Project Site and acquainted itself with the conditions of the Site and of the streets or roads approaching the Site.
- B. Prior to commencement of Work, Contractor shall survey the Site and existing buildings and improvements to observe existing damage and defects such as cracks, sags, broken, missing or damaged glazing, other building elements and Site improvements, and other damage.
- C. Should Contractor observe cracks, sags, and other damage to and defects of the Site and adjacent buildings, paving, and other items not indicated in the Contract Documents, Contractor shall immediately report same to the District and the Architect.

1.08 CONTRACTOR'S USE OF PREMISES

- A. If unoccupied and only with District's prior written approval, Contractor may use the building(s) at the Project Site without limitation for its operations, storage, and office facilities for the performance of the Work. If the District chooses to beneficially occupy any building(s), Contractor must obtain the District's written approval for Contractor's use of spaces and types of operations to be performed within the building(s) while so occupied. Contractor's access to the building(s) shall be limited to the areas indicated.
- B. If the space at the Project Site is not sufficient for Contractor's operations, storage, office facilities and/or parking, Contractor shall arrange and pay for any additional facilities needed by Contractor.
- C. Contractor shall not interfere with use of or access to occupied portions of the building(s) or adjacent property.
- D. Contractor shall maintain corridors, stairs, halls, and other exit-ways of building clear and free of debris and obstructions at all times.
- E. No one other than those directly involved in the demolition and construction, or specifically designated by the District or the Architect shall be permitted in the areas of work during demolition and construction activities.
- F. The Contractor shall install the construction fence and maintain that it will be locked when not in use. Keys to this fencing will be provided to the District.

1.09 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. The Drawings show above-grade and below-grade structures, utility lines, and other installations that are known or believed to exist in the area of the Work. Contractor shall locate these existing installations before proceeding with

excavation and other operations that could damage same; maintain them in service, where appropriate; and repair damage to them caused by the performance of the Work. Should damage occur to these existing installations, the costs of repair shall be at the Contractor's expense and made to the District's satisfaction.

- B. Contractor shall be alert to the possibility of the existence of additional structures and utilities. If Contractor encounters additional structures and utilities, Contractor will immediately report to the District for disposition of same as indicated in the General Conditions.

1.10 UTILITY SHUTDOWNS AND INTERRUPTIONS

- A. Contractor shall give the District a minimum of three (3) days written notice in advance of any need to shut off existing utility services or to effect equipment interruptions. The District will set exact time and duration for shutdown, and will assist Contractor with shutdown. Work required to re-establish utility services shall be performed by the Contractor.
- B. Contractor shall obtain District's written approval as indicated in the General Conditions in advance of deliveries of material or equipment or other activities that may conflict with District's use of the building(s) or adjacent facilities.

1.11 STRUCTURAL INTEGRITY

- A. Contractor shall be responsible for and supervise each operation and work that could affect structural integrity of various building elements, both permanent and temporary.
- B. Contractor shall include structural connections and fastenings as indicated or required for complete performance of the Work.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

ALLOWANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-specified work.

1.2 RELATED SECTIONS

A. Document 01 10 00 (Summary of Work)

B. Document 01 29 00 (Payments and Completion)

C. Document 01 32 19 (Submittal Procedures)

1.3 ALLOWANCES

A. Included in the Contract, a stipulated sum/price of **\$350,000.00**.

As Owner allowances within the limits set forth in the Contract Documents. These Allowance(s) shall not be utilized without written approval by the District.

B. Contractor's costs, without overhead and profit, for products, delivery, installation, labor, insurance, payroll, taxes, bonding and equipment rental will be included in Allowance Expenditure Directive authorizing expenditure of funds from this Allowance. No overhead and profit shall be added to the Allowance Expenditure Directive.

C. Funds will be drawn from Allowance only with District approval evidenced by an Allowance Expenditure Directive.

D. At Contract closeout, funds remaining in Allowance will be credited to District by Change Order.

E. Whenever costs are more than the Allowance, the amount covered by the Allowance will be approved at cost. The Contract Price shall be adjusted by Change Order for amounts in excess of the Allowance.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF DOCUMENT

ALTERNATES AND UNIT PRICING

PART 1 – ALTERNATES

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Bid Form and Proposal;
- D. Instruction to Bidders.

1.02 DESCRIPTION

The items of work indicated below propose modifications to, substitutions for, additions to and/or deletions from the various parts of the Work specified in other Sections of the Specifications. The acceptance or rejection of any of the alternates is strictly at the option of the District subject to District's acceptance of Contractor's stated prices contained in this Proposal.

1.03 GENERAL

Where an item is omitted, or scope of Work is decreased, all Work pertaining to the item whether specifically stated or not, shall be omitted and where an item is added or modified or where scope of Work is increased, all Work pertaining to that required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

1.04 BASE BID

The Base Bid includes all work required to construct the Project completely and in accordance with the Contract Documents.

1.05 ALTERNATES

The above Alternate descriptions are general in nature and for reference purposes only. The Contract Documents, including, without limitation, the Drawings and Specifications, must be referred to for the complete scope of Work.

PART 2 - UNIT PRICING (NOT USED)

2.01 GENERAL

Contractor shall completely state all required figures based on Unit Prices listed below. Where scope of Work is decreased, all Work pertaining to the item, whether specifically stated or not, shall be omitted and where scope of Work is increased, all work pertaining to that item required to render same ready for use on the Project in accordance with intention of Drawings and Specifications shall be included in an agreed upon price amount.

2.02 UNIT PRICES

Furnish unit prices for each of the named items on a square foot, lineal foot, or per each basis, as applies. Unit prices shall include all labor, materials, services, profit, overhead, insurance, bonds, taxes, and all other incidental costs of Contractor, subcontractors, and supplier(s).

END OF DOCUMENT

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. Instructions to Bidders;
- B. General Conditions, including, without limitation, Substitutions For Specified Items; and
- C. Special Conditions.

1.02 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

- A. Catalog numbers and specific brands or trade names followed by the designation "or equal" are used in conjunction with material and equipment required by the Specifications to establish the standards of quality, utility, and appearance required. Substitutions which are equal in quality, utility, and appearance to those specified may be reviewed subject to the provisions of the General Conditions.
- B. Wherever more than one manufacturer's product is specified, the first-named product is the basis for the design used in the work and the use of alternative-named manufacturers' products or substitutes may require modifications in that design. If such alternatives are proposed by Contractor and are approved by the District and/or the Architect, Contractor shall assume all costs required to make necessary revisions and modifications of the design resulting from the substitutions requested by the Contractor.
- C. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name and "or approved equal," supporting data for the second product, if proposed by Contractor, shall be submitted in accordance with the requirements for substitutions. The District's Board has found and determined that certain item(s) shall be used on this Project based on the purpose(s) indicated pursuant to Public Contract Code section 3400(c). These findings, as well as the products and brand or trade names, have been identified in the Notice to Bidders.
- D. The Contractor will not be allowed to substitute specified items unless the request for substitution is submitted as follows:
 - (1) District must receive any notice of request for substitution of a specified item a minimum of ten (10) calendar days prior to bid opening.

- (2) Within 35 days after the date of the Notice of Award, the Contractor shall submit data substantiating the request(s) for all substitution(s) containing sufficient information to assess acceptability of product or system and impact on Project, including, without limitation, the requirements specified in the Special Conditions and the technical Specifications. Insufficient information shall be grounds for rejection of substitution.
- E. If the District and/or Architect, in reviewing proposed substitute materials and equipment, require revisions or corrections to be made to previously accepted Shop Drawings and supplemental supporting data to be resubmitted, Contractor shall promptly do so. If any proposed substitution is judged by the District and/or Architect to be unacceptable, the specified material or equipment shall be provided.
- F. Samples may be required. Tests required by the District and/or Architect for the determination of quality and utility shall be made at the expense of Contractor, with acceptance of the test procedure first given by the District.
- G. In reviewing the supporting data submitted for substitutions, the District and/or Architect will use for purposes of comparison all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Contract Documents. If more than two (2) submissions of supporting data are required, the cost of reviewing the additional supporting data shall be borne by Contractor, and the District will deduct the costs from the Contract Price. The Contractor shall be responsible for any re-design costs occasioned by District's acceptance and/or approval of any substitute.
- H. The Contractor shall, in the event that a substitute is less costly than that specified, credit the District with one hundred percent (100%) of the net difference between the substitute and the originally specified material. In this event, the Contractor agrees to execute a deductive Change Order to reflect that credit. In the event Contractor furnishes a material, process, or article more expensive than that specified, the difference in the cost of that material, process, or article so furnished shall be borne by Contractor.
- I. In no event shall the District be liable for any increase in Contract Price or Contract Time due to any claimed delay in the evaluation of any proposed substitute or in the acceptance or rejection of any proposed substitute.
- J. All Substitutions affecting DSA regulated items, or related to DSA SSS, ACS, and FLS items shall be considered as a CCD or Addenda and shall be submitted to and 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.

PART 2 – PRODUCTS Not used

PART 3 – EXECUTION Not used

END OF DOCUMENT

DOCUMENT 01 26 00

CHANGES IN THE WORK

CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE PROVISIONS IN THE AGREEMENT, GENERAL CONDITIONS, AND SPECIAL CONDITIONS, IF USED, RELATED TO CHANGES AND/OR REQUESTS FOR CHANGES.

END OF DOCUMENT

DOCUMENT 01 29 00

**APPLICATION FOR PAYMENT AND
CONDITIONAL AND UNCONDITIONAL WAIVER AND RELEASE FORMS**

**CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS IN THE GENERAL
CONDITIONS RELATED TO APPLICATIONS FOR PAYMENT AND/OR
PAYMENTS.**

**CONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(CIVIL CODE SECTION 8132)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: _____

Amount of Check: \$ _____

Check Payable to: _____

Exceptions

This document does not affect any of the following:

- (1) Retentions.
- (2) Extras for which the claimant has not received payment.
- (3) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release: _____

Amount(s) of unpaid progress payment(s): \$ _____

**SACRAMENTO CITY USD
Alice Birney Public Waldorf Campus
Renewal**

**APPLICATION FOR PAYMENT AND
CONDITIONAL AND UNCONDITIONAL
WAIVER AND RELEASE FORMS
DOCUMENT 01 29 00-2**

- (4) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**UNCONDITIONAL WAIVER AND RELEASE
ON PROGRESS PAYMENT
(CIVIL CODE SECTION 8134)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Through Date: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: \$_____

Exceptions

This document does not affect any of the following:

- (5) Retentions.
- (6) Extras for which the claimant has not received payment.
- (7) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**CONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(CIVIL CODE SECTION 8136)**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT'S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant's receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: _____

Amount of Check: \$ _____

Check Payable to: _____

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: \$ _____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

**UNCONDITIONAL WAIVER AND RELEASE
ON FINAL PAYMENT
(CIVIL CODE SECTION 8138)**

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Name of Claimant: _____

Name of Customer: _____

Job Location: _____

Owner: _____

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect any of the following: _____

Disputed claims for extras in the amount of: \$_____

Claimant's Signature: _____

Claimant's Title: _____

Date of Signature: _____

PROJECT MEETINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions; and
- B. Special Conditions.

1.02 PROGRESS MEETINGS:

- A. The District Representative shall schedule and hold regular weekly progress meetings after a minimum of one week's prior written notice of the meeting date and time to all Invitees as indicated below.
- B. Location: TBD
- C. The District Representative shall notify and invite the following entities ("Invitees"):
 - (1) District Representative.
 - (2) Contractor.
 - (3) Contractor's Project Manager.
 - (4) Contractor's Superintendent.
 - (5) Subcontractors, as appropriate to the agenda of the meeting.
 - (6) Suppliers, as appropriate to the agenda of the meeting.
 - (7) Architect
 - (8) Engineer(s), if any and as appropriate to the agenda of the meeting.
 - (9) Others, as appropriate to the agenda of the meeting.
- D. The District's and/or the Architect's Consultants will attend at their discretion, in response to the agenda.
- E. The District representative, the Construction Manager, and/or another District Agent shall take and distribute meeting notes to attendees and other concerned parties. If exceptions are taken to anything in the meeting notes,

those exceptions shall be stated in writing to the District within five (5) working days following District's distribution of the meeting notes.

1.03 PRE-INSTALLATION/PERFORMANCE MEETING:

- A. Contractor shall schedule a meeting prior to the start of each of the following portions of the Work: n/a Contractor shall invite all Invitees to this meeting, and others whose work may affect or be affected by the quality of the cutting and patching work.
- B. Contractor shall review in detail prior to this meeting, the manufacturer's requirements and specifications, applicable portions of the Contract Documents, Shop Drawings, and other submittals, and other related work. At this meeting, invitees shall review and resolve conflicts, incompatibilities, or inadequacies discovered or anticipated.
- C. Contractor shall review in detail Project conditions, schedule, requirements for performance, application, installation, and quality of completed Work, and protection of adjacent Work and property.
- D. Contractor shall review in detail means of protecting the completed Work during the remainder of the construction period.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

SCHEDULING OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Summary of Work; and
- D. Submittals.

1.02 SECTION INCLUDES

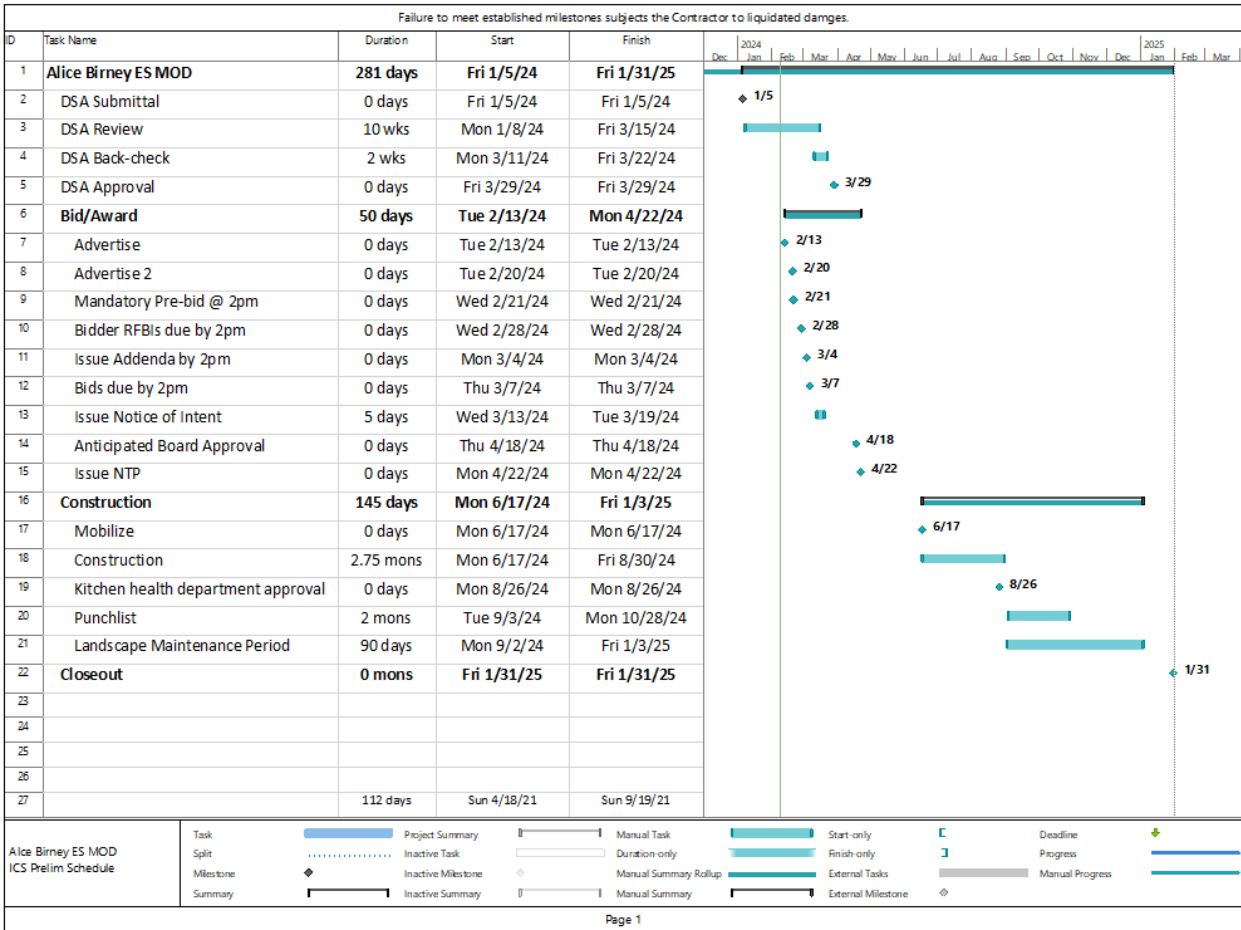
- A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.
 - (1) Development of schedule, cost and resource loading of the schedule, monthly payment requests, and project status reporting requirements of the Contract shall employ computerized Critical Path Method ("CPM") scheduling ("CPM Schedule").
 - (2) CPM Schedule shall be cost loaded based on Schedule of Values as approved by District.
 - (3) Submit schedules and reports as specified in the General Conditions.
- B. Upon Award of Contract, Contractor shall immediately commence development of Initial and Original CPM Schedules to ensure compliance with CPM Schedule submittal requirements.

1.03 CONSTRUCTION SCHEDULE

- A. Within ten (10) days of issuance of the Notice of Intent to Award and before request for first progress payment, the Contractor shall prepare and submit to the Project Manager a construction progress schedule conforming to the Milestone Schedule below.
- B. The Construction Schedule shall be continuously updated, and an updated schedule shall be submitted with each application for progress payment. Each revised schedule shall indicate the work actually accomplished during the previous period and the schedule for completion of the remaining work.

C. Milestone Schedule:

Preliminary Construction Schedule



1.04 QUALIFICATIONS

A. Contractor shall employ experienced scheduling personnel qualified to use the latest version of Microsoft Project. Experience level required is set forth below. Contractor may employ such personnel directly or may employ a consultant for this purpose.

- (1) The written statement shall identify the individual who will perform CPM scheduling.
- (2) Capability and experience shall be verified by description of construction projects on which individual has successfully applied computerized CPM.
- (3) Required level of experience shall include at least two (2) projects of similar nature and scope with value not less than three fourths (¾) of the Total Bid Price of this Project. The written statement shall provide

contact persons for referenced projects with current telephone and address information.

- B. District reserves the right to approve or reject Contractor's scheduler or consultant at any time. District reserves the right to refuse replacing of Contractor's scheduler or consultant, if District believes replacement will negatively affect the scheduling of Work under this Contract.

1.05 GENERAL

- A. Progress Schedule shall be based on and incorporate milestone and completion dates specified in Contract Documents.
- B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in the Contract, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by District. Any such agreement shall be formalized by a Change Order.
 - (1) District is not required to accept an early completion schedule, i.e., one that shows an earlier completion date than the Contract Time.
 - (2) Contractor shall not be entitled to extra compensation in event agreement is reached on an earlier completion schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in its early completion schedule but within the Contract Time.
 - (3) A schedule showing the work completed in less than the Contract Time, and that has been accepted by District, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and the Completion Date. Project Float is a resource available to both District and the Contractor.
- C. Ownership Project Float: Neither the District nor Contractor owns Project Float. The Project owns the Project Float. As such, liability for delay of the Completion Date rests with the party whose actions, last in time, actually cause delay to the Completion Date.
 - (1) For example, if Party A uses some, but not all of the Project Float and Party B later uses remainder of the Project Float as well as additional time beyond the Project Float, Party B shall be liable for the time that represents a delay to the Completion Date.
 - (2) Party A would not be responsible for the time since it did not consume the entire Project Float and additional Project Float remained; therefore, the Completion Date was unaffected by Party A.
- D. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract CPM Schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

- E. Failure of Progress Schedule to include any element of the Work, or any inaccuracy in Progress Schedule, will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. District's acceptance of schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests and shall not, in any manner, impose a duty of care upon District, or act to relieve Contractor of its responsibility for means and methods of construction.
- F. Software: Use **District Preferred Project Planning Software**. Such software shall be compatible with Windows operating system. Contractor shall transmit contract file to District on compact disk at times requested by District.
- G. Transmit each item under the form approved by District.
 - (1) Identify Project with District Contract number and name of Contractor.
 - (2) Provide space for Contractor's approval stamp and District's review stamps.
 - (3) Submittals received from sources other than Contractor will be returned to the Contractor without District's review.

1.06 INITIAL CPM SCHEDULE

- A. Initial CPM Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to ninety (90) calendar days after the Notice to Proceed.
- B. Indicate detailed plan for the Work to be completed in first ninety (90) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; procurement of materials and equipment. Show Work beyond ninety (90) calendar days in summary form.
- C. Initial CPM Schedule shall be time scaled.
- D. Initial CPM Schedule shall be cost and resource loaded. Accepted cost and resource loaded schedule will be used as basis for monthly progress payments until acceptance of the Original CPM Schedule. Use of Initial CPM Schedule for progress payments shall not exceed ninety (90) calendar days.
- E. District and Contractor shall meet to review and discuss the Initial CPM Schedule within seven (7) calendar days after it has been submitted to District.
 - (1) District's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).
 - (2) Contractor shall make corrections to schedule necessary to comply with Contract requirements and shall adjust schedule to incorporate

any missing information requested by District. Contractor shall resubmit Initial CPM Schedule if requested by District.

- F. If, during the first ninety (90) days after Notice to Proceed, the Contractor is of the opinion that any of the Work included on its Initial CPM Schedule has been impacted, the Contractor shall submit to District a written Time Impact Evaluation ("TIE") in accordance with Article 1.12 of this Section. The TIE shall be based on the most current update of the Initial CPM Schedule.

1.07 ORIGINAL CPM SCHEDULE

- A. Submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work in conformance with requirements as specified herein.
- B. Progress Schedule shall include or comply with following requirements:
 - (1) Time scaled, cost and resource (labor and major equipment) loaded CPM schedule.
 - (2) No activity on schedule shall have duration longer than fifteen (15) workdays, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by District.
 - (a) Activity durations shall be total number of actual workdays required to perform that activity.
 - (3) The start and completion dates of all items of Work, their major components, and milestone completion dates, if any.
 - (4) District furnished materials and equipment, if any, identified as separate activities.
 - (5) Activities for maintaining Project Record Documents.
 - (6) Dependencies (or relationships) between activities.
 - (7) Processing/approval of submittals and shop drawings for all material and equipment required per the Contract. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.
 - (a) Include time for submittals, re-submittals and reviews by District. Coordinate with accepted schedule for submission of Shop Drawings, samples, and other submittals.
 - (b) Contractor shall be responsible for all impacts resulting from re-submittal of Shop Drawings and submittals.
 - (8) Procurement of major equipment, through receipt and inspection at jobsite, identified as separate activity.

- (a) Include time for fabrication and delivery of manufactured products for the Work.
- (b) Show dependencies between procurement and construction.
- (9) Activity description; what Work is to be accomplished and where.
- (10) The total cost of performing each activity shall be total of labor, material, and equipment, excluding overhead and profit of Contractor. Overhead and profit of the General Contractor shall be shown as a separate activity in the schedule. Sum of cost for all activities shall equal total Contract value.
- (11) Resources required (labor and major equipment) to perform each activity.
- (12) Responsibility code for each activity corresponding to Contractor or Subcontractor responsible for performing the Work.
- (13) Identify the activities which constitute the controlling operations or critical path. No more than twenty-five (25%) of the activities shall be critical or near critical. Near critical is defined as float in the range of one (1) to (10) days.
- (14) Twenty (20) workdays for developing punch list(s), completion of punch-list items, and final clean up for the Work or any designated portion thereof. No other activities shall be scheduled during this period.
- (15) Interface with the work of other contractors, District, and agencies such as, but not limited to, utility companies.
- (16) Show detailed Subcontractor Work activities. In addition, furnish copies of Subcontractor schedules upon which CPM was built.
 - (a) Also furnish for each Subcontractor, as determined by District, submitted on Subcontractor letterhead, a statement certifying that Subcontractor concurs with Contractor's Original CPM Schedule and that Subcontractor's related schedules have been incorporated, including activity duration, cost and resource loading.
 - (b) Subcontractor schedules shall be independently derived and not a copy of Contractor's schedule.
 - (c) In addition to Contractor's schedule and resource loading, obtain from electrical, mechanical, and plumbing Subcontractors, and other Subcontractors as required by District, productivity calculations common to their trades, such as units per person day, feet of pipe per day per person, feet of wiring per day per person, and similar information.

- (d) Furnish schedule for Contractor/Subcontractor CPM schedule meetings which shall be held prior to submission of Original CPM schedule to District. District shall be permitted to attend scheduled meetings as an observer.
 - (17) Activity durations shall be in Work days.
 - (18) Submit with the schedule a list of anticipated non-Work days, such as weekends and holidays. The Progress Schedule shall exclude in its Work day calendar all non-Work days on which Contractor anticipates critical Work will not be performed.
- C. Original CPM Schedule Review Meeting: Contractor shall, within sixty (60) days from the Notice to Proceed date, meet with District to review the Original CPM Schedule submittal.
- (1) Contractor shall have its Project Manager, Project Superintendent, Project Scheduler, and key Subcontractor representatives, as required by District, in attendance. The meeting will take place over a continuous one (1) day period.
 - (2) District's review will be limited to submittal's conformance to Contract requirements including, but not limited to, coordination requirements. However, review may also include:
 - (a) Clarifications of Contract Requirements.
 - (b) Directions to include activities and information missing from submittal.
 - (c) Requests to Contractor to clarify its schedule.
 - (3) Within five (5) days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by District at the Meeting.

1.08 ADJUSTMENTS TO CPM SCHEDULE

- A. Adjustments to Original CPM Schedule: Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments from original CPM Schedule review meeting and resubmit network diagrams and reports for District's review.
- (1) District, within ten (10) days from date that Contractor submitted the revised schedule, will either:
 - (a) Accept schedule and cost and resource loaded activities as submitted, or
 - (b) Advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for District to monitor Project's progress,

resources, and status or evaluate monthly payment request by Contractor.

- (2) District may accept schedule with conditions that the first monthly CPM Schedule update be revised to correct deficiencies identified.
 - (3) When schedule is accepted, it shall be considered the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.
 - (4) District reserves right to require Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.
- B. Acceptance of Contractor's schedule by District will be based solely upon schedule's compliance with Contract requirements.
- (1) By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.
 - (2) Upon submittal of schedule update, updated schedule shall be considered "current" CPM Schedule.
 - (3) Submission of Contractor's schedule to District shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed Work.
- C. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.
- D. Contractor shall distribute Original CPM Schedule to Subcontractors for review and written acceptance, which shall be noted on Subcontractors' letterheads to Contractor and transmitted to District for the record.

1.09 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

- A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.
- (1) Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.
 - (2) Each update shall continue to show all Work activities including those already completed. These completed activities shall accurately reflect

“as built” information by indicating when activities were actually started and completed.

- B. A meeting will be held on approximately the twenty-fifth (25th) of each month to review the schedule update submittal and progress payment application.
 - (1) At this meeting, at a minimum, the following items will be reviewed: Percent (%) complete of each activity; Time Impact Evaluations for Change Orders and Time Extension Request; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated Contractor delays.
 - (2) These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor’s General Superintendent and Scheduler.
 - (3) Contractor shall plan on the meeting taking no less than four (4) hours.
- C. Within five (5) working days after monthly schedule update meeting, Contractor shall submit the updated CPM Schedule update.
- D. Within five (5) workdays of receipt of above noted revised submittals, District will either accept or reject monthly schedule update submittal.
 - (1) If accepted, percent (%) complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor’s Application for Payment.
 - (2) If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.
- E. Neither updating, changing or revising of any report, curve, schedule, or narrative submitted to District by Contractor under this Contract, nor District’s review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying in any way the Completion Date or milestone dates or of modifying or limiting in any way Contractor’s obligations under this Contract.

1.10 SCHEDULE REVISIONS

- A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.
- B. To reflect revisions to the Schedule, the Contractor shall provide District with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram which compares the original sequence to the

revised sequence of work. The Contractor shall provide the written narrative and schedule diagram for revisions two (2) working days in advance of the monthly schedule update meeting.

- C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District. District may request further information and justification for schedule revisions and Contractor shall, within three (3) days, provide District with a complete written narrative response to District's request.
- D. If the Contractor's revision is still not accepted by District, and the Contractor disagrees with District's position, the Contractor has seven (7) calendar days from receipt of District's letter rejecting the revision to provide a written narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of District's written rejection of a schedule revision shall be contractually interpreted as acceptance of District's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding District's position.
- E. At District's discretion, the Contractor can be required to provide Subcontractor certifications of performance regarding proposed schedule revisions affecting said Subcontractors.

1.11 RECOVERY SCHEDULE

- A. If the Schedule Update shows a completion date twenty-one (21) calendar days beyond the Contract Completion Date, or individual milestone completion dates, the Contractor shall submit to District the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.
- B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by District.
- C. If the Contractor's revisions are not accepted by District, District and the Contractor shall follow the procedures in paragraph 1.09.C, 1.09.D and 1.09.E above.
- D. At District's discretion, the Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.

1.12 TIME IMPACT EVALUATION ("TIE") FOR CHANGE ORDERS, AND OTHER DELAYS

- A. When Contractor is directed to proceed with changed Work, the Contractor shall prepare and submit within fourteen (14) calendar days from the Notice to Proceed a TIE which includes both a written narrative and a schedule diagram depicting how the changed Work affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate

the changed Work in the schedule and how it impacts the current schedule-update critical path. The Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram must be tied to the main sequence of schedule activities to enable District to evaluate the impact of changed Work to the scheduled critical path.

- B. Contractor shall be required to comply with the requirements of Paragraph 1.09.A for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.
- C. Contractor shall be responsible for all costs associated with the preparation of TIEs, and the process of incorporating them into the current schedule update. The Contractor shall provide District with four (4) copies of each TIE.
- D. Once agreement has been reached on a TIE, the Contract Time will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Time may be extended in an amount District allows, and the Contractor may submit a claim for additional time claimed by contractor.

1.13 TIME EXTENSIONS

- A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accord with the General Conditions.
- B. Where an event for which District is responsible impacts the projected Completion Date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment, and material the Contractor would expend to mitigate District-caused time impact. The Contractor shall submit its mitigation plan to District within fourteen (14) calendar days from the date of discovery of the impact. The Contractor is responsible for the cost to prepare the mitigation plan.
- C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.
- D. No time will be granted under this Contract for cumulative effect of changes.
- E. District will not be obligated to consider any time extension request unless the Contractor complies with the requirements of Contract Documents.
- F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.
- G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

1.14 SCHEDULE REPORTS

- A. Submit four (4) copies of the following reports with the Initial CPM Schedule, the Original CPM Schedule, and each monthly update.
- B. Required Reports:
 - (1) Two activity listing reports: one sorted by activity number and one by total Project Float. These reports shall also include each activity's early/late and actual start and finish dates, original and remaining duration, Project Float, responsibility code, and the logic relationship of activities.
 - (2) Cost report sorted by activity number including each activity's associated cost, percentage of Work accomplished, earned value- to date, previous payments, and amount earned for current update period.
 - (3) Schedule plots presenting time-scaled network diagram showing activities and their relationships with the controlling operations or critical path clearly highlighted.
 - (4) Cash flow report calculated by early start, late start, and indicating actual progress. Provide an exhibit depicting this information in graphic form.
 - (5) Planned versus actual resource (i.e., labor) histogram calculated by early start and late start.
- C. Other Reports:

In addition to above reports, District may request, from month to month, any two of the following reports. Submit four (4) copies of all reports.

- (1) Activities by early start.
 - (2) Activities by late start.
 - (3) Activities grouped by Subcontractors or selected trades.
 - (4) Activities with scheduled early start dates in a given time frame, such as fifteen (15) or thirty (30) day outlook.
- D. Furnish District with report files on compact disks containing all schedule files for each report generated.

1.15 PROJECT STATUS REPORTING

- A. In addition to submittal requirements for CPM scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each CPM Schedule as specified herein. Status reporting shall be in form specified below.

- B. Contractor shall prepare monthly written narrative reports of status of Project for submission to District. Written status reports shall include:
- (1) Status of major Project components (percent (%) complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.
 - (2) Progress made on critical activities indicated on CPM Schedule.
 - (3) Explanations for any lack of work on critical path activities planned to be performed during last month.
 - (4) Explanations for any schedule changes, including changes to logic or to activity durations.
 - (5) List of critical activities scheduled to be performed next month.
 - (6) Status of major material and equipment procurement.
 - (7) Any delays encountered during reporting period.
 - (8) Contractor shall provide printed report indicating actual versus planned resource loading for each trade and each activity. This report shall be provided on weekly and monthly basis.
 - (a) Actual resource shall be accumulated in field by Contractor, and shall be as noted on Contractor's daily reports. These reports will be basis for information provided in computer-generated monthly and weekly printed reports.
 - (b) Contractor shall explain all variances and mitigation measures.
 - (9) Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by District at no additional cost.
 - (10) Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

1.16 WEEKLY SCHEDULE REPORT

At the Weekly Progress Meeting, the Contractor shall provide and present a time-scaled three (3) week look-ahead schedule that is based and correlated by activity number to the current schedule (i.e., Initial, Original CPM, or Schedule Update).

1.17 DAILY CONSTRUCTION REPORTS

On a daily basis, Contractor shall submit a daily activity report to District for each workday, including weekends and holidays when worked. Contractor shall develop the daily construction reports on a computer-generated database capable of sorting daily Work, manpower, and man-hours by Contractor, Subcontractor, area, sub-

area, and Change Order Work. Upon request of District, furnish computer disk of this data base. Obtain District's written approval of daily construction report data base format prior to implementation. Include in report:

- A. Project name and Project number.
- B. Contractor's name and address.
- C. Weather, temperature, and any unusual site conditions.
- D. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work of Subcontractors. Descriptions shall be referenced to CPM scheduled activities.
- E. Worker quantities for its own Work force and for Subcontractors of any tier.
- F. Equipment, other than hand tools, utilized by Contractor and Subcontractors.

1.18 PERIODIC VERIFIED REPORTS

Contractor shall complete and verify construction reports on a form prescribed by the Division of the State Architect and file reports on the first day of February, May, August, and November during the preceding quarter year; at the completion of the Contract; at the completion of the Work; at the suspension of Work for a period of more than one (1) month; whenever the services of Contractor or any of Contractor's Subcontractors are terminated for any reason; and at any time a special verified report is required by the Division of the State Architect. Refer to section 4-336 and section 4-343 of Part 1, Title 24 of the California Code of Regulations.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Contractor's Submittals and Schedules, Drawings and Specifications;
- B. Special Conditions.

1.02 SECTION INCLUDES:

- A. Definitions:
 - (1) Shop Drawings and Product Data are as indicated in the General Conditions and include, but are not limited to, fabrication, erection, layout and setting drawings, formwork and falsework drawings, manufacturers' standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams. In addition, there are 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 all positions conform to the requirement of the Contract Documents, including, without limitation, the Drawings.
 - (2) "Manufactured" applies to standard units usually mass-produced; "fabricated" means specifically assembled or made out of selected materials to meet design requirements. Shop Drawings shall establish the actual detail of manufactured or fabricated items, indicated proper relation to adjoining work and amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure.
 - (3) Manufacturer's Instructions: Where any item of Work is required by the Contract Documents to be furnished, installed, or performed, at a minimum, in accordance with a specified product manufacturer's instructions, the Contractor shall procure and distribute copies of these to the District, the Architect, and all other concerned parties and shall furnish, install, or perform the work, at a minimum, in accordance with those instructions.

- B. Samples, Shop Drawings, Product Data, and other items as specified, in accordance with the following requirements:
- (1) Contractor shall submit all Shop Drawings, Product Data, and Samples to the District, the Architect, the Project Inspector, and the Construction Manager.
 - (2) Contractor shall comply with all time frames herein and in the General Conditions and, in any case, shall submit required information in sufficient time to permit proper consideration and action before ordering any materials or items represented by such Shop Drawings, Product Data, and/or Samples.
 - (3) Contractor shall allow sufficient time so that no delay occurs due to required lead time in ordering or delivery of any item to the Site. Contractor shall be responsible for any delay in progress of Work due to its failure to observe these requirements.
 - (4) Time for completion of Work shall not be extended on account of Contractor's failure to promptly submit Shop Drawings, Product Data, and/or Samples.
 - (5) Reference numbers on Shop Drawings shall have Architectural and/or Engineering Contract Drawings reference numbers for details, sections, and "cuts" shown on Shop Drawings. These reference numbers shall be in addition to any numbering system that Contractor chooses to use or has adopted as standard.
 - (6) When the magnitude or complexity of submittal material prevents a complete review within the stated time frame, Contractor shall make this submittal in increments to avoid extended delays.
 - (7) Contractor shall certify on submittals for review that submittals conform to Contract requirements. Also certify that Contractor-furnished equipment can be installed in allocated space. In event of any variance, Contractor shall specifically state in transmittal and on Shop Drawings, portions vary and require approval of a substitute. Submittals shall not be used as a means of requesting a substitution.
 - (8) Unless specified otherwise, sampling, preparation of samples, and tests shall be in accordance with the latest standard of the American Society for Testing and Materials.
 - (9) Upon demand by Architect or District, Contractor shall submit samples of materials and/or articles for tests or examinations and consideration before Contractor incorporates same in Work. Contractor shall be solely responsible for delays due to sample(s) not being submitted in time to allow for tests. Acceptance or rejection will be expressed in writing. Work shall be equal to approved samples in every respect. Samples that are of value after testing will remain the property of Contractor.

- C. Submittal Schedule:
- (1) Contractor shall prepare its proposed submittal schedule that is coordinated with the proposed construction schedule and submit both to the District within ten (10) days after the date of the Notice to Proceed. Contractor's proposed schedules shall become the Project Construction Schedule and the Project Submittal Schedule after each is approved by the District.
 - (2) Contractor is responsible for all lost time should the initial submittal be rejected, marked "revise and resubmit", etc.
 - (3) All Submittals shall be forwarded to the District by the date indicated on the approved Submittal Schedule, unless an earlier date is necessary to maintain the Construction Schedule, in which case those Submittals shall be forwarded to the District so as not to delay the Construction Schedule.
 - (4) Contractor may be assessed \$100 a day for each day it is late in submitting a shop drawing or sample. No extensions of time will be granted to Trade Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule.

1.03 SHOP DRAWINGS:

- A. Contractor shall submit one reproducible transparency and six (6) opaque reproductions. The District will review and return the reproducible copy and one (1) opaque reproduction to Contractor.
- B. Before commencing installation of any Work, the Contractor shall submit and receive approval of all drawings, descriptive data, and material list(s) as required to accomplish Work.
- C. Review of Shop Drawings is regarded as a service to assist Contractor and in all cases original Contract Documents shall take precedence as outlined under General Conditions.
- D. No claim for extra time or payment shall be based on work shown on Shop Drawings unless the claim is (1) noted on Contractor's transmittal letter accompanying Shop Drawings and (2) Contractor has complied with all applicable provisions of the General Conditions, including, without limitation, provisions regarding changes and payment, and all required written approvals.
- E. District shall not review Shop Drawings for quantities of materials or number of items supplied.
- F. District's and/or Architect's review of Shop Drawing will be general. District and/or Architect review does not relieve Contractor of responsibility for dimensions, accuracy, proper fitting, construction of Work, furnishing of materials, or Work required by Contract Documents and not indicated on

Shop Drawings. The District's and/or Architect's review of Shop Drawings is not to be construed as approving departures from Contract Documents.

- G. Review of Shop Drawings and Schedules does not relieve Contractor from responsibility for any aspect of those Drawings or Schedules that is a violation of local, County, State, or Federal laws, rules, ordinances, or rules and regulations of commissions, boards, or other authorities or utilities having jurisdiction.
- H. Before submitting Shop Drawings for review, Contractor shall check Shop Drawings of its subcontractors for accuracy, and confirm that all Work contiguous with and having bearing on other work shown on Shop Drawings is accurately drawn and in conformance with Contract Documents.
- I. Submitted drawings and details must bear stamp of approval of Contractor:
 - (1) Stamp and signature shall clearly certify that Contractor has checked Shop Drawings for compliance with Drawings.
 - (2) If Contractor submits a Shop Drawing without an executed stamp of approval, or whenever it is evident (despite stamp) that Drawings have not been checked, the District and/or Architect will not consider them and will return them to the Contractor for revision and resubmission. In that event, it will be deemed that Contractor has not complied with this provision and Contractor shall bear risk of all delays to same extent as if it had not submitted any Shop Drawings or details.
- J. Submission of Shop Drawings (in either original submission or when resubmitted with correction) constitutes evidence that Contractor has checked all information thereon and that it accepts and is willing to perform Work as shown.
- K. Contractor shall pay for cost of any changes in construction due to improper checking and coordination. Contractor shall be responsible for all additional costs, including coordination. Contractor shall be responsible for costs incurred by itself, the District, the Architect, the Project Inspector, the Construction Manager, any other Subcontractor or contractor, etc., due to improperly checked and/or coordination of submittals.
- L. Shop Drawings must clearly delineate the following information:
 - (1) Project name and address.
 - (2) Specification number and description.
 - (3) Architect's name and project number.
 - (4) Shop Drawing title, number, date, and scale.
 - (5) Names of Contractor, Subcontractor(s) and fabricator.

- (6) Working and erection dimensions.
 - (7) Arrangements and sectional views.
 - (8) Necessary details, including complete information for making connections with other Work.
 - (9) Kinds of materials and finishes.
 - (10) Descriptive names of materials and equipment, classified item numbers, and locations at which materials or equipment are to be installed in the Work. Contractor shall use same reference identification(s) as shown on Contract Drawings.
- M. Contractor shall prepare composite drawings and installation layouts when required to solve tight field conditions.
- (1) Shop Drawings shall consist of dimensioned plans and elevations and must give complete information, particularly as to size and location of sleeves, inserts, attachments, openings, conduits, ducts, boxes, structural interferences, etc.
 - (2) Contractor shall coordinate these composite Shop Drawings and installation layouts in the field between itself and its Subcontractor(s) for proper relationship to the Work, the work of other trades, and the field conditions. The Contractor shall check and approve all submittal(s) before submitting them for final review.

1.04 PRODUCT DATA OR NON-REPRODUCIBLE SUBMITTALS:

- A. Contractor shall submit manufacturer's printed literature in original form. Any fading type of reproduction will not be accepted. Contract must submit a minimum of six (6) each, to the District. District shall return one (1) to the Contractor, who shall reproduce whatever additional copies it requires for distribution.
- B. Contractor shall submit six (6) copies of a complete list of all major items of mechanical, plumbing, and electrical equipment and materials in accordance with the approved Submittal Schedule, except as required earlier to comply with the approved Construction Schedule. Other items specified are to be submitted prior to commencing Work. Contractor shall submit items of like kind at one time in a neat and orderly manner. Partial lists will not be acceptable.
- C. Submittals shall include manufacturer's specifications, physical dimensions, and ratings of all equipment. Contractor shall furnish performance curves for all pumps and fans. Where printed literature describes items in addition to that item being submitted, submitted item shall be clearly marked on sheet and superfluous information shall be crossed out. If highlighting is used, Contractor shall mark all copies.

- D. Equipment submittals shall be complete and include space requirements, weight, electrical and mechanical requirements, performance data, and supplemental information that may be requested.
- E. Imported Materials Certification must be submitted at least ten (10) days before material is delivered.

1.05 SAMPLES:

- A. Contractor shall submit for approval Samples as required and within the time frame in the Contract Documents. Materials such as concrete, mortar, etc., which require on-site testing will be obtained from Project Site.
- B. Contractor shall submit four (4) samples except where greater or lesser number is specifically required by Contract Documents including, without limitation, the Specifications.
 - (1) Samples must be of sufficient size and quality to clearly illustrate functional characteristics, with integrally related parts and attachment devices.
 - (2) Samples must show full range of texture, color, and pattern.
- C. Contractor shall make all Submittals, unless it has authorized Subcontractor(s) to submit and Contractor has notified the District in writing to this effect.
- D. Samples to be shipped prepaid or hand-delivered to the District.
- E. Contractor shall mark samples to show name of Project, name of Contractor submitting, Contract number and segment of Work where representative Sample will be used, all applicable Specifications Sections and documents, Contract Drawing Number and detail, and ASTM or FS reference, if applicable.
- F. Contractor shall not deliver any material to Site prior to receipt of District's and/or Architect's completed written review and approval. Contractor shall furnish materials equal in every respect to approved Samples and execute Work in conformance therewith.
- G. District's and/or Architect's review, acceptance, and/or approval of Sample(s) will not preclude rejections of any material upon discovery of defects in same prior to final acceptance of completed Work.
- H. After a material has been approved, no change in brand or make will be permitted.
- I. Contractor shall prepare its Submittal Schedule and submit Samples of materials requiring laboratory tests to specified laboratory for testing not less than ninety (90) days before such materials are required to be used in Work.

- J. Samples which are rejected must be resubmitted promptly after notification of rejection and be marked "Resubmitted Sample" in addition to other information required.
- K. Field Samples and Mock-Ups are to be removed by Contractor at District's direction:
 - (1) Size: As Specified.
 - (2) Furnish catalog numbers and similar data, as requested.

1.06 REVIEW AND RESUBMISSION REQUIREMENTS:

- A. The District will arrange for review of Sample(s), Shop Drawing(s), Product Data, and other submittal(s) by appropriate reviewer and return to Contractor as provided below within twenty-one (21) days after receipt or within twenty-one (21) days after receipt of all related information necessary for such review, whichever is later.
- B. One (1) copy of product or materials data will be returned to Contractor with the review status.
- C. Samples to be incorporated into the Work will be returned to Contractor, together with a written notice designating the Sample with the appropriate review status and indicating errors discovered on review, if any. Other Samples will not be returned, but the same notice will be given with respect thereto, and that notice shall be considered a return of the Sample.
- D. Contractor shall revise and resubmit any Sample(s), Shop Drawing(s), Product Data, and other submittal(s) as required by the reviewer. Such resubmittals will be reviewed and returned in the same manner as original Sample(s), Shop Drawing(s), Product Data, and other submittal(s), within fourteen (14) days after receipt thereof or within fourteen (14) days after receipt of all related information necessary for such review. Such resubmittal shall not delay the Work.
- E. Contractor may proceed with any of the Work covered by Sample(s), Shop Drawing(s), Product Data, and other submittal(s) upon its return if designated as no exception taken, or revise as noted, provided the Contractor proceeds in accordance with the District and/or the Architect's notes and comments.
- F. Contractor shall not begin any of the work covered by a Sample(s), Shop Drawing(s), Product Data, and other submittal(s), designated as revise and resubmit or rejected, until a revision or correction thereof has been reviewed and returned to Contractor.
- G. Sample(s), Shop Drawing(s), Product Data, and other submittal(s) designated as revise and resubmit or rejected and requiring resubmittal, shall be revised or corrected and resubmitted to the District no later than fourteen (14) days or a shorter period as required to comply with the approved Construction Schedule, after its return to Contractor.

- H. Neither the review nor the lack of review of any Sample(s), Shop Drawing(s), Product Data, and other submittal(s) shall waive any of the requirements of the Contract Documents, or relieve Contractor of any obligation thereunder.
- I. District's and/or Architect's review of Shop Drawings does not relieve the Contractor of responsibility for any errors that may exist. Contractor is responsible for the dimensions and design of adequate connections and details and for satisfactory construction of all the Work.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

SITE STANDARDS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including without limitation, Site Access, Conditions, and Regulations;
- B. Special Conditions;
- C. Drug-Free Workplace Certification;
- D. Tobacco-Free Environment Certification;
- E. Criminal Background Investigation/Fingerprinting Certification;
- F. Temporary Facilities and Controls.

1.02 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 in each work area, staging area, and parking area. 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: Profanity or other unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students, staff, volunteers, parents 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 mobile phones or other handheld communication radios.
 - (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 softscape 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 Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Obtaining of Permits, Licenses and Registrations and Work to Comply with All Applicable Laws and Regulations;
- B. Special Conditions; and
- C. Quality Control.

1.02 DESCRIPTION:

This section covers the general requirements for regulatory requirements pertaining to the Work and is supplementary to all other regulatory requirements mentioned or referenced elsewhere in the Contract Documents.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. All statutes, ordinances, laws, rules, codes, regulations, standards, and the lawful orders of all public authorities having jurisdiction over the Work, are hereby incorporated into these Contract Documents as if repeated in full herein and are intended to be included in any reference to Code or Building Code, unless otherwise specified, including, without limitation, the references in the list below. Contractor shall make available at the Site copies of all the listed documents applicable to the Work as the District and/or Architect may request, including, without limitation, applicable portions of the California Code of Regulations ("CCR").
 - (1) California Building Standards Administrative Code, Part 1, Title 24, CCR.
 - (2) California Building Code (CBC), Part 2, Title 24, CCR; (International Building Code volumes 1-2 and California Amendments).
 - (3) California Electrical Code (CEC), Part 3, Title 24, CCR; (National Electrical Code and California Amendments).
 - (4) California Mechanical Code (CMC), Part 4, Title 24, CCR; (Uniform Mechanical Code and California Amendments).
 - (5) California Plumbing Code (CPC), Part 5, Title 24, CCR; (Uniform Plumbing Code and California Amendments).

- (6) California Fire Code (CFC), Part 9, Title 24, CCR; (International Fire Code and California Amendments).
- (7) California Green Building Standards Code (CALGreen), Part 11, Title 24, CCR.
- (8) California Referenced Standards Code, Part 12, Title 24, CCR.
- (9) State Fire Marshal Regulations, Public Safety, Title 19, CCR.
- (10) Partial List of Applicable National Fire Protection Association (NFPA) Standards:
 - (a) NFPA 13 - Automatic Sprinkler System.
 - (b) NFPA 14 - Standpipes Systems.
 - (c) NFPA 17A - Wet Chemical System
 - (d) NFPA 24 - Private Fire Mains.
 - (e) (California Amended) NFPA 72 - National Fire Alarm Codes.
 - (f) NFPA 253 - Critical Radiant Flux of Floor Covering System.
 - (g) NFPA 2001 - Clean Agent Fire Extinguishing Systems.
- (11) California Division of the State Architect interpretation of Regulations ("DSA IR"), including, without limitation:
 - (a) DSA IR A-6 — Construction Change Document Submittal and Approval Processes.
 - (b) DSA IR A-7 — Project Inspector Certification and Approval.
 - (c) DSA IR A-8 — Project Inspector and Assistant Inspector Duties and Performance.
 - (d) DSA IR A-12 — Assistant Inspector Approval.
- (12) DSA Procedures ("DSA PR")
 - (a) DSA PR 13-01 – Construction Oversight Process
 - (b) DSA PR 13-02 – Project Certification Process

B. This Project shall be governed by applicable regulations, including, without limitation, the State of California's Administrative Regulations for the Division of the State Architect-Structural Safety (DSA/SS), Chapter 4, Part 1, Title 24, CCR, and the most current version on the date the bids are opened and as it pertains to school construction including, without limitation:

- (1) Test and testing laboratory per Section 4-335. District shall pay for the testing laboratory.
- (2) Special inspections per Section 4-333(c).
- (3) Deferred Approvals per section 4-317(g).
- (4) Verified reports per Sections 4-336 & 4-343(c).
- (5) Duties of the Architect & Engineers shall be per Sections 4-333(a) and 4-341.
- (6) Duties of the Contractor shall be per Section 4-343.
- (7) Duties of Project Inspector shall be per Section 4-334.
- (8) Addenda and Construction Change Documents per Section 4-338.

Contractor shall keep and make available all applicable parts of the most current version of Title 24 referred to in the plans and specifications at the Site during construction.

- C. Items of deferred approval shall be clearly marked on the first sheet of the Architect's and/or Engineer's approved Drawings. All items later submitted for approval shall be per Title 24 requirements to the DSA.
- (1) Contractor shall submit the following to Architect for review and endorsement:
 - (a) Product information on proposed material/system supplier.
 - (b) Drawings, specifications, and calculations prepared, signed, and stamped by an architect or engineer licensed in the State of California for that portion of the Work.
 - (c) All other requirements as may be required by DSA.
 - (2) Cost of preparing and submitting documentation per DSA Deferred Approval requirements including required modifications to Drawings and Specifications, whether or not indicated in the Contract Documents, shall be borne by Contractor.
 - (3) Contractor shall not begin fabrication and installation of deferred approval items without first obtaining DSA approval of Drawings and Specifications.
 - (4) Schedule of Work Subject to DSA Deferred Approval: Window wall systems exceeding 10 feet in span.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Obtaining of Permits, Licenses and Registrations and Work to Comply with All Applicable Laws and Regulations;
- B. Special Conditions; and
- C. Quality Control.

1.02 DESCRIPTION:

This section covers the general requirements for regulatory requirements pertaining to the Work and is supplementary to all other regulatory requirements mentioned or referenced elsewhere in the Contract Documents.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. All statutes, ordinances, laws, rules, codes, regulations, standards, and the lawful orders of all public authorities having jurisdiction over the Work, are hereby incorporated into these Contract Documents as if repeated in full herein and are intended to be included in any reference to Code or Building Code, unless otherwise specified, including, without limitation, the references in the list below. Contractor shall make available at the Site copies of all the listed documents applicable to the Work as the District and/or Architect may request, including, without limitation, applicable portions of the California Code of Regulations ("CCR").
 - (1) California Building Standards Administrative Code, Part 1, Title 24, CCR.
 - (2) California Building Code (CBC), Part 2, Title 24, CCR; (International Building Code volumes 1-2 and California Amendments).
 - (3) California Electrical Code (CEC), Part 3, Title 24, CCR; (National Electrical Code and California Amendments).
 - (4) California Mechanical Code (CMC), Part 4, Title 24, CCR; (Uniform Mechanical Code and California Amendments).
 - (5) California Plumbing Code (CPC), Part 5, Title 24, CCR; (Uniform Plumbing Code and California Amendments).

- (6) California Fire Code (CFC), Part 9, Title 24, CCR; (International Fire Code and California Amendments).
- (7) California Green Building Standards Code (CALGreen), Part 11, Title 24, CCR.
- (8) California Referenced Standards Code, Part 12, Title 24, CCR.
- (9) State Fire Marshal Regulations, Public Safety, Title 19, CCR.
- (10) Partial List of Applicable National Fire Protection Association (NFPA) Standards:
 - (a) NFPA 13 - Automatic Sprinkler System.
 - (b) NFPA 14 - Standpipes Systems.
 - (c) NFPA 17A - Wet Chemical System
 - (d) NFPA 24 - Private Fire Mains.
 - (e) (California Amended) NFPA 72 - National Fire Alarm Codes.
 - (f) NFPA 253 - Critical Radiant Flux of Floor Covering System.
 - (g) NFPA 2001 - Clean Agent Fire Extinguishing Systems.
- (11) California Division of the State Architect interpretation of Regulations ("DSA IR"), including, without limitation:
 - (a) DSA IR A-6 — Construction Change Document Submittal and Approval Processes.
 - (b) DSA IR A-7 — Project Inspector Certification and Approval.
 - (c) DSA IR A-8 — Project Inspector and Assistant Inspector Duties and Performance.
 - (d) DSA IR A-12 — Assistant Inspector Approval.
- (12) DSA Procedures ("DSA PR")
 - (a) DSA PR 13-01 – Construction Oversight Process
 - (b) DSA PR 13-02 – Project Certification Process

B. This Project shall be governed by applicable regulations, including, without limitation, the State of California's Administrative Regulations for the Division of the State Architect-Structural Safety (DSA/SS), Chapter 4, Part 1, Title 24, CCR, and the most current version on the date the bids are opened and as it pertains to school construction including, without limitation:

- (1) Test and testing laboratory per Section 4-335. District shall pay for the testing laboratory.
- (2) Special inspections per Section 4-333(c).
- (3) Deferred Approvals per section 4-317(g).
- (4) Verified reports per Sections 4-336 & 4-343(c).
- (5) Duties of the Architect & Engineers shall be per Sections 4-333(a) and 4-341.
- (6) Duties of the Contractor shall be per Section 4-343.
- (7) Duties of Project Inspector shall be per Section 4-334.
- (8) Addenda and Construction Change Documents per Section 4-338.

Contractor shall keep and make available all applicable parts of the most current version of Title 24 referred to in the plans and specifications at the Site during construction.

- C. Items of deferred approval shall be clearly marked on the first sheet of the Architect's and/or Engineer's approved Drawings. All items later submitted for approval shall be per Title 24 requirements to the DSA.
- (1) Contractor shall submit the following to Architect for review and endorsement:
 - (a) Product information on proposed material/system supplier.
 - (b) Drawings, specifications, and calculations prepared, signed, and stamped by an architect or engineer licensed in the State of California for that portion of the Work.
 - (c) All other requirements as may be required by DSA.
 - (2) Cost of preparing and submitting documentation per DSA Deferred Approval requirements including required modifications to Drawings and Specifications, whether or not indicated in the Contract Documents, shall be borne by Contractor.
 - (3) Contractor shall not begin fabrication and installation of deferred approval items without first obtaining DSA approval of Drawings and Specifications.
 - (4) Schedule of Work Subject to DSA Deferred Approval: Window wall systems exceeding 10 feet in span.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

ABBREVIATIONS AND ACRONYMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions including without limitation, Definitions;
- B. Special Conditions.

1.02 DOCUMENT INCLUDES:

- A. Abbreviations used throughout the Contract Documents.
- B. Reference to a technical society, organization, or body is by abbreviation, as follows:

| | | |
|-----|--------|---|
| 1. | AA | The Aluminum Association |
| 2. | AASHTO | American Association of State Highway and Transportation Officials |
| 3. | ABPA | Acoustical and Board Products Association |
| 4. | ACI | American Concrete Institute |
| 5. | AGA | American Gas Association |
| 6. | AGC | Associated General Contractors of America |
| 7. | AHC | Architectural Hardware Consultant |
| 8. | AHRI | Air Conditioning, Heating, Refrigeration Institute |
| 9. | AI | Asphalt Institute |
| 10. | AIA | American Institute of Architects |
| 11. | AISC | American Institute of Steel Construction |
| 12. | AISI | American Iron and Steel Institute |
| 13. | AMCA | Air Movement and Control Association |
| 14. | ANSI | American National Standards Institute |
| 15. | APA | APA – The Engineered Wood Association |
| 16. | ASCE | American Society of Civil Engineers |
| 17. | ASHRAE | American Society of Heating, Refrigeration and Air Conditioning Engineers |
| 18. | ASME | American Society of Mechanical Engineers |
| 19. | ASTM | American Society of Testing and Materials International |
| 20. | AWPA | American Wood Protection Association |
| 21. | AWPI | American Wood Preservers Institute |
| 22. | AWS | American Welding Society |
| 23. | AWSC | American Welding Society Code |
| 24. | AWI | Architectural Woodwork Institute |
| 25. | AWWA | American Water Works Association |

| | | |
|-----|----------------|---|
| 26. | BIA | The Brick Industry Association |
| 27. | CCR | California Code of Regulations |
| 28. | CLFMI | Chain Link Fence Manufacturers Institute |
| 29. | CRA | California Redwood Association |
| 30. | CRSI | Concrete Reinforcing Steel Institute |
| 31. | CS | Commercial Standards |
| 32. | CSI | Construction Specifications Institute |
| 33. | CTI | Cooling Technology Institute |
| 34. | FGIA | Fenestration and Glazing Industry Alliance |
| 35. | FGMA | Flat Glass Manufacturers' Association |
| 36. | FIA | Factory Insurance Association |
| 37. | FM | Factory Mutual Global |
| 38. | FS/FED SPEC | Federal Specification |
| 39. | FTI | Facing Title Institute |
| 40. | GA | Gypsum Association |
| 41. | IAPMO | International Association of Plumbing and Mechanical Officials |
| 42. | ICC | International Code Council |
| 43. | IEEE | Institute of Electrical and Electronics Engineers |
| 44. | IES | Illuminating Engineering Society |
| 45. | MCAC | Mason Contractors Association of California |
| 46. | MIMA | Mineral Wool Insulation Manufacturers Association |
| 47. | MLMA | Metal Lath Manufacturers Association |
| 48. | MS/MIL SPEC | Military Specifications |
| 49. | NAAMM | National Association of Architectural Metal Manufacturers |
| 50. | NBHA | National Builders Hardware Association |
| 51. | NCMA | National Concrete Masonry Association |
| 52. | NCSEA | National Council of Structural Engineers Associations |
| 53. | NEC | National Electrical Code |
| 54. | NEMA | National Electrical Manufacturers Association |
| 55. | NIST | National Institute of Standards and Technology |
| 56. | NSI | Natural Stone Institute |
| 57. | NTMA | National Terrazzo and Mosaic Association, Inc. |
| 58. | ORS | Office of Regulatory Services (California) |
| 59. | OSHA | Occupational Safety and Health Act |
| 60. | PCI | Precast/Prestressed Concrete Institute |
| 61. | PCA | Portland Cement Association |
| 62. | PCA | Painting Contractors Association |
| 63. | PDI | Plumbing Drainage Institute |
| 64. | PEI | Porcelain Enamel Institute, Inc. |
| 65. | PG&E | Pacific Gas & Electric Company |
| 66. | PS | Product Standards |
| 67. | SDI | Steel Door Institute; Steel Deck Institute |
| 68. | SJI | Steel Joist Institute |
| 69. | SSPC | Society for Protective Coatings |
| 70. | TCNA | Tile Council of North America, Inc. |
| 71. | TPI | Truss Plate Institute |

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| 72. | UBC | Uniform Building Code |
| 73. | UL | Underwriters Laboratories Code |
| 74. | UMC | Uniform Mechanical Code |
| 75. | USDA | United States Department of Agriculture |
| 76. | VI | Vermiculite Institute |
| 77. | WCLIB | West Coast Lumber Inspection Bureau |
| 78. | WDMA | Window and Door Manufacturers Association |
| 79. | WEUSER | Western Electric Utilities Service Engineering Requirements |
| 80. | WIC | Woodwork Institute of California |

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

DEFINITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions including without limitation, Definitions;
- B. Special Conditions.

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade, or Federal Standards, Contractor shall comply with requirements of the standard, except when more rigid requirements are specified in the Contract Documents, or are required by applicable codes.
- B. Contractor shall conform to current reference standard publication date in effect on the date of bid opening.
- C. Contractor shall obtain copies of standards unless specifically required not to by the Contract Documents.
- D. Contractor shall maintain a copy of all standards at jobsite during submittals, planning, and progress of the specific Work, until final completion, unless specifically required not to by the Contract Documents.
- E. Should specified reference standards conflict with Contract Documents, Contractor shall request clarification from the District and/or the Architect before proceeding.
- F. The contractual relationship of the parties to the Contract shall not be altered from the contractual relationship as indicated in the Contract Documents by mention or inference otherwise in any referenced document.
- G. Governing Codes shall be as shown in the Contract Documents including, without limitation, the Specifications.

END OF DOCUMENT

REFERENCES**PART 1 - GENERAL****1.01 SCHEDULE OF REFERENCES:**

The following information is intended only for the general assistance of the Contractor, and the District does not represent that all of the information is current. It is the Contractor's responsibility to verify the correct information for each of the entities listed.

| | | |
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| AA | The Aluminum Association 1400 Crystal Drive, Suite 430 Arlington, VA 22202 www.aluminum.org | 703/358-2960 |
| AABC | Associated Air Balance Council 2401 Pennsylvania Avenue NW, Suite 330 Washington, DC 20037 www.aabc.com | 202/737-0202 |
| AASHTO | American Association of State Highway and Transportation Officials 555 12th St. NW - Suite 1000 Washington, DC 20004 www.transportation.org | 202/624-5800 |
| AATCC | American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215 www.aatcc.org | 919/549-8141 |
| ACA | American Coatings Association 901 New York Ave., NW, Suite 300 West Washington, DC 20001 www.paint.org | 202/462-6272 |
| ACI | American Concrete Institute 38800 Country Club Dr. Farmington Hills, MI 48331-3439 www.concrete.org | 248/848-3800 |
| ACPA | American Concrete Pipe Association 5605 N. MacArthur Blvd., Suite 340 Irving, TX 75038 www.concrete-pipe.org | 972/506-7216 |

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| ADC | Air Duct Council 1901 N. Roselle Road, Suite 800 Schaumburg, IL 60195 www.flexibleduct.org | 847/706-6750 |
| AF&PA | American Forest and Paper Association 1101 K Street, NW, Suite 700 Washington, DC 20005 www.afandpa.org | 202/463-2700 |
| AGA | American Gas Association 400 North Capitol Street, NW, Suite 450 Washington, DC 20001 www.aga.org | 202/824-7000 |
| AGC | Associate General Contractors of America 2300 Wilson Blvd., Suite 300 Arlington, VA 22201 www.agc.org | 703/548-3118 |
| AHA | American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067 http://domensino.com/AHA/default.htm | 847/934-8800 |
| AI | Asphalt Institute 2696 Research Park Drive Lexington, KY 40511-8480 www.asphaltinstitute.org | 859/288-4960 |
| AIA | The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006-5292 www.aia.org | 202/626-7300 |
| AISC | American Institute of Steel Construction 130 East Randolph Street, Suite 2000 Chicago, IL 60601 www.aisc.org | 312.670.2400 |
| | | |
| AISI | American Iron and Steel Institute 25 Massachusetts Ave., NW, Suite 800 Washington, DC 20001 www.steel.org | 202/452-7100 |
| AITC | American Institute of Timber Construction 1010 South 336th Street, #210 Federal Way, WA 98003-7394 https://www.plib.org/aitc/ | 253/835-3344 |

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| ALI | Associated Laboratories, Inc. P.O. Box 152837 Dallas, TX 75315 www.assoc-labs.com | 214/565-0593 |
| ALSC | American Lumber Standards Committee, Inc. 7470 New Technology Way, Suite F Frederick, MD 21703 www.alsc.org | 301/972-1700 |
| AMCA | Air Movement and Control Association International, Inc. 30 W. University Drive Arlington Heights, IL 60004 www.amca.org | 847/394-0150 |
| AMPP (formerly SSPC) | Association for Materials Protection and Performance (merger of Society for Protective Coatings and National Association of Corrosion Engineers International) (formerly Steel Structures Painting Council) 800 Trumbull Drive Pittsburgh, PA 15205 www.sspc.org | 412/281-2331 877/281-7772 |
| ANLA | AmericanHort (merger of American Nursery & Landscape Association and OFA – The Association of Horticultural Professionals) 2130 Stella Court Columbus, OH 43215 www.americanhort.org | 614/487-1117 |
| ANSI | American National Standards Institute 1899 L Street, NW, 11th Floor Washington, DC 20036 www.ansi.org | 202/293-8020 |
| APA | APA-The Engineered Wood Association 7011 S. 19th Street Tacoma, WA 98466-5333 www.apawood.org | 253/565-6600 |

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| APA | Architectural Precast Association 325 John Knox Rd, Suite L-103 Tallahassee, FL 32303 www.archprecast.org | 850/205-5637 |
| APCIA | American Property Casualty Insurance Association (merger of American Insurance Association (formerly the National Board of Fire Underwriters) with the Property Casualty Insurers Association of America) 555 12th St, NW, Suite 550 Washington DC 20004 www.apci.org | 202/828-7100 |
| AHRI | Air Conditioning and Refrigeration Institute (now Air-Conditioning, Heating, & Refrigeration Institute) 2311 Wilson Blvd, Suite 400 Arlington, VA 22201 www.ahrinet.org | 703/524-8800 |
| ARMA | Asphalt Roofing Manufacturers Association 2331 Rock Spring Road Forest Hill, MD 21050 www.asphaltroofing.org | 443/640-1075 |
| ASA | The Acoustical Society of America Suite 300 1305 Walt Whitman Road Melville, NY 11747-4300 https://acousticalsociety.org/ | 516/576-2360 |
| ASCE | American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 www.asce.org | 800/548-2723 703/295-6300 |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers 180 Technology Parkway Peachtree Corners, GA 30092 www.ashrae.org | 800/527-4723 404/636-8400 |
| ASLA | American Society of Landscape Architects 636 Eye Street, NW Washington, DC 20001-3736 www.asla.org | 202/898-2444 |
| ASME | American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990 www.asme.org | 800/834-2763 |

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| ASPE | American Society of Plumbing Engineers 6400 Shafer Court, Suite 350 Rosemont, IL 60018 http://aspe.org | 847/296-0002 |
| ASQ | American Society for Quality P.O. Box 3005 Milwaukee, WI 53201-3005 or 600 North Plankinton Avenue Milwaukee, WI 53203 http://asq.org | 800/248-1946 414/272-8575 |
| ASSE | American Society of Sanitary Engineering 18927 Hickory Creek Dr., Suite 220 Mokena, IL 60448 www.asse-plumbing.org | 708/995-3019 |
| ASTM | ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 www.astm.org | 610/832-9500 |
| AWCI | Association of the Wall and Ceiling Industry 513 West Broad Street, Suite 210 Falls Church, VA 22046 www.awci.org | 703/538-1600 |
| AWPA | American Wood Protection Association (formerly American Wood Preservers Institute) P.O. Box 361784 Birmingham, AL 35236-1784 www.awpa.com | 205/733-4077 |
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| AWS | American Welding Society 8669 NW 36 Street, Suite 130 Miami, FL 33166 www.aws.org | 800/443-9353 305/443-9353 |
| AWI | Architectural Woodwork Institute 46179 Westlake Drive, Suite 120 Potomac Falls, VA 20165-5874 www.awinet.org | 571/323-3636 |
| AWWA | American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 www.awwa.org | 800/926-7337 303/794-7711 |

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| BHMA | Builders Hardware Manufacturers Association 355 Lexington Avenue, 15th Floor New York, NY 10017 www.buildershardware.com | 212/297-2122 |
| BIA | The Brick Industry Association 12007 Sunrise Valley Drive, Suite 430 Reston, VA 20191 www.gobrick.com | 703/620-0010 |
| CGA | Compressed Gas Association 8484 Westpark Drive, Suite 220 McLean, VA 22102 www.cganet.com | 703/788-2700 |
| CISCA | Ceilings & Interior Systems Construction Association 1010 Jorie Blvd, Suite 30 Oak Brook, IL 60523 www.cisca.org | 630/584-1919 |
| CISPI | Cast Iron Soil Pipe Institute 2401 Fieldcrest Dr. Mundelein, IL 60060 www.cispi.org | 224/864-2910 |
| CLFMI | Chain Link Fence Manufacturers Institute 10015 Old Columbia Road, Suite B-215 Columbia, MD 21046 chainlinkinfo.org | 301/596-2583 |
| CPA | Composite Panel Association 19465 Deerfield Avenue, Suite 306 Leesburg, VA 20176 www.compositepanel.org | 703/724-1128 |
| CPSC | Consumer Product Safety Commission 4330 East-West Highway Bethesda, MD 20814 www.cpsc.gov | 800/638-2772 |
| CRA | California Redwood Association 818 Grayson Road, Suite 201 Pleasant Hill, CA 94523 www.calredwood.org | 925/935-1499 |

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| CRI | Carpet and Rug Institute 100 S. Hamilton Street Dalton, GA 30722-2048 www.carpet-rug.org | 706/278-3176 |
| CRSI | Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org | 847/517-1200 |
| CSI | The Construction Specifications Institute 123 North Pitt St, Suite 450 Alexandria, VA 22314 www.csinet.org | 800/689-2900 |
| CTIOA | Ceramic Tile Institute of America 12061 Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org | 310/574-7800 |
| DHA | Decorative Hardwoods Association (formerly Hardwood Plywood & Veneer Association) 42777 Trade West Dr. Sterling, VA 20166 https://www.decorativehardwoods.org/ | 703/435-2900 |
| DHI | Door and Hardware Institute (formerly National Builders Hardware Association) 2001 K Street NW, 3rd Floor North Washington, DC 20006 www.dhi.org | 202/367-1134 |
| DIPRA | Ductile Iron Pipe Research Association P.O. Box 190306 Birmingham, AL 35219 www.dipra.org | 205/402-8700 |
| DOC | U.S. Department of Commerce 1401 Constitution Ave., NW Washington, DC 20230 www.commerce.gov | 202/482-2000 |
| DOT | U.S. Department of Transportation 1200 New Jersey Avenue, SE Washington, DC 20590 www.dot.gov | 855/368-4200 |
| EJMA | Expansion Joint Manufacturers Association, Inc. 25 North Broadway Tarrytown, NY 10591 www.ejma.org | 914/332-0040 |

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| EPA | Environmental Protection Agency Ariel Rios Building 1200 Pennsylvania Avenue, N.W. Washington, DC 20460 www.epa.gov | 202/272-0167 |
| FCICA | Floor Covering Installation Contractors Association 800 Roosevelt Rd., Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.fcica.com | 630/672-3702 |
| FGIA | Fenestration and Glazing Industry Alliance 1900 E Golf Rd, Suite 1250 Schaumburg, IL 60173 https://fgiaonline.org/ | 847/303-5664 |
| FM Global | Factory Mutual Insurance Company Amy Daley Global Practice Leader – Education, Public Entities, Health Care FM Global 270 Central Avenue Johnston, RI 02919-4949 www.fmglobal.com | 401/275-3000 401/275-3029 |
| FS | General Services Administration (GSA) Index of Federal Specifications, Standards and Commercial Item Descriptions 470 East L'Enfant Plaza, SW, Suite 8100 Washington, DC 20407 www.gsa.gov | 202/619-8925 |
| GA | The Gypsum Association 962 Wayne Ave., Suite 620 Silver Spring, MD 20910 www.gypsum.org | 301/277-8686 |
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| HMA | Hardwood Manufacturers Association One Williamsburg Place, Suite 108 Warrendale, PA 15086 http://hmamembers.org | 412/244-0440 |

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| IAPMO | International Association of Plumbing and Mechanical Officials (formerly the Western Plumbing Officials Association) 4755 E. Philadelphia St. Ontario, CA 91761 www.iapmo.org | 909/472-4100 |
| ICC | International Code Council 500 New Jersey Avenue, NW, 6th Floor Washington, DC 20001 www.iccsafe.org | 888/422-7233 |
| IEEE | Institute of Electrical and Electronics Engineers 3 Park Avenue, 17th Floor New York, NY 10016-5997 www.ieee.org | 212/419-7900 |
| IES | Illuminating Engineering Society 120 Wall Street, Floor 17 New York, NY 10005-4001 www.ies.org | 212/248-5000 |
| ITRK | Intertek Testing Services 3933 US Route 11 Cortland, NY 13045 www.intertek.com | 607/753-6711 |
| MCAA | Mechanical Contractors Association of America 1385 Piccard Drive Rockville, MD 20850 www.mcaa.org | 301/869-5800 |
| MMPA (formerly WMMPA) | Moulding & Millwork Producers Association (formerly Wood Moulding & Millwork Producers Association) 507 First Street Woodland, CA 95695 www.wmmpa.com | 530/661-9591 800/550-7889 |
| MSS | Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc. 127 Park Street, NE Vienna, VA 22180-4602 http://mss-hq.org | 703/281-6613 |
| NAAMM | National Association of Architectural Metal Manufacturers 800 Roosevelt Rd. Bldg. C, Suite 312 Glen Ellyn, IL 60137 www.naamm.org | 630/942-6591 |

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| NAIMA | North American Insulation Manufacturers Association P.O. Box 1906 Alexandria, VA 22313 https://insulationinstitute.org/ | 703/684-0084 |
| NALP | National Association of Landscape Professionals (formerly Professional Landcare Network) 12500 Fair Lakes Circle, Suite 200 Fairfax, VA 22033 https://www.landscapeprofessionals.org/ | 703/736-9666 |
| NAPA | National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD 20770-1441 www.asphaltpavement.org | 888/468-6499 301/731-4748 |
| NCSPA | National Corrugated Steel Pipe Association 14070 Proton Road, Suite 100 Dallas, TX 75244 www.ncspa.org | 972/850-1907 |
| NCMA | National Concrete Masonry Association 13750 Sunrise Valley Drive Herndon, VA 20171-4662 www.ncma.org | 703/713-1900 |
| NEBB | National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877 www.nebb.org | 301/977-3698 |
| NECA | National Electrical Contractors Association 1201 Pennsylvania Ave. NW Washington, D.C., 20004 www.necanet.org | 202/991-6300 |
| NEMA | National Electrical Manufacturers Association 1300 North 17th Street N, Suite 900 Rosslyn, VA 22209 www.nema.org | 703/841-3200 |
| NEII | National Elevator Industry, Inc. 5537 SW Urish Road Topeka, KS 66610 https://nationalelevatorindustry.org/ | 703/589-9985 |
| NFPA | National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471 www.nfpa.org | 800/344-3555 855/274-8525 |

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| NGA (formerly GANA) | National Glass Association (merged with Glass Association of North America) 1945 Old Gallows Road Suite 750 Vienna, VA 22182 www.glass.org | 866/342-5642 Ext 127 |
| NHLA | National Hardwood Lumber Association PO Box 34518 Memphis, TN 38184 www.nhla.com | 901/377-1818 |
| NIA | National Insulation Association 516 Herndon Pkwy., Ste. D Herndon, VA 20170 www.insulation.org | 703/464-6422 |
| NRCA | National Roofing Contractors Association 10255 W. Higgins Road, Suite 600 Rosemont, IL 60018-5607 www.nrca.net | 847/299-9070 |
| NSF | NSF International 789 N. Dixboro Road Ann Arbor, MI 48113-0140 www.nsf.org | 800/673-6275 734/769-8010 |
| NSI | Natural Stone Institute (formerly Marble Institute of America) 380 E. Lorain St. Oberlin, OH 44074 https://www.naturalstoneinstitute.org/ | 440/250-9222 |
| NTMA | National Terrazzo and Mosaic Association 209 N. Crockett Street, Suite 2 PO Box 2605 Fredericksburg, TX 78624 www.ntma.com | 800/323-9736 |
| OSHA | Occupational Safety and Health Act U.S. Department of Labor Occupational Safety & Health Administration 200 Constitution Ave., NW Washington, DC 20210 www.osha.gov | 800/321-OSHA (6742) |

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| PCA | Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077 or 200 Massachusetts Ave NW, Suite 200 Washington, DC 20001 www.cement.org | 847/966-6200 202/408-9494 |
| PCA | Painting Contractors Association (formerly Painting and Decorating Contractors of America) 2316 Millpark Drive Maryland Heights, MO 63043 https://www.pcapainted.org/ | 800/322-7322 |
| PCI | Precast/Prestressed Concrete Institute 8770 W. Bryn Mawr Ave., Suite 1150 Chicago, IL 60631 www.pci.org | 312/786-0300 |
| PDI | Plumbing & Drainage Institute 800 Turnpike Street, Suite 300 North Andover, MA 01845 http://pdionline.org | 978/557-0720 800/589-8956 |
| PEI | Porcelain Enamel Institute, Inc. P.O. Box 920220 Norcross, GA 30010 www.porcelainenamel.com | 770/676-9366 |
| PG&E | Pacific Gas & Electric Company P.O. Box 997300 Sacramento, CA 95899-7300 www.pge.com | 800/743-5000 |
| PLIB | Pacific Lumber Inspection Bureau (formerly West Coast Lumber Inspection Bureau) 1010 South 336th Street, Suite 210 Federal Way, WA 98003-7394 https://www.plib.org/ | 253/835-3344 |
| RFCI | Resilient Floor Covering Institute 115 Broad Street, Suite 201 La Grange, GA 30240 www.rfci.com | 706/882-3833 |
| SDI | Steel Deck Institute P.O. Box 426 Glenshaw, PA 15116 www.sdi.org | 412/487-3325 |

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| SDI | Steel Door Institute 30200 Detroit Road Westlake, OH 44145 www.steeldoor.org | 440/899-0010 |
| SJI | Steel Joist Institute 140 West Evans Street, Suite 203 Florence, SC 29501 http://steeljoist.org | 843/407-4091 |
| SMA | Stucco Manufacturers Association 5753 E Santa Ana Cyn Rd, #G-156 Anaheim, CA 92807 www.stuccomfgassoc.com | 714/473-9579 |
| SMACNA | Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Drive Chantilly, VA 20151-1219 www.smacna.org | 703/803-2980 |
| SPI | SPI: The Plastics Industry Trade Association, Inc. 1425 K St. NW, Suite 500 Washington, DC 20005 www.plasticsindustry.org | 202/974-5200 |
| | | |
| TCA | The Tile Council of North America 100 Clemson Research Blvd. Anderson, SC 29625 www.tcnatile.com | 864/646-8453 |
| TPI | Truss Plate Institute 2670 Crain Highway, Suite 203 Waldorf, MD 20601 www.tpinst.org | 240/587-5582 |
| TPI | Turfgrass Producers International 444 E. Roosevelt Road #346 Lombard, IL 60148 www.turfgrassod.org | 800/405-8873 847/649-5555 |
| TCIA | Tree Care Industry Association (formerly the National Arborist Association) 670 N Commercial Street, Suite 201 Manchester, NH 03101 www.tcia.org | 603/314-5380 800/733-2622 |

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| TVI | The Vermiculite Institute c/o The Schundler Company 10 Central Street Nahant, MA 01908 www.vermiculiteinstitute.org | 732/287-2244 |
| UL | Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, IL 60062-2096 www.ul.com | 847/272-8800 877/854-3577 |
| UNI | Uni-Bell PVC Pipe Association 201 E. John Carpenter Freeway, Suite 750 Irving, TX 75062 www.uni-bell.org | 972/243-3902 |
| USDA | U.S. Department of Agriculture 1400 Independence Ave., S.W. Washington, DC 20250 www.usda.gov | 202/720-2791 |
| WA | Wallcoverings Association 35 E Wacker Dr., Suite 850 Chicago, IL 60601 www.wallcoverings.org | 312/224-2574 |
| WCMA | Window Covering Manufacturers Association 355 Lexington Avenue 15th Floor New York, NY 10017 www.wcmanet.org | 212/297-2122 |
| WDMA | Window & Door Manufacturers Association 2001 K Street NW, 3rd Floor North Washington, D.C. 20006 www.wdma.com | 202/367-1157 |
| WI | Woodwork Institute 1455 Response Road, Suite 110 Sacramento, CA 95815 www.wicnet.org | 916/372-9943 |
| WRI | Wire Reinforcement Institute 942 Main Street, Suite 300 Hartford, CT 06103 www.wirereinforcementinstitute.org | 860/240-9545 |
| WWCA | Western Wall & Ceiling Contractors Association 1910 N. Lime St. Orange, CA 92865 www.wwcca.org | 714/221-5520 |

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| WWPA | Western Wood Products Association (formerly Redwood Inspection Service) 1500 SW First Ave., Suite 870 Portland, OR 97201 www.wwpa.org | 503/224-3930 |
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PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Purchase of Materials and Equipment;
- B. Special Conditions;
- C. Imported Materials Certification.

1.02 MATERIAL AND EQUIPMENT

- A. Only items approved by the District and/or Design Professional shall be used.
- B. Contractor shall submit lists of products and other product information in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.

1.03 MATERIAL AND EQUIPMENT COLORS

- A. The District and/or Architect will provide a schedule of colors.
- B. No individual color selections will be made until after approval of all pertinent materials and equipment and after receipt of appropriate samples in accordance with the Contract Documents, including, without limitation, the provisions regarding the submittals.
- C. Contractor shall request priority in writing for any item requiring advance ordering to maintain the approved Construction Schedule.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall deliver manufactured materials in original packages, containers, or bundles (with seals unbroken), bearing name or identification mark of manufacturer.
- B. Contractor shall deliver fabrications in as large assemblies as practicable; where specified as shop-primed or shop-finished, package or crate as required to preserve such priming or finish intact and free from abrasion.
- C. Contractor shall store materials in such a manner as necessary to properly protect them from damage. Materials or equipment damaged by handling, weather, dirt, or from any other cause will not be accepted.

- D. Materials are not acceptable that have been warehoused for long periods of time, stored or transported in improper environment, improperly packaged, inadequately labeled, poorly protected, excessively shipped, deviated from normal distribution pattern, or reassembled.
- E. Contractor shall store material so as to cause no obstructions of sidewalks, roadways, access to the Site or buildings, and underground services. Contractor shall protect material and equipment furnished under Contract.
- F. Contractor may store materials on Site with prior written approval by the District, all material shall remain under Contractor's control and Contractor shall remain liable for any damage to the materials. Should the Project Site not have storage area available, the Contractor shall provide for off-site storage at a bonded warehouse and with appropriate insurance coverage at no cost to District.
- G. When any room in Project is used as a shop or storeroom, the Contractor shall be responsible for any repairs, patching, or cleaning necessary due to that use. Location of storage space shall be subject to prior written approval by District.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers listed in various sections of Contract Documents are names of those manufacturers that are believed to be capable of supplying one or more of items specified therein.
- B. The listing of a manufacturer does not imply that every product of that manufacturer is acceptable as meeting the requirements of the Contract Documents.

2.02 FACILITIES AND EQUIPMENT

Contractor shall provide, install, maintain, and operate a complete and adequate facility for handling, the execution, disposal, and distribution of material and equipment as required for proper and timely performance of Work connected with Contract.

2.03 MATERIAL REFERENCE STANDARDS

Where material is specified solely by reference to "standard specifications" and if requested by District, Contractor shall submit for review data on actual material proposed to be incorporated into Work of Contract listing name and address of vendor, manufacturer, or producer, and trade or brand names of those materials, and data substantiating compliance with standard specifications.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. Where not more specifically described in any other Contract Documents, workmanship shall conform to methods and operations of best standards and accepted practices of trade or trades involved and shall include items of fabrication, construction, or installation regularly furnished or required for completion (including finish and for successful operation, as intended).
- B. Work shall be executed by tradespersons skilled in their respective lines of Work. When completed, parts shall have been durably and substantially built and present a neat appearance.

3.02 COORDINATION

- A. Contractor shall coordinate installation of Work so as to not interfere with installation of others. Adjustment or rework because of Contractor's failure to coordinate will be at no additional cost to District.
- B. Contractor shall examine in-place work for readiness, completeness, fitness to be concealed or to receive other work, and in compliance with Contract Documents. Concealing or covering Work constitutes acceptance of additional cost which will result should in-place Work be found unsuitable for receiving other Work or otherwise deviating from the requirements of the Contract Documents.

3.03 COMPLETENESS

Contractor shall provide all portions of the Work, unless clearly stated otherwise, installed complete and operational with all elements, accessories, anchorages, utility connections, etc., in manner to assure well-balanced performance, in accordance with manufacturer's recommendations and by Contract Documents. For example, electric water coolers require water, electricity, and drain services; roof drains require drain system; sinks fit within countertop, etc. Terms such as "installed complete," "operable condition," "for use intended," "connected to all utilities," "terminate with proper cap," "adequately anchored," "patch and refinish," "to match similar," should be assumed to apply in all cases, except where completeness of functional or operable condition is specifically stated as not required.

3.04 APPROVED INSTALLER OR APPLICATOR

Installation by a manufacturer's approved installer or applicator is an understood part of Specifications and only approved installer or applicator is to provide on-site Work where specified manufacturer has on-going program of approving (i.e. certifying, bonding, re-warranting) installers or applicators. Newly established relationships between a manufacturer and an installer or applicator who does not have other approved applicator work in progress or completed is not approved for this Project.

3.05 MANUFACTURER'S RECOMMENDATIONS

All installations shall be in accordance with manufacturer's published recommendations and specific written directions of manufacturer's representative. Should Contract Documents differ from recommendations of manufacturer or directions of his representative, Contractor shall analyze differences, make recommendations to the District and the Architect in writing, and shall not proceed until interpretation or clarification has been issued by the District and/or the Architect.

END OF DOCUMENT

QUALITY CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Inspector, Inspections and Tests, Uncovering of Work and Non-conforming of Work and Correction of Work;
- B. Special Conditions.

1.02 RELATED CODES:

- A. The Work is governed by requirements of Title 24, California Code of Regulations ("CCR"), and the Contractor shall keep a copy of these available at the job Site for ready reference during construction.
- B. The Division of the State Architect ("DSA") shall be notified at or before the start of construction.

1.03 OBSERVATION AND SUPERVISION:

- A. The District and Architect or their appointed representatives will review the Work and the Contractor shall provide facilities and access to the Work at all times as required to facilitate this review. Administration by the Architect and any consulting Structural Engineer will be in accordance with applicable regulations, including, without limitation, CCR, Part 1, Title 24, Section 4-341.
- B. One or more Project Inspector(s) approved by DSA and employed by or in contract with the District, referred to hereinafter as the "Project Inspector", will observe the work in accordance with CCR, Part 1, Title 24, Sections 4-333(b) and 4-342:
 - (1) The Project Inspector and Special Inspector(s) shall have access to the Work wherever it is in preparation or progress for ascertaining that the Work is in accordance with the Contract Documents and all applicable code sections. The Contractor shall provide facilities and operation of equipment as needed, and access as required and shall provide assistance for sampling or measuring materials.
 - (2) The Project Inspector will notify the District and Architect and call the attention of the Contractor to any observed failure of Work or material to conform to Contract Documents.

- (3) The Project Inspector shall observe and monitor all testing and inspection activities required.

The Contractor shall conform with all applicable laws as indicated in the Contract Documents, including, without limitation, to CCR, Part 1, Title 24, Section 4-343. The Contractor shall supervise and direct the Work and maintain a competent superintendent on the job who is authorized to act in all matters pertaining to the Work. The Contractor's superintendent shall also inspect all materials, as they arrive, for compliance with the Contract Documents. Contractor shall reject defective Work or materials immediately upon delivery or failure of the Work or material to comply with the Contract Documents. The Contractor shall submit verified reports as indicated in the Contract Documents, including, without limitation, the Specifications and as required by Part 1, Title 24, Section 4-336.

1.04 TESTING AGENCIES:

- A. Testing agencies and tests shall be in conformance with the General Documents and the requirements of Part 1, Title 24, Section 4- 335.
- B. Testing and inspection in connection with earthwork shall be under the direction of the District's consulting soils engineer, if any, referred to hereinafter as the "Soils Engineer."
- C. Testing and inspection of construction materials and workmanship shall be performed by a qualified laboratory, referred to hereinafter as the "Testing Laboratory." The Testing Laboratory shall be under direction of an engineer registered in the State of California, shall conform to requirements of ASTM E329, and shall be employed by or in contract with the District.

1.05 TESTS AND INSPECTIONS:

- A. The Contractor shall be responsible for notifying the District and Project Inspector of all required tests and inspections. Contractor shall notify the District and Project Inspector at least seventy-two hours (72) hours in advance of performing any Work requiring testing or inspection.
- B. The Contractor shall provide access to Work to be tested and furnish incidental labor, equipment, and facilities to facilitate all inspections and tests.
- C. The District will pay for first inspections and tests required by the "CCR", and other inspections or tests that the District and/or the Architect may direct to have made, including the following principal items:
 - (1) Tests and observations for earthwork and paving.
 - (2) Tests for concrete mix designs, including tests of trial batches.
 - (3) Tests and inspections for structural steel work.
 - (4) Field tests for framing lumber moisture content.

- (5) Additional tests directed by the District that establish that materials and installation comply with the Contract Documents.
- (6) Tests and observations of welding and expansion anchors.
- D. The District may at its discretion, pay and then back charge the Contractor for:
 - (1) Retests or reinspection's, if required, and tests or inspections required due to Contractor error or lack of required identifications of material.
 - (2) Uncovering of work in accordance with Contract Documents.
 - (3) Testing done on weekends, holidays, and overtime will be chargeable to the Contractor for the overtime portion.
 - (4) Testing done off Site.
- E. Testing and inspection reports and certifications:
 - (1) If initially received by Contractor, Contractor shall provide to each of the following a copy of the agency or laboratory report of each test or inspection or certification.
 - (a) The District;
 - (b) The Construction Manager, if any;
 - (c) The Architect;
 - (d) The Consulting Engineer, if any;
 - (e) Other engineers on the Project, as appropriate;
 - (f) The Project Inspector; and
 - (g) The Contractor.
 - (2) When the test or inspection is one required by the CCR, a copy of the report shall also be provided to the DSA.

PART 2 - PRODUCTS

2.01 TYPE OF TESTS AND INSPECTIONS

- A. Testing and inspection shall be in accordance with DSA Form 103 (or current version) See Exhibit D
- B. Slump Test
ASTM C 143
- C. Concrete Tests

Testing agency shall test concrete used in the work per the following paragraphs:

- (1) Compressive Strength:
 - (a) Minimum number of tests required: One (1) set of three (3) cylinders for each 100 cubic yards (Sec. 2604(h) 01) of concrete or major fraction thereof, placed in one (1) day. See Title 24, Section 2605(g).
 - (b) Two cylinders of each set shall be tested at twenty-eight (28) days. One (1) cylinder shall be held in reserve and tested only when directed by the Architect or District.
 - (c) Concrete shall test the minimum ultimate compressive strength in twenty-eight 28 days, as specified on the structural drawings.
 - (d) In the event that the twenty-eight (28) day test falls below the minimum specified strength, the effective concrete in place shall be tested by taking cores in accordance with UBC Standard No. 26-13 and tested as required for cylinders.
 - (e) In the event that the test on core specimens falls below the minimum specified strength, the concrete will be deemed defective and shall be removed and replaced upon such direction of the Architect, and in a manner acceptable to the Division of the State Architect.

D. Reinforcing, Steel

E. Structural Steel Per Title 24 and as noted:

- (1) Material: Steel per Table in Title 24, Section 2712.
- (2) Qualification of Welders (UBC Std. 27-6).
- (3) Shop fabrication (Section 2712(d). Structural steel only).
- (4) Shop and field welding (Section 2712(e)).

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions;
- C. Site Standards; and
- D. Construction Waste Management and Disposal.

1.02 TEMPORARY UTILITIES:

- A. Electric Power and Lighting:
 - (1) Contractor will pay for power during the course of the Work. To the extent power is available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver that power service from its existing location in the building(s) or on the Site to point of intended use.
 - (2) Contractor shall verify characteristics of power available in building(s) or on the Site. Contractor shall take all actions required to make modifications where power of higher voltage or different phases of current are required. Contractor shall be fully responsible for providing that service and shall pay all costs required therefor.
 - (3) Contractor shall furnish, wire for, install, and maintain temporary electrical lights wherever it is necessary to provide illumination for the proper performance and/or observation of the Work: a minimum of 20 foot-candles for rough work and 50 foot-candles for finish work.
 - (4) Contractor shall be responsible for maintaining existing lighting levels in the project vicinity should temporary outages or service interruptions occur.
- B. Heat and Ventilation:
 - (1) Contractor shall provide temporary heat to maintain environmental conditions to facilitate progress of the Work, to meet specified

minimum conditions for the installation and curing of materials, and to protect materials and finishes from damage due to improper temperature and humidity conditions. Portable heaters shall be standard units complete with controls.

- (2) Contractor shall provide forced ventilation and dehumidification, as required, of enclosed areas for proper installation and curing of materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, and gases.
- (3) Contractor shall pay the costs of installation, maintenance, operation, and removal of temporary heat and ventilation, including costs for fuel consumed, required for the performance of the Work.

C. Water:

- (1) Contractor shall pay for water used during the course of the Work. Contractor shall coordinate and pay for installation or use of water meter in compliance with local water agency requirements. To the extent water is then available in the building(s) or on the Site, Contractor may use the District's existing utilities by making prearranged payments to the District for the utilities used by Contractor and all Subcontractors. Contractor shall be responsible for providing temporary facilities required to deliver such utility service from its existing location in the building(s), on the Site, or other location approved by the local water agency, to point of intended use.
- (2) Contractor shall use backflow preventers on water lines at point of connection to District's water supply. Backflow preventers shall comply with requirements of Uniform Plumbing Code.
- (3) Contractor shall make potable water available for human consumption.

D. Sanitary Facilities:

- (1) Contractor shall provide sanitary temporary facilities in no fewer numbers than required by law and such additional facilities as may be directed by the Inspector for the use of all workers. The facilities shall be maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by the Inspector or Contractor completes all other work at the Site.
- (2) Use of toilet facilities in the Work under construction shall not be permitted except by consent of the Inspector and the District.

E. Telephone Service:

- (1) Contractor shall arrange with local telephone service company for telephone service as required for the performance of the Work. Contractor shall, at a minimum, provide in its field office one line for telephone and one line for fax machine.

- (2) Contractor shall pay the costs for telephone and fax lines installation, maintenance, service, and removal.

F. Fire Protection:

- (1) Contractor shall provide and maintain fire extinguishers and other equipment for fire protection. Such equipment shall be designated for use for fire protection only and shall comply with all requirements of the California Fire, State Fire Marshall and/or its designee.
- (2) Where on-site welding and burning of steel is unavoidable, Contractor shall provide protection for adjacent surfaces.

G. Trash Removal:

- (1) Contractor shall provide trash removal on a daily basis. Under no circumstance shall Contractor use District trash service.

~~H. Field Office:~~

- ~~(1) If Contractor chooses to provide a field office, it shall be an acceptable construction trailer that is well lit and ventilated. The construction trailer shall be equipped with shelves, desks, filing cabinet, chairs, and such other items of equipment needed. Trailer and equipment are the property of the Contractor and must be removed from the Site upon completion of the Work. Contractor shall coordinate lay down area with the District Representative for approval in writing.~~
- ~~(2) Contractor shall provide any additional electric lighting and power required for the trailer. Contractor shall make adequate provisions for heating and cooling as required.~~

I. Temporary Facilities: n/a

- (1)

1.03 CONSTRUCTION AIDS:

A. Plant and Equipment:

- (1) Contractor shall furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting materials and equipment; and for conveyances for transporting workers. Include elevators, hoists, debris chutes, and other equipment, tools, and appliances necessary for performance of the Work.
- (2) Contractor shall maintain plant and equipment in safe and efficient operating condition. Damages due to defective plant and equipment, and uses made thereof, shall be repaired by Contractor at no expense to the District.

- B. None of the District's tools and equipment shall be used by Contractor for the performance of the Work.

1.04 BARRIERS AND ENCLOSURES:

- A. Contractor shall obtain the District's written permission for locations and types of temporary barriers and enclosures, including fire-rated materials proposed for use, prior to their installation.
- B. Contractor shall provide and maintain temporary enclosures to prevent public entry and to protect persons using other buildings and portions of the Site and/or Premises, the public, and workers. Contractor shall also protect the Work and existing facilities from the elements, and adjacent construction and improvements, persons, and trees and plants from damage and injury from demolition and construction operations.
- C. Contractor shall provide site access to existing facilities for persons using other buildings and portions of the Site, the public, and for deliveries and other services and activities.
- D. Tree and Plant Protection:
 - (1) Contractor shall preserve and protect existing trees and plants on the Premises that are not designated or required to be removed, and those adjacent to the Premises.
 - (2) Contractor shall provide barriers to a minimum height of 4'-0" around drip line of each tree and plant, around each group of trees and plants, as applicable, in the proximity of demolition and construction operations, or as denoted on the Plans.
 - (3) Contractor shall not park trucks, store materials, perform Work or cross over landscaped areas. Contractor shall not dispose of paint thinners, water from cleaning, plastering or concrete operations, or other deleterious materials in landscaped areas, storm drain systems, or sewers. Plant materials damaged as a result of the performance of the Work shall, at the option of the District and at Contractor's expense, either be replaced with new plant materials equal in size to those damaged or by payment of an amount representing the value of the damaged materials as determined by the District.
 - (4) Contractor shall remove soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at Contractor's expense.
 - (5) Excavation around Trees:
 - (a) Excavation within drip lines of trees shall be done only where absolutely necessary and with written permission from the District.

- (b) Where trenching for utilities is required within drip lines, tunneling under and around roots shall be by hand digging and shall be approved by the District. Main lateral roots and taproots shall not be cut. All roots 2 inches in diameter and larger shall be tunneled under and heavily wrapped with wet burlap so as to prevent scarring or excessive drying. Smaller roots that interfere with installation of new work may be cut with prior approval by the District. Roots must first be cut with a Vermeer, or equivalent, root cutter prior to any trenching.
- (c) Where excavation for new construction is required within drip line of trees, hand excavation shall be employed to minimize damage to root system. Roots shall be relocated in backfill areas wherever possible. If encountered immediately adjacent to location of new construction, roots shall be cut approximately 6 inches back from new construction.
- (d) Approved excavations shall be carefully backfilled with the excavated materials approved for backfilling. Backfill shall conform to adjacent grades without dips, sunken areas, humps, or other surface irregularities. Do not use mechanical equipment to compact backfill. Tamp carefully using hand tools, refilling and tamping until Final Acceptance as necessary to offset settlement.
- (e) Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or roots shall be wrapped with four layers of wet, untreated burlap and temporarily supported and protected from damage until permanently relocated and covered with backfill.
- (f) Accidentally broken roots should be sawed cleanly 3 inches behind ragged end.

1.05 SECURITY:

The Contractor shall be responsible for project security for materials, tools, equipment, supplies, and completed and partially completed Work.

1.06 TEMPORARY CONTROLS:

A. Noise Control:

- (1) Contractor acknowledges that adjacent facilities may remain in operation during all or a portion of the Work period, and it shall take all reasonable precautions to minimize noise as required by applicable laws and the Contract Documents.
- (2) Notice of proposed noisy operations, including without limitation, operation of pneumatic demolition tools, concrete saws, and other equipment, shall be submitted to the District a minimum of forty-eight (48) hours in advance of their performance.

B. Noise and Vibration:

- (1) Equipment and impact tools shall have intake and exhaust mufflers.
- (2) Contractor shall cooperate with District to minimize and/or cease the use of noisy and vibratory equipment if that equipment becomes objectionable by its longevity.

C. Dust and Dirt:

- (1) Contractor shall conduct demolition and construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulating in the Work and adjacent areas including, without limitation, occupied facilities.
- (2) Contractor shall periodically water exterior demolition and construction areas to minimize the generation of dust and dirt.
- (3) Contractor shall ensure that all hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins, and as otherwise required by local and state ordinance.
- (4) Contractor shall prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain lines.

D. Water:

- (1) Contractor shall not permit surface and subsurface water, and other liquids, to accumulate in or about the vicinity of the Premises. Should accumulation develop, Contractor shall control the water or other liquid, and suitably dispose of it by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

E. Pollution:

- (1) No burning of refuse, debris, or other materials shall be permitted on or in the vicinity of the Premises.
- (2) Contractor shall comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of the Work including, without limitation, demolition, construction, and disposal operations.

F. Lighting:

- (1) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

1.07 JOB SIGN(S):

A. General:

- (1) Contractor shall provide and maintain a Project identification sign with the design, text, and colors designated by the District and/or the Design Professional; locate sign as approved by the District.
- (2) Signs other than the specified Project sign and or signs required by law, for safety, or for egress, shall not be permitted, unless otherwise approved in advance by the District.

B. Materials:

- (1) Structure and Framing: Structurally sound, new or used wood or metal; wood shall be nominal 3/4-inch exterior grade plywood.
- (2) Sign Surface: Minimum 3/4-inch exterior grade plywood.
- (3) Rough Hardware: Galvanized.
- (4) Paint: Exterior quality, of type and colors selected by the District and/or the Design Professional.

C. Fabrication:

- (1) Contractor shall fabricate to provide smooth, even surface for painting.
- (2) Size: 4'-0" x 8'-0", unless otherwise indicated.
- (3) Contractor shall paint exposed surfaces of supports, framing, and surface material with exterior grade paint: one coat of primer and one coat of finish paint.
- (4) Text and Graphics: As indicated.

1.08 PUBLICITY RELEASES:

- A. Contractor shall not release any information, story, photograph, plan, or drawing relating information about the Project to anyone, including press and other public communications medium, including, without limitation, on website(s) without the written permission of the District.

PART 2 – PRODUCTS Not used.

PART 3 – EXECUTION Not used.

END OF DOCUMENT

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions; and
- C. Temporary Facilities and Controls.

1.02 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.

1.03 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.

1.04 PERFORMANCE REQUIREMENTS:

- A. General: Develop waste management plan that results in end-of Project rates for salvage/recycling of sixty-five percent (65%) by weight (or by volume, but not a combination) of total waste generated by the Work.

1.05 SUBMITTALS:

- A. Waste Management Plan: Submit waste management plan within 30 days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit copies of report. Include the following information:
 - (1) Material category.
 - (2) Generation point of waste.
 - (3) Total quantity of waste in tons or cubic yards.
 - (4) Quantity of waste salvaged, both estimated and actual in tons or cubic yards.
 - (5) Quantity of waste recycled, both estimated and actual in tons or cubic yards.
 - (6) Total quantity of waste recovered (salvaged plus recycled) in tons or cubic yards.
 - (7) Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for final payment, submit copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. 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.
- G. 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.

- H. Qualification Data: For Waste Management Coordinator.
- I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- J. Submittal procedures and quantities are specified in Document 01 33 00.

1.06 QUALITY ASSURANCE:

- A. Waste Management Coordinator Qualifications: LEED Accredited Professional by U.S. Green Building Council.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. 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 including responsibilities of Waste Management Coordinator.
 - (2) Review requirements for documenting quantities of each type of waste and its disposition.
 - (3) Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - (4) Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - (5) Review waste management requirements for each trade.

1.07 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 measurement 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 Used.

PART 3 - EXECUTION

3.01 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.
 - (1) Comply with Document 01 50 00 for operation, termination, and removal requirements.
- B. [Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.]
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - (1) Distribute waste management plan to everyone concerned within 3 days of submittal return.

- (2) Distribute waste management plan to entities when they first begin work on site. Review plan procedures and locations established for salvage, recycling, and disposal.
- 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 Document 01 50 00 for controlling dust and dirt, environmental protection, and noise control.

3.02 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.

3.03 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 DOCUMENT

FIELD OFFICES

~~PART 1—GENERAL~~

~~1.01—RELATED DOCUMENTS AND PROVISIONS:~~

~~All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:~~

- ~~A. General Conditions;~~
- ~~B. Special Conditions; and~~
- ~~C. Temporary Facilities and Controls.~~

~~1.02—SECTION INCLUDES:~~

- ~~A. Requirements for Field Offices and Field Office Trailers.~~

~~1.03—SUMMARY:~~

- ~~A. General: Contractor shall provide District's Field Office Trailer and contents, for District's use exclusively, during the term of the Contract.~~
- ~~B. Property: Trailer, furniture, furnishings, equipment, and the like, supplied by the Contractor with the Office Trailer shall remain the property of the Contractor; District property items installed, delivered, and the like by District within the Office Trailer will remain District's property.~~
- ~~C. Modifications: District reserves the right to modify the trailer or contents, or both, as may be deemed proper by District.~~
- ~~D. Condition: Trailer and contents shall be clean, neat, substantially finished, in good, proper, and safe condition for use, operation, and the like; the trailer and contents shall not be required to be new.~~
- ~~E. Installation Timing: Provide safe, fully furnished, functional, proper, complete, and finished trailer properly ready for entire use, within fourteen (14) calendar days of District's notification of the issuance of Notice to Proceed.~~

~~1.04—SUBMITTALS:~~

- ~~A. General: Submit submittals to District in quantity, format, type, and the like, as specified herein.~~
- ~~B. Office Trailer Data: One (1) copy of manufacturer's descriptive data, technical descriptions, regulatory compliance, industry standards, installation, removal, and maintenance instructions.~~

- C. ~~Equipment Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.~~
- D. ~~Furniture and Furnishings Data: Two (2) copies of manufacturer data for each type of equipment, if directed by District.~~
- E. ~~Plans: One (1) reproducible copy of appropriately scaled plans of trailer layout. Plans shall include, but not be limited to: lighting; furniture; equipment; telephone and electrical outlets; and the like.~~
- F. ~~Product Samples: One (1) complete and entire unit of each type, if directed by District.~~

~~1.05 QUALITY ASSURANCE~~

- A. ~~Standards: In the event that provisions of codes, regulations, safety orders, Contract Documents, referenced manufacturer's specifications, manufacturer's instructions, industry standards, and the like, are in conflict, the more restrictive and higher quality shall govern.~~
- B. ~~Installer: Installer or Installers engaged by Contractor must have a minimum of five (5) years of documented and properly authenticated successful experience of specialization in the installation of the items or systems, or both, specified herein.~~
- C. ~~Manufacturer: Contractor shall obtain products from nationally and industry recognized Manufacturer with five (5) years minimum, of immediately recent, continuous, documented and properly authenticated successful experience of specialization in the manufacture of the product specified herein.~~
- D. ~~State Personnel Training: Provide proper training for maintenance and operations, including emergency procedures, and the like, as directed by District.~~
- E. ~~Units: Shall be sound and free of defects, and shall not include any damage or defect that will impair the safety, installation, performance, or the durability of the entire Office Trailer and appurtenant systems.~~

~~1.06 REGULATORY REQUIREMENTS~~

- A. ~~General: Work shall be executed in accordance with applicable Codes, Regulations, Statutes, Enactments, Rulings, Laws, each authority having jurisdiction, and including, but not limited to, Regulatory Requirements specified herein.~~
- B. ~~California Building Standards Code ("CBSC").~~
- C. ~~California Code of Regulations, Title 25, Chapter 3, Sub Chapter 2, Article 3 ("CCR").~~

- ~~D. Coach Insignia: Trailer shall display California Commercial Coach Insignia; such insignia shall be deemed to show that the trailer is in accordance with the Construction and Fire Safety requirements of CCR.~~

~~PART 2—PRODUCTS~~

~~2.01—FIELD OFFICE TRAILER~~

- ~~A. General: Provide entire Field Office Trailer of type, function, operation, capacity, size, complete with controls, safety devices, accessories, and the like, for proper and durable installation. Partitions, walls, ceiling, and other interior and exterior surfaces shall be appropriately finished, including, but not limited to, trim, painting, wall base, floor covering, suspended or similar ceiling, and the like; provide systems, components, units, nuts, bolts, screws, anchoring devices, fastening devices, washers, accessories, adhesives, sealants, and other items of type, grade, and class required for the particular use, not identified but required for a complete, weather tight, appropriately operating, and finished installation.~~
- ~~B. Manufacturers: General Electric Capital Modular Space; The Space Place, Inc.; or equal.~~
- ~~C. Program: Provide a wheel mounted trailer with stairs, landings, platforms, ramps, and the like, in good, proper, safe, clean, and properly finished condition; with proper heavy duty locks, and other proper and effective security at all doors, windows, and the like. Trailer shall be maintained in good, proper, safe, clean, and properly finished condition during the Contract.~~
- ~~(1) Nominal Trailer Size: Four hundred eighty (480) square feet, minimum.~~
- ~~(2) Stairs, Platform: Properly finished stairs, platforms, and ramps.~~
- ~~(3) Doors: Two (2), three (3) foot wide exterior doors with locksets; finished ramp, steps, and entry platform at each exterior door.~~
- ~~(4) Keys: Submit five (5) keys for each door, window, furniture unit, and the like. There shall be no other key copies or originals available; each key shall be identified for District; and shall be labeled, or tagged or both, as directed by District.~~
- ~~(5) HVAC:~~
- ~~(6) Lighting: Sixty five (65) foot candles illumination minimum at any point, at thirty (30) inches above finished floor throughout from fluorescent light source, exclusively, or as directed by District.~~
- ~~(7) Electrical Outlets: One (1) duplex outlet evenly spaced every twelve (12) linear horizontal feet of wall face, and electrical service ready for use.~~

- (8) ~~Telephones and Telephone Outlets: Two (2) telephone lines wired, connected to telephone utility service, and ready for use, and two (2) telephone instruments, each with two (2) line capability, speed dial and hands free feature. Locate each outlet as directed by District.~~

~~2.02 FIELD OFFICE TRAILER ITEMS~~

- A. ~~General: Provide the Field Office Trailer with the following arranged into two (2) workstations:~~

- (1) ~~Desks: Two (2) desks: thirty six (36) inches by sixty (60) inches; steel, laminated plastic top; locking, one (1) or two (2) file drawers single pedestal; steel; provide five (5) keys to District.~~
- (2) ~~Tables: Two (2) tables; thirty six (36) inches by sixty (60) inches; twenty nine (29) inches high; steel, laminated plastic top tables; one (1) at each desk.~~
- (3) ~~Chairs: Two (2) chairs: swivel; steel; with seat cushion and arms; one (1) at each desk.~~
- (4) ~~Waste Baskets: Two (2) waste baskets, one at each desk.~~

- B. ~~Furniture and Equipment: Provide in the space located to effect efficient and logical use:~~

- (1) ~~File cabinet: One (1); four (4) drawer; lateral; steel locking.~~
- (2) ~~Plan Table: One (1) plan table: thirty six (36) inches deep by seventy two (72) inches wide by forty two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawers.~~
- (3) ~~Drafting Stool: One (1) drafting stool; swiveling; steel; padded; adjustable; with footrest and casters.~~
- (4) ~~Bookshelf: One (1) bookshelf: thirty six (36) inches deep by seventy two (72) inches wide by forty two (42) inches high; adjustable; wood or steel; with lockable plan and pencil drawer.~~
- (5) ~~Plan Rack: One (1) wheel mounted plan rack.~~
- (6) ~~Waste Baskets: One (1) large waste basket.~~
- (7) ~~Coat/Hat Hanger: Wall mounted with minimum capacity for four (4) garments and ten (10) hats.~~
- (8) ~~Document Management System: Shall include an integrated high-volume printer, copier, and facsimile machine, including stand, base, and storage cabinet; and shall include the following features:~~
 - (a) ~~Type: Laser, dry electrostatic transfer, plain paper, digital, multi-function imaging system.~~

- ~~(b) Network: Ethernet or Token Ring network ready, Plug and Play.~~
- ~~(c) Print, send/receive facsimile from any connected workstation.~~
- ~~(d) Resolution: Six hundred (600) dots per inch by six hundred (600) dots per inch, minimum.~~
- ~~(e) Print Speed: Twenty (20) pages per minute, minimum.~~
- ~~(f) Copies: Twenty (20) copies per minute, minimum.~~
- ~~(g) Document Handler: Forty (40) sheet, minimum~~
- ~~(h) Collator: Forty (40) bin, minimum, with stapling.~~
- ~~(i) Duplexing: Capable.~~
- ~~(j) Paper Size: Capable of handling paper sizes to eleven (11) inches by seventeen (17) inches.~~
- ~~(k) Paper Cassettes: One (1) each for eight and one half (8.5) inches by eleven (11) inches, eight and one half (8.5) inches by fourteen (14) inches, and eleven (11) inches by seventeen (17) inches paper sizes; minimum two hundred fifty (250) sheets per cassette.~~
- ~~(l) Reduction/Enlargement: Capable of reduction to twenty five percent (25%) and enlargement to two hundred percent (200%).~~
- ~~(m) Facsimile Electronic Storage: Capable of storing minimum of fifty (50) speed dial numbers, group faxing and broadcast faxing.~~
- ~~(n) Facsimile Scanning: Capable of scanning into memory a minimum of one hundred (100) pages with maximum scan time of three (3) seconds per page.~~
- ~~(o) Halftone: Sixty four (64) levels.~~
- ~~(p) Redial: Automatic and Manual.~~
- ~~(9) Maintenance: Contractor shall purchase service agreements for each unit of equipment for the duration of the project plus two (2) months, and shall maintain all equipment in proper working condition. Service agreements shall include provision for replacement of toner cartridges and other items required to effect proper unit use. Service agreements shall also provide for:
 - ~~(a) Unlimited Service Calls.~~~~

- ~~(b) Same Day Response.~~
- ~~(c) All parts, labor, preventative maintenance and mileage.~~
- ~~(d) All chemicals, such as toner, fixing agent, and the like.~~
- ~~(e) System training and setup.~~
- ~~(10) Portable Toilets: Two (2); each shall include a urinal; each unit shall be a properly enclosed chemical unit conforming to ANSI Z4.3.~~
 - ~~(a) Location: As directed by District.~~
 - ~~(b) Maintenance: Maintain each unit and surrounding areas in a clean, hygienic and orderly manner, at all time. Empty, clean, and sanitize each unit each day at a location and time as directed by District.~~
 - ~~(c) Removal: Relocate, or remove from the site, each Portable Toilet. Upon such directive by District, the Contractor shall forthwith relocate or remove each Portable Toilet and submit the affected areas to a condition which existed prior to the installation of each Portable Toilet, within three (3) calendar days, or as directed by District in writing, at no cost to District.~~

~~2.03 UTILITY AND SERVICES~~

- ~~A. Telephone Service: Contractor shall provide and interface the entire telephone service and shall properly and timely pay for telephone service for District's non long distance use.~~
- ~~B. Electrical Service: Provide all proper connections and continuously pay for service for the duration of the Work.~~

~~2.04 FINISHES~~

- ~~A. General: Manufacturer standard finish system over surfaces properly cleaned, pretreated, and prepared to obtain proper bond; all visible surfaces shall be coated.~~
- ~~B. Finish: Color as selected by District from manufacturer standard palette.~~

~~PART 3 EXECUTION~~

~~3.01 INSTALLATION~~

- ~~A. General: Properly prepare area and affected items to receive the Work. Set Work accurately in location, alignment, and elevation; rigidly, securely, and firmly anchor to appropriate structure; install plumb, straight, square, level, true, without racking, rigidly anchored to proper solid blocking, substrate, and the like; provide appropriate type and quantity of reinforcements, fasteners, adhesives, self-adhesive and other tapes; lubricants, coatings, accessories,~~

and the like, as required for a complete, structurally rigid, stable, sound, and appropriately finished installation, in accordance with manufacturer's published instructions, and as indicated. The more restrictive and higher quality requirement shall govern. Moving parts shall be properly secured, without binding, looseness, noise, and the like.

- B. ~~Installation: Install in accordance with 25 CCR 3.2.3 and as directed by District; jack up trailer and level both ways; mount on proper concrete piers with all load off wheels; provide required tie down and accessories per Section 4368 of referenced CCR, and as directed by District.~~
- C. ~~Rejected Work: Work, materials, unit, items, systems, and the like, not accepted by District shall be deemed rejected, and shall forthwith be removed and replaced with proper and new Work, materials, unit, items, systems, and the like at no cost to District.~~
- D. ~~Standard: Comply with manufacturer's published instructions, or with instructions as shown or indicated; the more restrictive and higher quality requirement shall govern.~~
- E. ~~Location: As directed by District.~~
- F. ~~Fire Resistance: Construct and install in accordance with UL requirements.~~
- G. ~~Maintenance: Contractor shall maintain trailer and adjacent areas in a safe, clean and hygienic condition throughout the duration of the Work, and as directed by District. Properly repair or replace furniture or other items, as directed by District. Properly remove unsafe, damaged, or broken furniture, or similar items, and replace with safe and proper items. Contractor shall pay cost of all services, repair, and maintenance, or replacement of each item.~~
- H. ~~Janitorial Service: Provide professional janitorial services, including, but not limited to, trash, waste paper baskets, fill paper dispensers; clean and dust all furniture, files, and the like; sweep and mop resilient and similar flooring; and vacuum carpeting and similar flooring.~~
 - (1) ~~Frequency: Two (2) times per week, minimum.~~
- I. ~~Removal: Properly remove the Office Trailer and contents from the Site upon completion of the Contract, or as directed by District in writing. Forthwith properly patch and repair affected areas; replace damaged items with new items. Carefully and properly inventory, clean, pack, store, and protect District property; submit District property to District at a date, time and location as directed by District.~~

END OF DOCUMENT

SECTION 01 57 13 – EROSION CONTROL

PART 1 – GENERAL

1.1 SUMMARY

- A. General: Provide all materials, equipment and labor necessary to furnish and install straw wattles at locations shown on the Drawings and on Contractors Storm Water Pollution Prevention Plan.
- B. Storm Water Pollution Prevention Plan: Contractor will be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) or waiver, and submit to the State Water Resource Control Board to obtain Notice of Intent approval and a WDID number. Comply with State Water Resources Control Board requirements. The SWPPP shall be provided by the Contractor prior to the start of work. The SWPPP shall be tailored to the contractor's approach to the work in this contract. The SWPPP shall be prepared by a Qualified SWPPP Developer (QSD). The Contractor shall as a minimum address:
 - 1. Cut and fill operations.
 - 2. Temporary stockpiles.
 - 3. Vehicle and equipment storage, maintenance and fueling operations.
 - 4. Concrete, plaster, mortar and paint disposal.
 - 5. Dust control.
 - 6. Tracking of dirt, mud on off-site streets.
 - 7. Erosion Controls
 - 8. Sediment Controls

1.2 QUALITY ASSURANCE

- . General: Comply with governing codes and regulations.

1.3 SUBMITTALS

- A. SWPPP: Contractors Qualified SWPPP Developer (QSD) shall submit to the State Water Resources Control Board via Storm water Multi Application and Report Tracking System (SMARTS) and obtain a Notice of Intent and WDID number prior to beginning work on site.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Straw Wattles: Shall be new manufactured straw rolls in compliance with state requirements for sediment control.
- B. Filter Bag: Shall be as required by local jurisdiction.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All BMPS shall be installed per the drawings, CASQA standards and as required by the SWPPP.

3.2 MAINTENANCE AND REMOVAL:

- A. General: Maintain and repair existing and new erosion control facilities throughout the construction period. Remove silt build up at straw wattles and/or silt fences as needed. Repair damage to earth slopes and banks. Erosion control measures shall be left in place until hydroseed is placed.
- B. Monitoring: Based on determined Risk Level of Contractor's SWPPP provide monitoring of erosion and sediment control measures before, during and after storm events. Site monitoring shall be performed by a Qualified SWPPP Practitioner. Update SWPPP continuously throughout construction period and provide reporting and testing as required by the current NPDES permit. Testing and reporting of turbidity and ph will be required for a project determined to be Risk Level 2. Contractor's QSD/QSP will be required to prepare AdHoc reports of all testing on the State Water Resources Control Board's SMARTS database
- C. Cleaning: Keep area clean of debris.
- D. Remove all sediment control measures following site stabilization.
- E. The Contractor's QSD and QSP will be responsible for preparing and gaining approval of the annual report(s) and Notice of Termination on the State Water Resources Control Board's SMARTS database following project completion.

END OF SECTION

OWNER-FURNISHED PRODUCTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions;
- B. Special Conditions; and
- C. Materials and Equipment.

1.02 SECTION INCLUDES

- A. Requirements for the following:
 - (1) Installing Owner-furnished materials and equipment.
 - (2) Providing necessary utilities, connections and rough-ins.

1.03 DEFINITIONS

- A. Owner: District, who is providing/furnishing materials and equipment.
- B. Installing Contactor: Contractor, who is installing the materials and equipment furnished by the Owner.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Receive, store and handle products in accordance with the manufacturer's instructions.
- B. Protect equipment items as required to prevent damage during storage and construction.

PART 2 – PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

- A. Installing Contractor's Responsibilities:
 - (1) Verify mounting and utility requirements for Owner-furnished materials and equipment items.
 - (2) Provide mounting and utility rough in for all items where required.

- (a) Rough in locations, sizes, capacities, and similar type items shall be as indicated and required by product manufacturer.

B. Owner and Installing Contractor(s) Responsibilities:

- (1) Owner-Furnished/Contractor Installed ("OFICI"): Furnished by the Owner; installed by the Installing Contractor.
 - (a) General: Owner and Installing Contractor(s) will coordinate deliveries of materials and equipment to coincide with the construction schedule.
 - (b) Owner will furnish specified materials and equipment delivered to the site. Owner/vendor's representative shall be present on Site at the time of delivery to comply with the contract requirements and Specifications Section 01 43 00, Materials and Equipment, Article 1.04.
 - (c) The Owner furnishing specified materials and equipment is responsible to provide manufacturer guarantees as required by the Contract to the Installing Contractor.
 - (d) The Installing Contractor shall:
 - 1) Review, verify and accept the approved manufacturer's submittal/Shop Drawings for all materials and equipment required to be installed by the Installer Contractor and furnished by the Owner. Any discrepancies, including but not limited to possible space conflicts, should be brought to the attention of the Project Manager and/or Program Manager, if applicable.
 - 2) Coordinate timely delivery. Installing Contractor shall receive materials and equipment at Site when delivered and give written receipt at time of delivery, noting visible defects or omissions; if such declaration is not given, the Installing Contractor shall assume responsibility for such defects and omissions.
 - 3) Store materials and equipment until ready for installation and protect from loss and damage. Installing Contractor is responsible for providing adequate storage space.
 - 4) Coordinate with other bid package contractors and field measurement to ensure complete installation.
 - 5) Uncrate, assemble, and set in place.
 - 6) Provide adequate supports.

- 7) Install materials and equipment in accordance with manufacturer's recommendations, instructions, and Shop Drawings, supply labor and material required, and make mechanical, plumbing, and electrical connections required to operate equipment.
- 8) Be certified by equipment manufacturer for installation of the specific equipment supplied by the Owner.
- 9) Provide anchorage and/or bracing as required for seismic restraint per Title 24, UBC Standard 27-11 and all other applicable codes.
- 10) Provide the contract-required warranty and guarantee for all work, materials and equipment, and installation upon its completion and acceptance by the District. Guarantee includes all costs associated with the removal, shipping to and from the Site, and re-installation of any equipment found to be defective.

C. Compatibility with Space and Service Requirements:

- (1) Equipment items shall be compatible with space limitations indicated and as shown on the Contract Documents and specified in other sections of the Specifications.
- (2) Modifications to equipment items required to conform to space limitations specified for rough in shall not cause additional cost to the District.

D. Manufacturer's printed descriptions, specifications, and instructions shall govern the Work unless specifically indicated or specified otherwise.

2.02 FURNISHED MATERIALS AND EQUIPMENT

- A. All furnished materials and equipment are indicated or scheduled on the Contract Documents.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install equipment items in accordance with the manufacturer's instructions.
- B. Set equipment items securely in place, rigidly or flexibly mounted in accordance with manufacturers' directions.
- C. Make electrical and mechanical connections as indicated and required.
- D. Touch-up and restore damaged or defaced finishes to the Owner's satisfaction.

3.02 CLEANING AND PROTECTION

- A. Repair or replace items not acceptable to the Architect or Owner.
- B. Upon completion of installation, clean equipment items in accordance with manufacturer's recommendations, and protect from damage until final acceptance of the Work by the Owner.

END OF DOCUMENT

SECTION 01 66 00

PRODUCT DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Site Access, Conditions and Requirements;
- B. Special Conditions.

1.02 PRODUCTS

- A. Products are as defined in the General Conditions.
- B. Contractor shall not use and/or reuse materials and/or equipment removed from existing Premises, except as specifically permitted by the Contract Documents.
- C. Contractor shall provide interchangeable components of the same manufacturer, for similar components.

1.03 TRANSPORTATION AND HANDLING

- A. Contractor shall transport and handle Products in accordance with manufacturer's instructions.
- B. Contractor shall promptly inspect shipments to confirm that Products comply with requirements, quantities are correct, and products are undamaged.
- C. Contractor shall provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.04 STORAGE AND PROTECTION

- A. Contractor shall store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Contractor shall store sensitive products in weather-tight, climate-controlled enclosures.
- B. For exterior storage of fabricated Products, Contractor shall place on sloped supports, above ground.
- C. Contractor shall provide off-site storage and protection when Site does not permit on-site storage or protection.

- D. Contractor shall cover products subject to deterioration with impervious sheet covering and provide ventilation to avoid condensation.
- E. Contractor shall store loose granular materials on solid flat surfaces in a well-drained area and prevent mixing with foreign matter.
- F. Contractor shall provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- G. Contractor shall arrange storage of Products to permit access for inspection and periodically inspect to assure Products are undamaged and are maintained under specified conditions.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

END OF DOCUMENT

FIELD ENGINEERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Site Investigation, and Soils Investigation Report;
- B. Special Conditions;
- C. Site-Visit Certification.

1.02 REQUIREMENTS INCLUDED:

- A. Contractor shall provide and pay for field engineering services by a California-registered engineer, required for the project, including, without limitations:
 - (1) Survey work required in execution of the Project.
 - (2) Civil or other professional engineering services specified, or required to execute Contractor's construction methods.

1.03 QUALIFICATIONS OF SURVEYOR OR ENGINEERS:

Contractor shall only use a qualified licensed engineer or registered land surveyor, to whom District makes no objection.

1.04 SURVEY REFERENCE POINTS:

- A. Existing basic horizontal and vertical control points for the Project are those designated on the Drawings.
- B. Contractor shall locate and protect control points prior to starting Site Work and preserve all permanent reference points during construction. In addition Contractor shall:
 - (1) Make no changes or relocation without prior written notice to District and Architect.
 - (2) Report to District and Architect when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - (3) Require surveyor to replace Project control points based on original survey control that may be lost or destroyed.

1.05 RECORDS:

Contractor shall maintain a complete, accurate log of all control and survey work as it progresses.

1.06 SUBMITTALS:

- A. Contractor shall submit name and address of Surveyor and Professional Engineer to District and Architect prior to its/their work on the Project.
- B. On request of District and Architect, Contractor shall submit documentation to verify accuracy of field engineering work, at no additional cost to the District.
- C. Contractor shall submit a certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance or nonconformance with Contract Documents.

PART 2 – PRODUCTS Not Used.

PART 3 - EXECUTION

3.01 COMPLIANCE WITH LAWS:

Contractor is responsible for meeting all applicable codes, OSHA, safety and shoring requirements.

3.02 NONCONFORMING WORK:

Contractor is responsible for any re-surveying required by correction of nonconforming work.

END OF DOCUMENT

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Inspector, Inspections, and Tests, Integration of Work, Nonconforming Work, and Correction of Work, and Uncovering Work;
- B. Special Conditions;
- C. Imported Materials Certification.

1.02 CUTTING AND PATCHING:

- A. Contractor shall be responsible for all cutting, fitting, and patching, including associated excavation and backfill, required to complete the Work or to:
 - (1) Make several parts fit together properly.
 - (2) Uncover portions of Work to provide for installation of ill-timed Work.
 - (3) Remove and replace defective Work.
 - (4) Remove and replace Work not conforming to requirements of Contract Documents.
 - (5) Remove Samples of installed Work as specified for testing.
 - (6) Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
 - (7) Attaching new materials to existing remodeling areas – including painting (or other finishes) to match existing conditions.
- B. In addition to Contract requirements, upon written instructions from the District, Contractor shall uncover Work to provide for observations of covered Work in accordance with the Contract Documents; remove samples of installed materials for testing as directed by District; and remove Work to provide for alteration of existing Work.
- C. Contractor shall not cut or alter Work, or any part of it, in such a way that endangers or compromises the integrity of the Work, the Project, or work of others.

1.03 SUBMITTALS:

- A. Prior to any cutting or alterations that may affect the structural safety of Project, or work of others, and well in advance of executing such cutting or alterations, Contractor shall submit written notice to District pursuant to the applicable notice provisions of the Contract Documents, requesting consent to proceed with the cutting or alteration, including the following:
 - (1) The work of the District or other trades.
 - (2) Structural value or integrity of any element of Project.
 - (3) Integrity or effectiveness of weather-exposed or weather-resistant elements or systems.
 - (4) Efficiency, operational life, maintenance or safety of operational elements.
 - (5) Visual qualities of sight-exposed elements.

- B. Contractor's Request shall also include:
 - (1) Identification of Project.
 - (2) Description of affected Work.
 - (3) Necessity for cutting, alteration, or excavations.
 - (4) Effects of Work on District, other trades, or structural or weatherproof integrity of Project.
 - (5) Description of proposed Work:
 - (a) Scope of cutting, patching, alteration, or excavation.
 - (b) Trades that will execute Work.
 - (c) Products proposed to be used.
 - (d) Extent of refinishing to be done.
 - (6) Alternates to cutting and patching.
 - (7) Cost proposal, when applicable.
 - (8) The scheduled date the Contractor intends to perform the Work and the duration of time to complete the Work.
 - (9) Written permission of District or other District contractor(s) whose work will be affected.

1.04 QUALITY ASSURANCE:

- A. Contractor shall ensure that cutting, fitting, and patching shall achieve security, strength, weather protection, appearance for aesthetic match, efficiency, operational life, maintenance, safety of operational elements, and the continuity of existing fire ratings.
- B. Contractor shall ensure that cutting, fitting, and patching shall successfully duplicate undisturbed adjacent profiles, materials, textures, finishes, colors, and that materials shall match existing construction. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the District's decision shall be final.

1.05 PAYMENT FOR COSTS:

- A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of the District, its consultants, including but not limited to the Construction Manager, the Architect, the Project Inspector(s), Engineers, and Agents, will be paid by Contractor and/or deducted from the Contract by the District.
- B. District shall only pay for cost of Work if it is part of the original Contract Price or if a change has been made to the contract in compliance with the provisions of the General Conditions. Cost of Work performed upon instructions from the District, other than defective or nonconforming Work, will be paid by District on approval of written Change Order. Contractor shall provide written cost proposals prior to proceeding with cutting and patching.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Contractor shall provide for replacement and restoration of Work removed. Contractor shall comply with the Contract Documents and with the Industry Standard(s), for the type of Work, and the Specification requirements for each specific product involved. If not specified, Contractor shall first recommend a product of a manufacturer or appropriate trade association for approval by the District.
- B. Materials to be cut and patched include those damaged by the performance of the Work.

PART 3 – EXECUTION

3.01 INSPECTION:

- A. Contractor shall inspect existing conditions of the Site and the Work, including elements subject to movement or damage during cutting and patching, excavating and backfilling. After uncovering Work, Contractor shall inspect conditions affecting installation of new products.

- B. Contractor shall report unsatisfactory or questionable conditions in writing to District as indicated in the General Conditions and shall proceed with Work as indicated in the General Conditions by District.

3.02 PREPARATION:

- A. Contractor shall provide shoring, bracing and supports as required to maintain structural integrity for all portions of the Project, including all requirements of the Project.
- B. Contractor shall provide devices and methods to protect other portions of Project from damage.
- C. Contractor shall, provide all necessary protection from weather and extremes of temperature and humidity for the Project, including without limitation, any work that may be exposed by cutting and patching Work. Contractor shall keep excavations free from water.

3.03 ERECTION, INSTALLATION AND APPLICATION:

- A. With respect to performance, Contractor shall:
 - (1) Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.
 - (2) Execute cutting and demolition by methods that will prevent damage to other Work, and provide proper surfaces to receive installation of repairs and new Work.
 - (3) Execute cutting, demolition excavating, and backfilling by methods that will prevent damage to other Work and damage from settlement.
- B. Contractor shall employ original installer or fabricator to perform cutting and patching for:
 - (1) Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants, waterproofing, and other trades.
 - (2) Sight-exposed finished surfaces.
- C. Contractor shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes as shown or specified in the Contract Documents including, without limitation, the Drawings and Specifications.
- D. Contractor shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Contractor shall conform to all Code requirements for penetrations or the Drawings and Specifications, whichever calls for a higher quality or more thorough requirement. Contractor shall maintain integrity of both rated and non-rated fire walls, ceilings, floors, etc.

- E. Contractor shall restore Work which has been cut or removed. Contractor shall install new products to provide completed Work in accordance with requirements of the Contract Documents and as required to match surrounding areas and surfaces.
- F. Contractor shall refinish all continuous surfaces to nearest intersection as necessary to match the existing finish to any new finish.

END OF DOCUMENT

ALTERATION PROJECT PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Integration of Work, Purchase of Materials and Equipment, Uncovering of Work and Non-conforming Work and Correction of Work and Trenches;
- B. Special Conditions.

PART 2 - PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK:

- A. New Materials: As specified in the Contract Documents including, without limitation, in the Specifications, Contractor shall match existing products, conditions, and work for patching and extending work.
- B. Type and Quality of Existing Products: Contractor shall determine by inspection, by testing products where necessary, by referring to existing conditions and to the Work as a standard.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Contractor shall verify that demolition is complete and that areas are ready for installation of new Work.
- B. By beginning restoration Work, Contractor acknowledges and accepts the existing conditions.

3.02 PREPARATION:

- A. Contractor shall cut, move, or remove items as necessary for access to alterations and renovation Work. Contractor shall replace and restore these at completion.
- B. Contractor shall remove unsuitable material not as salvage unless otherwise indicated in the Contract Documents. Unsuitable material may include, without limitation, rotted wood, corroded metals, and deteriorated masonry and concrete. Contractor shall replace materials as specified for finished Work.

- C. Contractor shall remove debris and abandoned items from all areas of the Site and from concealed spaces.
- D. Contractor shall prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
- E. Contractor shall close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity. Contractor shall insulate ductwork and piping to prevent condensation in exposed areas. Contractor shall insulate building cavities for thermal and/or acoustical protection, as detailed.

3.03 INSTALLATION:

- A. Contractor shall coordinate Work of all alternations and renovations to expedite completion and to accommodate District occupancy.
- B. Designated Areas and Finishes: Contractor shall complete all installations in all respects, including operational, mechanical work and electrical work.
- C. Contractor shall remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition.
- D. Contractor shall refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat and square or straight transition to adjacent finishes.
- E. Contractor shall install products as specified in the Contract Documents, including without limitation, the Specifications.

3.04 TRANSITIONS:

- A. Where new Work abuts or aligns with existing, Contractor shall perform a smooth and even transition. Patched Work must match existing adjacent work in texture and appearance.
- B. When finished surfaces are cut so that a smooth transition with new Work is not possible, Contractor shall terminate existing surface along a straight line at a natural line of division and make a recommendation for resolution to the District and the Architect for review and approval.

3.05 ADJUSTMENTS:

- A. Where removal of partitions or walls results in adjacent spaces becoming one, Contractor shall rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- B. Where a change of plane of 1/4 inch or more occurs, Contractor shall submit a recommendation for providing a smooth transition to the District and the Architect for review and approval.

- C. Contractor shall trim and seal existing wood doors and shall trim and paint metal doors as necessary to clear new floor finish and refinish trim as required.
- D. Contractor shall fit Work at penetrations of surfaces.

3.06 REPAIR OF DAMAGED SURFACES:

- A. Contractor shall patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections, in the area where the Work is performed.
- B. Contractor shall repair substrate prior to patching finish.

3.07 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS:

- A. Cultivated or planted areas and other surface improvements which are damaged by actions of the Contractor shall be restored by Contractor to their original condition or better, where indicated.
- B. Contractor shall protect and replace, if damaged, all existing guard posts, barricades, and fences.
- C. Contractor shall give special attention to avoid damaging or killing trees, bushes and/or shrubs on the Premises and/or identified in the Contract Documents, including without limitation, the Drawings.

3.08 FINISHES:

- A. Contractor shall finish surfaces as specified in the Contract Documents, including without limitations, the provisions of all Divisions of the Specifications.
- B. Contractor shall finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, Contractor shall refinish entire surface to nearest intersections.

3.09 CLEANING:

- A. Contractor shall continually clean the Site and the Premises as indicated in the Contract Documents, including without limitation, the provisions in the General Conditions and the Specifications regarding cleaning.

END OF DOCUMENT

CONTRACT CLOSEOUT AND FINAL CLEANING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Completion of Work;
- B. Special Conditions;
- C. Temporary Facilities and Controls.

1.02 CLOSEOUT PROCEDURES

Contractor shall comply with all closeout provisions as indicated in the General Conditions.

1.03 FINAL CLEANING

- A. Contractor shall execute final cleaning prior to final inspection.
- B. Contractor shall clean interior and exterior glass and all surfaces exposed to view; remove temporary labels, tape, stains, and foreign substances, polish transparent and glossy surfaces, wax and polish new vinyl floor surfaces, vacuum carpeted and soft surfaces.
- C. Contractor shall clean equipment and fixtures to a sanitary condition.
- D. Contractor shall replace filters of operating equipment.
- E. Contractor shall clean debris from roofs, gutters, down spouts, and drainage systems.
- F. Contractor shall clean Site, sweep paved areas, and rake clean landscaped surfaces.
- G. Contractor shall remove waste and surplus materials, rubbish, and construction facilities from the Site and surrounding areas.

1.04 ADJUSTING

Contractor shall adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 RECORD DOCUMENTS AND SHOP DRAWINGS

- A. Contractor shall legibly mark each item to record actual construction, including:
 - (1) Measured depths of foundation in relation to finish floor datum.
 - (2) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permit surface improvements.
 - (3) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - (4) Field changes of dimension and detail.
 - (5) Details not on original Contract Drawings
 - (6) Changes made by modification(s).
 - (7) References to related Shop Drawings and modifications.
- B. Contractor will provide one set of Record Drawings to District.
- C. Contractor shall submit all required documents to District and/or Architect prior to or with its final Application for Payment.

1.06 INSTRUCTION OF DISTRICT PERSONNEL

- A. Before final inspection, at agreed upon times, Contractor shall instruct District's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. For equipment requiring seasonal operation, Contractor shall perform instructions for other seasons within six months or by the change of season.
- C. Contractor shall use operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Contractor shall prepare and insert additional data in Operation and Maintenance Manual when the need for such data becomes apparent during instruction.
- E. Contractor shall review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Contractor shall provide products, spare parts, maintenance, and extra materials in quantities specified in the Specifications and in Manufacturer's recommendations.

- B. Contractor shall provide District with all required Operation and Maintenance Data at one time. Partial or piecemeal submissions of Operation and Maintenance Data will not be accepted.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Completion of the Work;
- B. Special Conditions.

1.02 QUALITY ASSURANCE:

Contractor shall prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT:

- A. Contractor shall prepare data in the form of an instructional manual entitled "OPERATIONS AND MAINTENANCE MANUAL & INSTRUCTIONS" ("Manual").
- B. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size. When multiple binders are used, Contractor shall correlate data into related consistent groupings.
- C. Cover: Contractor shall identify each binder with typed or printed title "OPERATION AND MAINTENANCE MANUAL & INSTRUCTIONS"; and shall list title of Project and identify subject matter of contents.
- D. Contractor shall arrange content by systems process flow under section numbers and sequence of Table of Contents of the Contract Documents.
- E. Contractor shall provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- F. Text: The content shall include Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Contractor shall provide with reinforced punched binder tab and shall bind in with text; folding larger drawings to size of text pages.

1.04 CONTENTS, EACH VOLUME:

- A. Table of Contents: Contractor shall provide title of Project; names, addresses, and telephone numbers of the Architect, any engineers, subconsultants,

Subcontractor(s), and Contractor with name of responsible parties; and schedule of products and systems, indexed to content of the volume.

- B. For Each Product or System: Contractor shall list names, addresses, and telephone numbers of Subcontractor(s) and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Contractor shall mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Contractor shall supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Contractor shall not use Project Record Documents as maintenance drawings.
- E. Text: Contractor shall include any and all information as required to supplement product data. Contractor shall provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- F. Warranties and Bonds: Contractor shall bind in one copy of each.

1.05 MANUAL FOR MATERIALS AND FINISHES:

- A. Building Products, Applied Materials, and Finishes: Contractor shall include product data, with catalog number, size, composition, and color and texture designations. Contractor shall provide information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Contractor shall include Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Contractor shall include product data listing applicable reference standards, chemical composition, and details of installation. Contractor shall provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: Contractor shall include all additional requirements as specified in the Specifications.
- E. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS:

- A. Each Item of Equipment and Each System: Contractor shall include description of unit or system, and component parts and identify function, normal operating characteristics, and limiting conditions. Contractor shall include performance curves, with engineering data and tests, and complete nomenclature, and commercial number of replaceable parts.

- B. Panelboard Circuit Directories: Contractor shall provide electrical service characteristics, controls, and communications.
- C. Contractor shall include color coded wiring diagrams as installed.
- D. Operating Procedures: Contractor shall include start-up, break-in, and routine normal operating instructions and sequences. Contractor shall include regulation, control, stopping, shut-down, and emergency instructions. Contractor shall include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Contractor shall include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Contractor shall provide servicing and lubrication schedule, and list of lubricants required.
- G. Contractor shall include manufacturer's printed operation and maintenance instructions.
- H. Contractor shall include sequence of operation by controls manufacturer.
- I. Contractor shall provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Contractor shall provide control diagrams by controls manufacturer as installed.
- K. Contractor shall provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Contractor shall provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Contractor shall provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Additional Requirements: Contractor shall include all additional requirements as specified in Specification(s).
- O. Contractor shall provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.07 SUBMITTAL:

- A. Contractor shall submit to the District for review two (2) copies of preliminary draft or proposed formats and outlines of the contents of the Manual within thirty (30) days of Contractor's start of Work.
- B. For equipment, or component parts of equipment put into service during construction and to be operated by District, Contractor shall submit draft

content for that portion of the Manual within ten (10) days after acceptance of that equipment or component.

- C. Contractor shall submit two (2) copies of a complete Manual in final form prior to final Application for Payment. Copy will be returned with Architect/Engineer comments. Contractor must revise the content of the Manual as required by District prior to District's approval of Contractor's final Application for Payment.
- D. Contractor must submit two (2) copies as well as a PDF in searchable and tabbed format in Specification Section order of revised Manual in final form within ten (10) days after final inspection.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

WARRANTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Warranty/Guarantee Information;
- B. Special Conditions.

1.02 FORMAT

- A. Binders: Contractor shall use commercial quality, 8-1/2 by 11 inch, three-side rings, with durable plastic covers; two inch maximum ring size. Warranties will be in Specification Section order and shall also be submitted in PDF Format
- B. Cover: Contractor shall identify each binder with typed or printed title "WARRANTIES" and shall list title of Project.
- C. Table of Contents: Contractor shall provide title of Project; name, address, and telephone number of Contractor and equipment supplier; and name of responsible principal. Contractor shall identify each item with the number and title of the specific Specification, document, provision, or section in which the name of the product or work item is specified.
- D. Contractor shall separate each warranty with index tab sheets keyed to the Table of Contents listing, providing full information and using separate typed sheets as necessary. Contractor shall list each applicable and/or responsible Subcontractor(s), supplier(s), and/or manufacturer(s), with name, address, and telephone number of each responsible principal(s).

1.03 PREPARATION:

- A. Contractor shall obtain warranties, executed in duplicate by each applicable and/or responsible subcontractor(s), supplier(s), and manufacturer(s), within ten (10) days after completion of the applicable item or work. Except for items put into use with District's permission, Contractor shall leave date of beginning of time of warranty blank until the date of completion is determined.
- B. Contractor shall verify that documents are in proper form, contain full information, and are notarized, when required.
- C. Contractor shall co-execute submittals when required.

D. Contractor shall retain warranties until time specified for submittal.

1.04 TIME OF SUBMITTALS:

- A. For equipment or component parts of equipment put into service during construction with District's permission, Contractor shall submit a draft warranty for that equipment or component within ten (10) days after acceptance of that equipment or component.
- B. Contractor shall submit for District approval all warranties and related documents within ten (10) days after date of completion. Contractor must revise the warranties as required by the District prior to District's approval of Contractor's final Application for Payment.
- C. For items of work delayed beyond date of completion, Contractor shall provide an updated submittal within ten (10) days after acceptance, listing the date of acceptance as start of warranty period.

PART 2 - PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF DOCUMENT

RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS AND PROVISIONS:

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including, without limitation, Documents on Work;
- B. Special Conditions.

PART 2 - RECORD DRAWINGS

2.01 GENERAL:

- A. As indicated in the Contract Documents, the District will provide Contractor with one set of reproducible, full size original Contract Drawings.
- B. Contractor shall maintain at each Project Site one set of marked-up plans and shall transfer all changes and information to those marked-up plans, as often as required in the Contract Documents, but in no case less than once each month. Contractor shall submit to the Project Inspector one set of reproducible Project Record Drawings ("As-Builts") showing all changes incorporated into the Work since the preceding monthly submittal. The As-Builts shall be available at the Project Site. The Contractor shall submit reproducible drawings at the conclusion of the Project following review of the blue-line prints.
- C. Label and date each Record Drawing "RECORD DOCUMENT" in legibly printed letters.
- D. All deviations in construction, including but not limited to pipe and conduit locations and deviations caused by without limitation Change Orders, Construction Claim Directives, RFI's, and Addenda, shall be accurately and legibly recorded by Contractor.
- E. Locations and changes shall be done by Contractor in a neat and legible manner and, where applicable, indicated by drawing a "cloud" around the changed or additional information.

2.02 RECORD DRAWING INFORMATION:

- A. Contractor shall record the following information:
 - (1) Locations of Work buried under or outside each building, including, without limitation, all utilities, plumbing and electrical lines, and conduits.

- (2) Actual numbering of each electrical circuit to match panel schedule.
- (3) Locations of significant Work concealed inside each building whose general locations are changed from those shown on the Contract Drawings.
- (4) Locations of all items, not necessarily concealed, which vary from the Contract Documents.
- (5) Installed location of all cathodic protection anodes.
- (6) Deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
- (7) Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stubouts, invert elevations, etc.
- (8) Sufficient information to locate Work concealed in each building with reasonable ease and accuracy.

In some instances, this information may be recorded by dimension. In other instances, it may be recorded in relation to the spaces in the building near which it was installed.

- B. Contractor shall provide additional drawings as necessary for clarification.
- C. Contractor shall provide reproducible record drawings, made from final Shop Drawings marked "No Exceptions Taken" or "Approved as Noted."
- D. After review and approval of the marked-up specifications by the Project Inspector, Contractor shall provide electronic copies of the drawings (in PDF format) with one file with all of the sheets and one set of individual sheet files at the conclusion of the Project.

PART 3 - RECORD SPECIFICATIONS

3.01 GENERAL:

- A. Contractor shall mark each section legibly to record manufacturer, trade name, catalog number, and supplier of each Product and item of equipment actually installed.
- B. After review and approval of the marked-up specifications by the Project Inspector, Contractor shall provide one electronic copy of the specifications (in PDF format) at the conclusion of the Project.

PART 4 - MAINTENANCE OF RECORD DOCUMENTS

4.01 GENERAL

- A. Contractor shall store Record Documents apart from documents used for construction as follows:
 - (1) Provide files and racks for storage of Record Documents.
 - (2) Maintain Record Documents in a clean, dry, legible condition and in good order.
- B. Contractor shall not use Record Documents for construction purposes.

PART 5 – PRODUCTS Not Used.

END OF DOCUMENT



CALIFORNIA DESIGN WEST ARCHITECTS INC.

2100 19TH STREET
SACRAMENTO CA 95818
916.446.2466

TECHNICAL SPECIFICATIONS

ALICE BIRNEY PUBLIC WALDORFTK-8 SCHOOL CAMPUS RENEWAL

6251 13TH STREET
SACRAMENTO, CA 95831

DSA APP # 02-122002
DSA FILE # 34-53

SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

CAMPUS RENEWAL

JANUARY 2024

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 Divisions 22-28 for plumbing, mechanical, and 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.
 2. All copper feeders removed will go back to SCUSD.

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 by the 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 20 00 – Concrete Reinforcing

03 30 00 – Cast-in-Place Concrete

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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 3000 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 for Buildings.
 - 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 Billet-Steel Bars for Concrete Reinforcement.
 - 2. ASTM A706 – Standard Specification for Low-alloy Steel Deformed 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, ESR-2495, 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. Interior slabs-on-grade.
 - 2. 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 20 00: Concrete Reinforcing.
 - 2. Division 22: Plumbing.
 - 3. Division 23: Mechanical.
 - 4. 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 C94 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. 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. Maximum aggregate size: 3/4"
 - e. Slump limit: Four inches (4"), plus or minus one inch (1").

B. 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. Maximum aggregate size: 3/4"
 - e. 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.
- 2. 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.

END OF SECTION.

DIVISION 6 – WOOD, PLASTICS, AND COMPOSITES

06 10 00 – Rough Carpentry

06 46 29 – Pre-Primed Wood Fascia

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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 07 21 00 – Building Insulation.
- C. Section 07 92 00 – Joint Sealants.
- D. Section 08 71 00 – Finish Hardware.
- E. Section 09 24 00 – Lath and Plaster
- F. 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 Bolts: 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 46 29 – PRE-PRIMED WOOD FASCIA

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: Pre-primed wood fascia replacement on areas of dry rot, as shown on plans.

1.3 RELATED REQUIREMENTS

- A. Section 06 10 00 – Rough Carpentry.
- B. Section 07 62 00 – Flashing and Sheet Metal.
- C. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. Comply with references to extent specified in this section.
 - 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. 2022 California Building Code, with Amendments.
 - 4. ASTM International: ASTM E84 – Surface Burning Characteristics of Building Materials.

1.5 PREINSTALLATION MEETINGS

- A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1.6 SUBMITTALS

- A. Submittal Procedures: See Section 01 33 00.
- B. Submittal Drawings:
 - 1. Show size, configuration, and fabrication and installation details.
 - 2. Half full size scale for sections and details 1:50 (1/4 inch) for elevations and plans.

- C. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. List of acceptable sealers.
 - 3. Installation instructions.
- D. Samples: Small (approx. 6" x 6") sample in grade / finish specified.
- E. Certificates: Certify products comply with specifications.
 - 1. Fire retardant treatment of materials.
 - 2. Moisture content of materials.
- F. Qualifications: Substantiate qualifications comply with specifications.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Regularly installs specified products.
 - 2. Installed specified products with satisfactory service on five similar installations for minimum five years.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original sealed packaging.
- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, product, size, and manufacture date.
- C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.
- D. Store products indoors in dry, weathertight, conditioned facility.
- E. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

- A. Environment:
 - 1. Product Temperature: Minimum 21°C (70°F) for minimum 48 hours before installation.
 - 2. Install products when wet construction is completed, dried, and cured.
 - 3. Do not install finish lumber or millwork in any room or space where wet process systems such as concrete, masonry, or plaster work is not complete and dry.

- B. Field Measurements: Verify field conditions affecting fabrication and installation. Show field measurements on Submittal Drawings.

- 1. Coordinate field measurement and fabrication schedule to avoid delay.

1.10 WARRANTY

- A. Construction Warranty: See Division 1 for requirements for installation; manufacturer shall provide minimum of 20 year warranty against peeling, flaking, and chalking.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of Design: Basis of Design manufacturer and product is UFP-Edge True™, manufactured by UFP-Edge.
- B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01 25 13 – Project Options and Substitutions.

2.2 PRODUCTS – GENERAL

- A. Pre-primed wood fascia is made from all cedar, which naturally resists rot and termites, and shall be knot-free. All six sides shall be pre-primed.
- B. Each of these cedar trim boards is finger-jointed and edge-glued with a high-quality exterior adhesive that binds the wood during production.
- C. Pre-primed with a first primer coat of an absorbing tannin blocker, with the second coat being fortified using a durable, non-blocking PPG acrylic primer that prepares the surface on all sides for a superior finish.
- D. Two-sided board (smooth / resawn) sanded between coats on the smooth side to give you the best surface.
- E. Factory-applied coating (Machine-Applied Coatings®) enhanced with a mildewcide to help deter mildew.
- F. Coated on all sides for ultimate protection.
- G. Provide each product from one manufacturer and from one production run, when possible.

2.3 FABRICATION

- A. General:
 - 1. Free from pitch pockets.
 - 2. Standard members of same species, except where special profiles are shown.

3. Edges of members in contact with concrete or masonry having a square corner caulking rebate.
4. Fabricate members less than 4 m (14 feet) in length from one piece of lumber, back channeled and molded as shown.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.
- C. Remove existing wall finish (if applicable) to permit new installation.
- D. Clean substrates: Remove contaminants capable of affecting subsequently installed product's performance.

3.2 INSTALLATION

- A. Follow manufacturer's instructions for installation.
- B. Cutting / Machining:
 1. The use of common woodworking tools is recommended. Power saws with a carbide-tipped combination blade work best. Always cut into the finished face for best results.
 - a. Note that all cuts or machined areas must be primed with a quality primer/paint (see Paint section for further details).
- C. Caulk: Caulk is required anytime the product intersects with other materials, such as siding, windows or doors. Always use a high-quality exterior-grade caulk that remains flexible and will move as the wood expands and contracts. Never use hard-setting caulks.
- D. Joints: All joints must fall over a structural framing member and be primed and caulked to prevent moisture intrusion. In areas prone to moisture, the use of a water-resistance barrier flashing behind the joint is recommended. For finished appearance, a 22.5-degree angle should be used, double nailing on either side of the joint. Glue joints for the best finished appearance. Do not nail any closer than 1/2" from the end of the material without drilling a pilot hole to prevent splitting.
- E. Fastening:
 1. 6d or 8d galvanized or other corrosion-resistant fasteners must be used. Ring shank nails are preferred. Fastener length should be long enough to penetrate a minimum of 1-1/2" into structural framing.
 2. Product must be fastened to structural framing, sheathing or other materials. It must be double nailed at a maximum of 24" on center or stagger nailed every 12" or less.

3. Nail heads must be driven snug with the surface of the material. Do not overdrive or countersink fasteners. If nails are driven too far and wood fiber is exposed, the area must be caulked or painted to seal the wood.
4. Fasten material from one end to the other. Do not nail from both ends towards the center as this can create undue stress on the wood.

F. Moisture Control:

1. Lumber and finish issues typically result from moisture, which causes the lumber to expand and contract at a greater rate, causing nail pops, splitting, checking and paint degradation. Proper handling and building practices can prevent most performance issues.
2. Products should only be applied to structures that are well ventilated and dry. Never install over wet sheathing.
3. Spacing requirements:
 - a. 6" above finished grade or landscaping
 - b. At least 1/2" above brick or concrete and should be properly flashed in all applications to prevent water from traveling behind the trim.
 - c. In all applications, products should never be placed where they could come into contact with standing water.
 - d. Trim used in a horizontal application should be flashed.

G. Paint:

1. Refer to Section 09 91 00. Paint color shall be as designated by the Architect or Owner.
2. Any paint or primer used should be a high-quality coating applied to the manufacturer's specifications. Application method and conditions will significantly impact the performance of the coating and thus the substrate.
3. Primer: When primed material is field cut or wood is exposed, it must be primed to prevent the uptake of moisture. All field cuts must be re-primed with one coat of at least 6 wet mills of primer prior to installation to meet warranty requirements. If the primed product is left exposed or unfinished for an extended period of time, all surfaces should be primed again before final coatings.
 - a. Primers should be a high-quality exterior oil or acrylic latex primer formulated for wood.
4. Surface Preparation: All surfaces must be free from dirt, dust, mildew and other loose or foreign material. Washing the surface with water and a mild detergent may be required to properly prepare the surface. Allow the surface to fully dry before painting.

5. Use satin/semi-gloss or full gloss exterior acrylic latex over a flat finish for better performance.
6. All exposed surfaces must be well coated, paying special attention to the bottom edge on any horizontal applications since this is an especially moisture-prone area.
7. Topcoat must be applied to material that has a moisture content of 15% or less.
8. All exposed surfaces must be top-coated with 2-3 dry mills of high-quality,

3.3 CLEANING

- A. Clean exposed surfaces. Remove contaminants and stains.
- B. Touch up damaged finishes. Repair painted surfaces with touch up primer.

3.4 PROTECTION

- A. Protect from traffic and construction operations.
- B. Remove protective materials immediately before acceptance.
- C. Repair damage.

END OF SECTION.

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

- 07 54 19 – Polyvinyl-Chloride (PVC/TPA) Roofing
- 07 62 00 – Flashing and Sheet Metal
- 07 71 23 – Gutters and Related Flashing
- 07 92 00 – Joint Sealants

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SECTION 07 54 19 – POLYVINYL-CHLORIDE (PVC/TPA) ROOFING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically fastened thermoplastic PVC/TPA roofing system on wood or metal deck, including:
2. Rigid Roof Insulation.
3. Roof Insulation cover board.
4. Walkway material.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Division 06 Sections for wood nailers, curbs, and blocking.
3. Section 07 62 00 – Flashing and Sheet Metal for metal roof penetration flashings, flashings, and counterflashings.
4. Section 07 71 23 – Gutters and Related Flashing.
5. Section 07 92 00 – Joint Sealants, for joint sealants, joint fillers, and joint preparation.
6. Divisions 22-26 Sections.

1.2 DEFINITIONS

- A. Roofing Terminology: See ASTM D1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.3 SUBMITTALS

- A. Action Submittals – Product Data: For each type of product indicated.

B. Informational Submittals:

1. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
2. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.

- a. Include letter from Manufacturer written for this Project indicating approval of Installer.
- 3. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.
- 4. Warranties: Unexecuted sample copies of special warranties.
- C. Closeout Submittals:
 - 1. Maintenance Data: To include in maintenance manuals.
 - 2. Warranties: Manufacturer and contractor warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems identical to that specified for this Project, with minimum five years' experience in manufacture of specified products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
- D. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- 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. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. 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.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
3. Remove temporary plugs from roof drains at end of each day.
4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.7 WARRANTY

- A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Manufacturer's Warranty: Manufacturer's standard or customized form, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 1. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories and other components of roofing system specified in this Section.
 2. A single manufacturer will provide warranty for both single ply and built-up roof systems specified.
 3. Warranty Period: 20 years from date of Substantial Completion.
- C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form, signed by Installer, covering the Work of this Section and related Sections indicated above, including all components of membrane roofing such as single ply roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 1. Warranty Period: Two years from date of Substantial Completion.
- D. Extended Roof System Warranty: Warranties specified in this Section include the following components and systems specified in other sections supplied by the roofing system Manufacturer, and installed by the roofing system Installer:
 1. Sheet metal flashing and trim, including roof penetration flashings.
 2. Manufactured copings, roof edge, counterflashings, and reglets.
 3. Roof curbs, hatches, and penetration flashings.
 4. Roof and parapet expansion joint assemblies.
 5. Metal roof, wall, and soffit panels and trim.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon products of Tremco, Inc. or Equal.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D3746 or ASTM D4272.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Flashings and Fastening: Comply with requirements of Division 07 Sections “Sheet Metal Flashing and Trim” and “Roof Specialties.” Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 - 1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 - 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- D. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.
- F. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 THERMOPLASTIC MEMBRANE MATERIALS

- A. Thermoplastic PVC/TPA sheet, ASTM D4434 Type IV internally fabric reinforced, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant. The PVC/TPA sheet is comprised of an elastomeric tri-polymer alloy that is a blend of CPE, Elvaloy, and PVC.
1. Basis of design product: Tremco, TPA Roof Membrane or Equal.
 2. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D751: 300 lbf/in.
 3. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D751: 100 lbf.
 4. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D751: 25 percent.
 5. Minimum Thickness, nominal, ASTM D751: 60 mils.
 6. Exposed Face Color: White.
 7. Reflectance, ASTM C1549: 86 percent.
 8. Thermal Emittance, ASTM C1371: 0.86.
 9. Solar Reflectance Index (SRI), ASTM E1980: 108.
 10. Recycled Content, minimum: 25 percent pre-consumer.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC/TPA sheet membrane.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Membrane Bonding Adhesive:
1. Elastomeric solvent-based contact-type adhesive for bonding TPA single ply membranes and flashings to substrates.
 - a. TPA Single Ply Bonding Adhesive or Equal.
 - b. Density at 77 deg. F (25 deg. C), minimum, ASTM D1475: 7.0 lb/gal.
 - c. Percent solids, minimum: 25 percent.

- C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.
- E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 ROOF INSULATION MATERIALS

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.
- B. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- C. Rigid Roof Insulation:
 - 1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
 - a. Compressive Strength, ASTM D1621: Grade 2: 20 psi.
- D. Glass-mat-faced, pre-primed, gypsum panel coverboard, ASTM C1177/C1177M.
 - 1. Basis of design product: DensDeck or equal.
 - 2. Thickness: 1/4 inch.

2.6 WALKWAY MATERIALS

- A. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
 - 1. TPA Walkway Roll or Equal.
 - 2. Roll Size: 36 inches by 60 feet.
 - 3. Thickness: 0.080 inch.
 - 4. Color: Grey.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Wood Roof Deck: Verify that wood deck is securely fastened with no projecting fasteners.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.

3.4 INSULATION INSTALLATION

- A. Cover Boards: Install cover boards straight lines with end joints staggered between rows. Loosely butt cover boards together and mechanically fasten to roof deck.
 - 1. Mechanically fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Mechanically fasten cover boards, minimum 8 fasteners per 4' x 8' board.

3.5 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

- A. Mechanically fasten membrane roofing over area to receive roofing and install according to roofing system manufacturer's written instructions.
 - 1. Install sheet according to ASTM D5082.

- B. Start installation of membrane roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten or adhere membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings 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 sheet membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
 - 4. Install T patches where sheets intersect.
- G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

- B. Walkways will not be installed over seams in single ply membrane.

3.8 FIELD QUALITY CONTROL

- A. Manufacturer Inspector: Manufacturer will employ technical personnel to inspect the roof while it is being installed. Roof will be inspected a minimum of 3 times per week while in progress with jobsite reports, including photos, sent to all of the project stakeholders.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION.

SECTION 07 62 00 – FLASHING AND SHEET METAL

PART 1 – GENERAL

1.1 SUMMARY

- A. All applicable portions of Division 1, including the drawings and general provisions of the contract, the general and supplementary conditions and Division 1 specification sections which apply to work of this section as if printed herein.
- B. Section Includes: Flashings, counter flashings, and copings as indicated on the Drawings and specified herein.
- C. Related Sections:
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Section 07 54 19 – Polyvinyl-Chloride (PVC/TPA) Roofing
 - 3. Section 07 71 23 – Gutters and Related Flashings.
 - 4. Section 07 92 00 – Joint Sealants.
 - 5. Refer to Division 7, for Roofing Sections, and Prefabricated roof curbs, hatches, roof deck insulation, and Division 8 component daylight systems.

1.2 REFERENCES

- A. Fabricate sheet metal items from sheet steel in accordance with ASTM G90.
- B. ASTM A924 / A924M-16ae1 – General Requirements for Steel Sheet, Metallic-Coated by the Hot Dip Process.
- C. FS TT-C 494B – Federal Specification for Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. SMACNA – Architectural Sheet Metal Manual, current edition.
- E. AWS – American Welding Society.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, welding methods, fastening methods, expansion joint layouts, downspout layout and installation details.
- C. Samples: Submit two samples, 12 inches long illustrating component design, finish, color, and configuration.

1.4 QUALITY ASSURANCE

- A. Conform to SMACNA Manual for architectural sheet metal flashing and installation details.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Where general flashing pieces are shown on drawings, provide steel sheet metal of at least 22-gauge steel unless otherwise noted on drawings.
- B. Where sheet aluminum is shown on Drawings, provide 0.032-inch thickness (20-gauge) and in accordance with ASTM B209, 6063-T5 in color finish as selected by Architect.
- C. Extruded Aluminum: Manufacturer's standard extrusions of sizes and profiles indicated, 60063-T52, AA-C22A41 clear anodized finish; 0.080-inch minimum thickness for primary legs of extrusions.
- D. Stainless Steel: AISI Type 302/304, complying with ASTM A167, 2D annealed finish, soft, except where harder temper required for forming or performance; 0.0156-inch thick (28 gauge) except as otherwise indicated.
- E. Galvanized Steel: ASTM A924 / A924M-09a, Grade A, G90 zinc coating.

2.2 ACCESSORIES

- A. Fasteners and Clips: Provide as required and appropriate for the materials being fastened. Where fasteners or clips may be exposed to outside weather conditions, provide galvanized or stainless-steel type.
 - 1. Provide fasteners such as bolts, screws, and nails hot-dip galvanized as specified in accordance with ASTM A153.
- B. Where rivets will be used, provide malleable iron type with rust-inhibitive coating.
- C. If drive pins are incorporated into work, provide Omark or other approved, cadmium plated with neoprene facing, at least 1-inch long, with neoprene washers.
- D. Solder:
 - 1. For use steel or copper, provide 50 – 50 tin/lead solder (ASTM B32) with rosin flux.
 - 2. For use with stainless steel, provide 60 – 40 tin/lead solder (ASTM B32) with acid-chloride type flux, except use rosin flux over tinned surfaces.
- E. Bituminous Coating: SSPC – Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
- F. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.

- G. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 Joint Sealers.
- H. Epoxy Seam Sealer: Two-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- I. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
- J. Paper Slip Sheet: 5 lbs. rosin-sized building paper.
- K. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E154.
- L. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncorrosive.
- M. 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.

2.3 FABRICATION

- A. General Metal Fabrication:
 - 1. 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 waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work.
 - 2. 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 seams with epoxy seam sealer; rivet joints for additional strength where required.
- B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, in edges to be seamed, form seams and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently weather/waterproof, 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 incompatible 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. Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed for extruded aluminum joint covers. Fabricate mitered and welded corner units.

2.4 PREFABRICATED SHEET METALS

- A. Copings: Provide factory prefabricated 22-gauge galvanized steel sheet metal continuous snap on type copings per SMACNA Chapter 3, Figure 3-1 with EIEPGE Styles. Copings shall be maximum 10-foot lengths, secured at one (1) end and free at other end and/or per SMACNA requirements. Cover plate shall extend 6-inch minimum beyond 1/2-inch space between coping lengths. Secure cover plate with screw in neoprene washer per SMACNA Figure 3-1-Detail 1 in oversized holes. Provide copings manufactured by MM Systems Corporation, Construction Specialties, Tremco, KC Metals, Fry Reglet or others, as approved by Architect.
 - 1. Pre-finish coping in Kynar 500 coating of standard color as selected by Architect.
- B. All other flashing: Provide minimum 22-gauge galvanized flashing to the sizes and shapes as detailed on the drawings. All exposed flashing shall be primed and painted per the paint specification sections. Provide minimum two (2) coats of paint.
- C. Expand-O-Flashing, for Expansion Joints at Roof Expansions and Roof/Wall Expansion Joint Conditions: Provide factory Expand-O-Flash by Johns Manville or equal. Provide 10 foot or maximum lengths possible. Fabricate Expand-O-Flash expansion joint covers as detailed on the drawings. Use Type N-Neoprene Sheet-Black, flange shall be minimum 26 ga. galvanized steel bellows width minimum 4 inches.
- D. Expansion and Seismic Covers for Expansion Joints and Seismic Joints for Floors, Ceilings, Walls and Roofs: Provide factory aluminum joint covers by Balco Inc. or equal. Provide maximum lengths possible. Fabricate expansion and seismic joints covers Model No. RDA-4 with aluminum center plate. Provide extruded aluminum sub-channel (6063-T5) standard mill finish. Movement capabilities shall be at 50 percent or as recommended by the manufacturer.
 - 1. At Rated Expansion and Seismic Joint Conditions up to 2 Hour Rated Systems: Use Balco Fire Barrier Systems as tested in accordance with ASTM E1966 and as listed with Omega Point Laboratories Inc.
 - 2. Expansion and Seismic Joint Covers at Interior, Vertical, and Ceiling Surfaces: Use 6000 Series No. 6GOU- Aluminum snap lock cover plate with standard aluminum mill finish.
 - 3. Expansion and Seismic Joint Cover at Exterior Vertical and Ceiling/Soffit Surfaces: Use FCWW aluminum with standard mill finish.

- E. All Expansion and Seismic Covers that intersect at Floor to Wall, Wall to Ceiling/Soffit, Roof to Parapet, etc.: Use factory preassembled transition pieces that will meet the manufacturers' minimum requirement for a watertight intersection connection.
- F. Balconies Edge Flashing: Use Schluter-Bara-Rak powder-coated aluminum edging profile with drip lip. Extruded aluminum to ASTM B221, 6463-T5 alloy with integral trap E201-DAL-perforated anchoring leg and complete with outside/inside corners and connectors. Length 8 ½ inches long. Color from standard color. Use a thin set mortar over the trapezoid perforated anchoring leg. Apply waterproof membrane per manufacturers' requirements.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Inspect substrate conditions prior to installation of sheet metal items. Conditions which could be detrimental to correct and proper installation of sheet metal assemblies are to be called to the attention of the Owner for their disposition prior to sheet metal work being installed.
- B. Coordinate fabrication and installation of sheet metal items with work of others such as roofing, curtainwall and windows, sealants, mechanical and electrical.

3.2 INSTALLATION

- 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 that 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 counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 3 sections. Where shown in masonry, finish reglets to trades of masonry work, for installation as work of Division 4 sections.
- E. Install counter flashings in reglets, either by snap-in seal arrangement or by welding in-place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated in depending on degree of sealant exposure.
- F. Install elastic flashing in accordance with manufacturer's recommendations. Where required, provide for movement as joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water

for 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.
- H. Conductor Head Guards: Install "bee-hive type" strainer-guard at conductor heads, removable for cleaning downspouts.
- I. Flash around exterior openings in the building where other waterproofing methods are insufficient.
- J. Joints:
 - 1. Typically, provide flat locked joints with sealant between metal surfaces, unless shown otherwise. Where standing seams are required, provide with folded corners.
 - 2. Provide minimum of 3-inch laps.
 - 3. Where concealed joints are possible, provide flat locked joints with 3-inch reinforcing behind, set-in full bed of sealant.
 - 4. Do not leave sheet metal joint unsealed. See sealant section of these specifications.

3.3 INSPECTION

- A. Immediately following installation of sheet metal work, touch-up areas where primer has been removed during installation operations and where soldering has occurred.
- B. Where architectural coatings are provided, touch-up marred or abraded finishes with compatible coating which can be expected to provide the same serviceability as factory applied coatings.

3.4 CLEANING

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

3.5 PROTECTION

- A. 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 71 23 – GUTTERS AND RELATED FLASHINGS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Galvanized steel gutters.
2. Downspouts.
3. Related flashing.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 07 54 19 – Polyvinyl-Chloride (PVC/TPA) Roofing
3. Section 07 62 00 – Sheet Metal Flashing and Trim.
4. Section 07 92 00 – Joint Sealants.
5. Section 09 91 00 – Painting: Field painting of metal surfaces.
6. Refer to Division 7, for Roofing Sections, and Prefabricated roof curbs, hatches, roof deck insulation, and Division 8 component daylight systems.

1.2 REFERENCES

- A. ASTM A924 / A924M-16ae1 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- B. FS TT-C-494 – Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- C. SMACNA – Architectural Sheet Metal Manual, current edition.
- D. AWS – American Welding Society.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, welding methods, fastening methods, expansion joint layouts, downspout layout and installation details.
- C. Samples: Submit two samples, 12 inches long illustrating component design, finish, color, and configuration.

1.4 QUALITY ASSURANCE

- A. Conform to SMACNA Manual for architectural sheet metal flashing and installation details.

1.5 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.

1.6 COORDINATION

- A. Coordinate painting portions prior to installation and the work with downspout discharge pipe inlet.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel: ASTM A924 / A924M-09a, Grade A, G90 zinc coating.
- B. Schedule 10 galvanized pipe.

2.2 COMPONENTS

- A. Gutters: 18-gauge core steel. Minimum size shall be 6" x 6" or as otherwise shown on drawings.
- B. Downspouts: Finished grade to bottom of gutter shall be schedule 10 galvanized pipe, round shape only, 3" minimum diameter or size as shown on drawings.

2.3 ACCESSORIES

- A. Anchorage Devices: SMACNA requirements.
- B. Gutter Supports: Straps.
- C. Fasteners: Galvanized steel or stainless steel and as specified in Section 05 50 00. Finish exposed fasteners same as flashing metal.
- D. Clean out Tee: Smith 4510 cleanout tee with countersunk plug and round access cover. 4", 5" or sized as required to coordinate with downspout and underground piping sizes.
- E. Touch-up Primer: Cold applied zinc-rich type.
- F. Protective Back Coating: FS TT-C-494, bituminous.

- G. Sealant: Type as specified under Section 07 92 00.
- H. Conductor-Head Guards: 20-gauge bronze or nonmagnetic stainless-steel mesh or fabricated units, with salvaged edges and noncorrosive fasteners. Select materials for compatibility with gutters and downspouts.
- I. Overflow Drain: 18 ga. galvanized sheet metal. Approximately 2 inches high by 2 inch diameter.

2.4 FABRICATION

- A. Form gutters of profiles and size indicated, to SMACNA requirements.
- B. Gutters shall be fascia mounted whenever possible. See drawings for additional mounting information.
- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- E. Hem all exposed edges of metal.
- F. Welding process shall be Metallic Inert Gas (MIG).
- G. Weld all shop formed metal joints. Grind exposed joints flush with adjacent surfaces and apply touch-up primer as specified.
- H. Butt weld all field assembled gutter sections. Grind exposed joints flush with adjacent surfaces and apply touch-up primer as specified.
- I. Fabricate gutter sections with SMACNA butt type expansion joints at 40 feet maximum with a minimum of one (1) downspout in each 40 foot section. Provide additional downspouts as necessary to accommodate expansion joint locations.
- J. All joints shall be watertight per SMACNA standards.
- K. 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.
- L. All downspouts that spill to grade shall have a 45-degree elbow of same pipe profile fully welded to bottom of downspout.
- M. All downspouts connecting to underground storm drainage systems shall be provided with a cleanout tee at grade.
- N. At all individual gutter sections, provide an overflow drain at opposite end of gutter from downspout. Overflow drain shall be fully welded to gutter bottom. I.D. shall match the I.D. for the downspout outlet.

2.5 FINISHES

- A. Field paint gutters under provisions of Section 09 91 00.
- B. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.

3.2 INSTALLATION

- A. Install gutters and downspouts as shown on drawings. Install expansion joints, additional downspouts and accessories as specified.
- B. Field assemble (weld) gutter sections at “ground level” wherever possible and lift into place as one unit.
- C. All downspout sections shall be fully welded, ground smooth, primed and painted. All downspouts shall be mechanically fastened to building at top, bottom, and maximum 6 feet on center.
- D. Install gutters level and straight in line with building. Shim horizontally and vertically as required to level. Installed gutter to have no ponding water more than ¼" deep.
- E. Water test all gutters and downspouts for leaks and ponding in presence of IOR.
- F. At all welded connections, end caps, overflows, and outlets, provide bituminous coating minimum 1 inch each side of joint.
- G. Provide 3-inch closure plate at all gutter expansion joint locations.

END OF SECTION

SECTION 07 92 00 – JOINT SEALANTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing sealant substrate surfaces.
2. Concrete Joint Sealants.
3. Sealant and backing.
4. Fireproof Firestopping and fire-safing materials and accessories.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 00 72 13 – General Conditions.
- C. Section 03 30 00 – Cast-In-Place Concrete.
- D. Section 07 62 00 – Flashing and Sheet Metal: Sealants used in conjunction with metal flashings.
- E. Section 07 71 23 – Gutters and Related Flashings.
- F. Section 09 29 00 – Gypsum Board Assemblies.
- G. Division 22: Mechanical.
- H. Division 26: Electrical.
- I. Section 32 16 00 – Site Concrete.

1.3 REFERENCES

- A. ASTM C834 – Standard Specification for Latex Sealants.
- B. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
- C. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
- E. ASTM E814 – Standard Test Method for Fire Tests of Penetration Firestop Systems.
- F. FM (Factory Mutual) – Fire Hazard Classifications.

- G. UL – Fire Hazard Classifications.
- H. UL 263 – Standard for Fire Tests of Building Construction and Materials.
- I. UL 723 – Test for Surface Burning Characteristics of Building Materials.
- J. UL 1479 – Fire Tests of Through-Penetration Firestops.
- K. FS TT S 00227 – Sealing Compound: Elastomeric Type, Multi-Component.
- L. FS TT S 00230 – Sealing Compound: Elastomeric Type, Single Component.
- M. FS TT S 001543 – Sealing Compound, Silicone Rubber Base.

1.4 SUBMITTALS

- A. Submit manufacturer's product data under provisions of Section 01 33 00, for each product required.
- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, and color availability.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit standard color ranges of exposed materials for Architect selection.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years' experience.
- B. Applicator: Company specializing in applying the work of this section with minimum three years' experience, with projects of a similar size and type.
- C. Conform to Sealant Waterproofing and Restoration Institute requirements for materials and installation.
- D. Prior to installation of joint sealants, field test adhesion to joint substrates.
 - 1. Install joint sealants in 5-foot joint lengths. Allow to cure before testing. Test adhesion by pulling sealant out of joint.
 - 2. Perform field tests for each type of elastomeric sealant and joint substrate.
 - 3. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 - 4. Report whether or not sealant in joint connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.

5. Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrate during testing.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- C. Do not install sealants under adverse weather conditions or when temperatures are above or below manufacturer's recommended limitations for installation.
- D. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, color, expiration period, curing time and mixing instructions for multi-component materials.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with all Sections referencing this Section.

1.8 WARRANTY

- A. Provide two-year warranty for materials and workmanship under provisions of Section 01 33 00.
- B. Warranty: Include coverage of installed sealants and accessories which fail to achieve airtight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 – PRODUCTS

2.1 SEALANTS

- A. Silicone Sealant: Silicone Sealant (use at concrete, masonry, or glazing applications): FS TT S 01543, Class A, low modulus type; Spectrum I as manufactured by Tremco, Inc.
- B. Interior Building Sealant: Acrylic-emulsion; one-part, non-sag, mildew-resistant. Complying with ASTM C834, formulated to be paintable; Pecora Corp. "AC-20", Sonneborn "Sonolac", Tremco Inc. "Tremco Acrylic Latex 834" or approved equal.
- C. Sanitary Sealant: One-part mildew-resistant silicone; ASTM C920 Type S; Grade NS Class 25; Uses NT, G, A and O; formulated with fungicide for sealing interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures; Dow Corning Corp. "786 Mildew Resistant", or approved equal.
- D. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, non-skinning, non-staining, gun-able, synthetic rubber sealant recommended for sealing interior

concealed joints to reduce transmission of airborne sound; Pecora Corp. "BA-98", Tremco Inc. "Tremco Acoustical Sealant" or approved equal.

- E. Acoustical Sealant for Exposed Joints: Nonoxidizing, skin-able, paintable, gun-able sealant recommended for sealing interior exposed joints to reduce transmission of airborne sound; Pecora Corp. "AC-20", USG "Sheetrock Acoustical Sealant" or approved equal.
- F. Concrete Expansion Joints: Joint sealing material shall be a two-component, self-leveling, polyurethane elastomeric sealant. Product shall be Sikaflex 2cSL as manufactured Sika Corporation, or equal. Color shall be chosen from the full range of manufacturer's standard colors.
- G. Vertical Building Expansion Joints: Joint sealing material shall be a one-component, polyurethane-based non-sag elastomeric sealant. Product shall be Sikaflex Construction Sealant as manufactured Sika Corporation, Pecora Corp. "DynaTrol II" or approved equal. Color shall be chosen from the full range of manufacturer's standard colors.
- H. Sheet Metal Flashings, Trims, Gutters, & Joints: Joint sealing material shall be a two-component, self-leveling, polyurethane elastomeric sealant. Product shall be Sikaflex 2cSL as manufactured Sika Corporation, or equal. Color shall be chosen from the full range of manufacturer's standard colors. Provide Sikaflex 260 Primer at all stainless steel and/or galvanized substrate location for proper adhesion of Sikaflex 2cSL.
- I. Substitutions: Under provisions of Section 01 33 00.
- J. Color of sealant shall be as selected by Architect.

2.2 FIRESTOPPING SEALANTS

- A. Firestopping Material: One-Piece insert conforming to the following:
 - 1. All fire stopping shall be one part, two stage intumescent sealants and putty.
 - 2. All fire stopping sealants shall be capable of maintain an effective barrier against flame, heat, and smoke in compliance with the requirements of ASTM E814, UL 1479, ASTM E119, UL 723, ASTM E84 and UL 263.
 - 3. Fire stopping materials shall be classified in the Underwriters Laboratories (UL) Fire Resistance Directory or listed in the Warnock Hersey International Directory.
 - 4. Fire stopping materials shall be paintable or capable of receiving finish materials in those areas which are exposed to view and which are scheduled to receive finishes.
 - 5. Acceptable Manufacturers: Hilti Firestop Systems, International Protective Coating Corporation "Flamesafe" Systems, 3M Fire Protection Products or approved equal.
 - 6. Substitutions: Under provisions of Section 01 25 13.

2.3 ACCESSORIES

- A. Primer: Non staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Noncorrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Non-staining; compatible with sealant and primer; such as round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Sealant shall not adhere to back-up material.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Solvents: cleaning agents or other accessory materials shall be as recommended by the sealant manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing surfaces.

3.2 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Perform preparation in accordance with sealant manufacturer's recommendations.
- E. Protect elements surrounding the work of this Section from damage or disfiguration.
- F. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or acid washing to produce a clean, sound substrate. Remove loose particles remaining from cleaning operations by vacuuming or blowing out joints.
- G. Clean metal, glass, glazed surfaces of ceramic tile and other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealants.

3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.

- B. Caulk all exterior joints and openings in the building envelope that are observable sources of air infiltration.
- C. Measure joint dimensions and size materials to achieve required width/depth ratios.
- D. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width. Roll the material into the joint to avoid lengthwise stretching. Do not twist or braid rod stock.
- E. Install bond breaker where joint backing is not used.
- F. Prime surfaces to receive joint sealant with primer recommended by sealant manufacturer.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges. Apply masking tape where required to protect adjacent surfaces from sealant application.
- H. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- I. Tool joints concave.
- J. At all surface-mounted light fixtures mounted on gypsum board ceilings, contractor shall caulk light fixture body to ceiling finish to eliminate gap between metal body and fixture. Coordinate locations with drawings.
- K. Firestopping:
 - 1. Apply materials in exact accordance with manufacturer's latest published instructions, requirements, specifications, details and approved submittals.
 - 2. Installation shall be in accordance with the appropriate UL Fire Resistance Directory or Listing with the appropriate Warnock Hersey International Listing.
 - 3. Seal holes or voids made by penetrating items to ensure an effective fire and smoke barrier.
 - 4. Seal intersections and penetrations of floors, ceilings, walls and columns.
 - 5. Seal around cutouts for lights, cabinets, pipes, plumbing, HVAC ducts and electrical boxes, etc.
 - 6. Where floor openings are four inches or more in width and subject to traffic or loading, install cover plate systems capable of supporting same loading as floor.
 - 7. Interface with Other Projects: Coordinate and cooperate with adjacent, contiguous and related materials trades, (such as concrete, drywall, plumbing, conduit, electrical wiring, communication systems) to ensure a proper and timely installation.

8. Seal steel deck flute openings.

3.4 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01 77 00.
- B. Clean adjacent soiled surfaces. Use a solvent or cleaning agent as recommended by the sealant manufacturer.
- C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01 66 00.
- B. Protect sealants until cured.
- C. Do not paint sealants until sealant is fully cured.
- D. Do not paint silicone sealant.

END OF SECTION

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DIVISION 8 – DOORS AND WINDOWS

08 71 00 – Door Hardware

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SECTION 08 11 13 – HOLLOW METAL FRAMES

PART 1 – GENERAL

1.1 SUMMARY

A. Work Included:

1. Replacement Non-rated and fire rated rolled steel frames.
2. Reinstallation of existing doors to be placed in replacement frames.

B. Referenced Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 08 71 00 – Door Hardware.

1.2 REFERENCES

- A. ANSI A250.8 – Recommended Specification for Standard Steel Doors and Frames.
- B. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
- C. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- D. ASTM A653 – Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A924 – General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- F. CEC – California Energy Commission.
- G. NFPA 80 – Fire Doors and Windows.
- H. SDI-105 – Recommended Erection Instructions for Steel Frames.
- I. DHI – Door and Hardware Institute.
- J. CBC – California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 and Part 6.
- K. UL 9 – Fire Tests of Window Assemblies.
- L. UL 10C – Fire Tests of Door Assemblies.

1.3 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.

- B. Fire rated frame construction to conform to UL 9 and UL 10C.
- C. Installed frame assembly to conform to NFPA 80 for fire rated class indicated on Drawings.
- D. Installed exterior frame assembly to be weather tight
- E. Manufacturer shall have both fabrication and assembly plant located within the continental United States or Canada. Products that are either fabricated or assembled outside the continental United States or Canada are not acceptable.

1.4 SYSTEM REQUIREMENTS

A. Regulatory Requirements:

- 1. Conform to CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2 for fire rated frames and doors.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.
- C. Indicate salvaged and reinstalled door elevations, internal reinforcement, and closure method.
- D. Submit Label Certificate FC-1, Figure 3-3, from the Nonresidential Compliance Manual documenting compliance with the CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 6, Section 116, Table 116-A and 116-8.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products under provisions of Section 01 62 00.
- B. Store products on site under cover.
- C. Place products on at least 4-inch wood sills to prevent rust and damage.
- D. Protect doors and frames with resilient packaging.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence work under the provisions of Section 01 32 13.
- B. Schedule work under the provisions of Section 01 32 13.
- C. Schedule delivery of all frames so as not to delay progress of other trades.

1.8 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Amweld Building Products, Inc., www.amweld.com.
- B. Curries Mfg. Inc., www.curries.com.
- C. Door Components, Inc., www.doorcomponents.com.
- D. Fleming, www.flemingdoor.com.
- E. Krieger Steel Products Company, www.kriegersteel.com.
- F. Republic Builders Products Corporation, www.republicdoor.com.
- G. Curries, www.curries.com.
- H. Ceco, www.cecodoor.com.
- I. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

- A. Frames:
1. Steel: Commercial quality cold rolled steel conforming to ASTM A653 galvanized to A60 or G60 coating class or Type 8, A40 (ZF120) according to ASTM A924 with minimized spangle, mill phosphatized.
 2. Exterior Frames: ANSI A250 .8, Level 3, 0.067-inch-thick material (14 GA. Minimum), core thickness.
 3. Interior Frames: ANSI A250 .8, Level 2, 0.053-inch-thick material (16 GA. Minimum), core thickness.
 4. Panels: Same materials and construction as specified for doors.
- B. Closer Channels: Close top and bottom edge of exterior door flush with inverted steel channel closure. Weld all joints watertight.
- C. Frame Anchors:
1. Masonry Anchors: Adjustable T-strap, 0.053-inch-thick steel, corrugated, 2-inch x 10-inch size. Fire rated frames to have UL listed perforated strap anchor permanently anchored to frame.
 2. Metal Stud Anchor: Z type anchor, welded to frame, 0.053-inch-thick steel, UL listed as required for fire rating.

3. Wood Stud Anchor: U shaped anchor, welded to frame, 1 inch wide, 0.053-inch-thick steel, with 2 pre-punched holes in nailing flange. UL listed as required for fire rating.
4. Existing Wall Anchor: 0.053-inch-thick pipe spacer with 2-inch x 0.053-inch-thick steel plate sized to accommodate a 3/8 diameter countersunk flathead expansion anchor. UL listed as required for fire rating.
5. Floor Clip: Angle anchor, full width of frame, 0.067-inch-thick steel.

D. Protective Coatings:

1. Bituminous Coating: Fibered asphalt-based corrosion proofing and sound deadener compound. Equivalent to Transcoat 101-F, www.oilservice.com.
2. Primer: Clean and treat with three stage iron phosphate process. Provide baked-on shop coat of EPA compliant gray synthetic rust-inhibitive enamel primer meeting acceptance criteria of ANSI 250.10.

E. Hardware Reinforcement:

1. Fabricate frames and doors with hardware reinforcement plates welded in place.
2. Hinge reinforcing shall be full width of frame profile.
3. Provide spacers for all thru-bolted hardware.
4. Reinforcement components shall be the following minimum thickness:

| | | |
|----|--------------------------|------------|
| a. | Hinge (door and frame) | 3/16 inch |
| b. | Mortise Lock or Deadbolt | 0.093 inch |
| c. | Bored Lock or Deadbolt | 0.093 inch |
| d. | Flush Bolt Front | 0.093 inch |
| e. | Surface Bolt | 0.093 inch |
| f. | Surface Applied Closer | 0.093 inch |
| g. | Hold Open Arm | 0.093 inch |
| h. | Pull Plates and Bars | 0.067 inch |
| i. | Surface Exit Device | 0.093 inch |
| j. | Floor Checking Hinge | 0.167 inch |
| k. | Pivot Hinge | 0.167 inch |

2.3 FABRICATION

- A. When shipping limitations so dictate, frames for large openings shall be fabricated in sections designed for splicing.
- B. All spliced joints shall occur on the interior side of exterior frames.
- C. Fabricate frames as full profile welded units.

- D. All face, rabbet and soffit joints between abutting members shall be continuously welded and finished smooth when exposed to exterior.
- E. Corner joints shall have all contact edges closed tight, with faces mitered and continuously welded.
- F. Frames with multiple openings shall have mullion members fabricated with no visible seams or joints. All face, rabbet and soffit joints between abutted members shall be continuously welded and finished smooth when exposed to exterior.
- G. Provide 3/8-inch back bend return on frames where gypsum board wall material occurs whether on one or both sides.
- H. Mullions for Double Doors: Removable type supplied by Section 08 71 00.
- I. Dust cover boxes or mortar guards of 0.016-inch-thick steel shall be provided at all hardware mortises on frames.
- J. Reinforce frames wider than 48 inches with roll formed, 0.093-inch-thick steel channels fitted tightly and welded into frame head, inverted U-shape profile.
- K. Prepare frame for silencers except for frames which receive weatherstripping. Provide three (3) single rubber silencers for single doors on strike side, and two (2) single silencers on frame head at double doors without mullions.
- L. Provide steel spreader temporarily attached to feet of both jambs as a brace during shipping and handling. Spreader is not to be used for installation purposes.
- M. Attach fire rated label to each frame and door unit.
- N. Manufacturing Tolerances: Manufacturing tolerance shall be maintained within the following limits:
 - 1. Frame width +1/16 inch -1/32 inch
 - 2. Frame height +-3/64 inch
 - 3. Frame face +-1/32 inch
 - 4. Frame stop +-1/32 inch
 - 5. Frame rabbet +-1/64 inch
 - 6. Frame depth +-1/32 inch
 - 7. Frame throat +-1/16 inch
 - 8. Door width and height +-3/64 inch
 - 9. Door thickness +-1/16 inch
 - 10. Hardware location +-1/32 inch
 - 11. Door flatness +-1/16 inch

2.4 FINISHES

- A. Primer: Baked on rust-inhibitive enamel.
- B. Finish: Site paint under provisions of Section 09 91 00.

- C. Coat inside of frame profile for frames installed in masonry construction with bituminous coating to a thickness of 1/16 inch. Coating may be factory or site applied. Do not apply coating to fire rated frames.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install frames in accordance with SDI-105.
- B. Install fire frames in accordance with NFPA 80.
- C. Installation of exterior doors and frames to be weathertight and waterproof.
- D. Seal penetration of all surface applied screws on exterior face of frames at glass stops and hardware attachments.
- E. Coordinate with wall construction and details for anchor placement. Provide anchors as follows:
 - 1. Frames up to 7 feet 6 inches height - 4 anchors each jamb.
 - 2. Frames 7 feet 6 inches to 8 feet 0-inch height - 5 anchors each jamb, plus an additional anchor for each 2 feet or fraction thereof over 8 feet 0 inch.
 - 3. Frames for double doors; minimum of two (2) anchors in head approximately 12 inches from each jamb.
 - 4. Floor anchors - one (1) anchor each jamb for interior doors. Where wall construction will not allow placement of floor anchor, provide one (1) additional jamb anchor as close to floor as possible.
 - 5. Existing wall anchors shall be welded to provide non-removable condition. Welded bolt head to be ground, dressed and finished smooth.
- F. Frames installed in masonry walls to be fully grouted with masonry grout.
- G. Exposed field welds to be finished smooth and touched up.
- H. Primed or painted surfaces which are scratched or marred shall be touched up.
- I. Hardware to be applied in accordance with hardware manufacturer's templates and instructions.
- J. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.2 CONSTRUCTION

A. INSTALLATION TOLERANCES

- 1. Edge clearance for swinging doors shall not exceed the following:

- a. Between door and frame at head and jamb: 1/8 inch.
- b. Between edge of pair of doors: 1/8 inch.
- c. At door sill with threshold. (From bottom of door to top of threshold): 3/8 inch.
- d. At door sill with no threshold: 1/2 inch.
- e. At door bottom and rigid floor covering per NFPA 80: 1/2 inch.
- f. At door bottom and nominal floor covering per NFPA 80: 5/8 inch.

2. Frame installation tolerance shall not exceed the following:

- a. Squareness +-1/16 inch.
- b. Alignment +-1/16 inch.
- c. Plumbness +-1/16 inch.
- d. Diagonal Distortion +-1/32 inch.

END OF SECTION.

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SECTION 08 71 00 – DOOR HARDWARE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
 - 1. Door Hardware, including electric hardware.
 - 2. Gate Hardware, including access control hardware.
 - 3. Thresholds, gasketing and weather-stripping.

1.3 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 28 10 00 – Access Control System.
- C. Section 32 31 13 – Chain Link Fences and Gates
- D. Section 32 31 19 – Decorative Metal Fences and Gates.

1.4 REFERENCES

- A. 2022 California Building Code, CCR, Title 24.
- B. BHMA – Builders’ Hardware Manufacturers Association
- C. CCR – California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- D. DHI – Door and Hardware Institute
- E. NFPA – National Fire Protection Association.
 - 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives
 - 2. NFPA 105 – Standard for Smoke Door Assemblies and Other Opening Protectives

- F. UL – Underwriters Laboratories.
 - 1. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies
 - 2. UL 305 – Standard for Panic Hardware
- G. WHI – Warnock Hersey Incorporated
- H. SDI – Steel Door Institute

1.5 SUBMITTALS AND SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit six (6) copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
 - 1. Include a Cover Sheet with:
 - a. Job Name, location, telephone number.
 - b. Architects name, location and telephone number.
 - c. Contractor's name, location, telephone number and job number.
 - d. Suppliers name, location, telephone number and job number.
 - e. Hardware consultant's name, location and telephone number.
 - 2. Job Index information included:
 - a. Numerical door number index including; door number, hardware heading number and page number.
 - b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
 - c. Manufacturers' names and abbreviations for all materials.
 - d. Explanation of abbreviations, symbols, and codes used in the schedule.
 - e. Mounting locations for hardware.
 - f. Clarification statements or questions.
 - g. Catalog cuts and manufacturer's technical data and instructions.
 - 3. Vertical schedule format sample:
 - a. Single or pair with opening number and location.
 - b. Degree of opening
 - c. Hand of door(s)
 - d. Door and frame dimensions and door thickness.

- e. Label requirements if any.
 - f. Door by frame material.
 - g. (Optional) Hardware item line #.
 - h. Keypad Symbol.
 - i. Quantity.
 - j. Product description.
 - k. Product Number.
 - l. Fastenings and other pertinent information.
 - m. Hardware finish codes per ANSI A156.18.
 - n. Manufacture abbreviation.
- D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
- E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- F. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- G. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.
- H. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.

1.6 QUALITY ASSURANCE

- A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
- 1. Responsible for detailing, scheduling and ordering of finish hardware.
 - 2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing. To maintain the integrity of patented key systems, provide a letter of authorization from the specified manufacturer indicating that supplier has authorization to purchase the key system directly from the manufacturer.
 - 3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.

- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
 - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.
- G. Pre-Installation Conference:
 - 1. Schedule a pre-installation conference at least one week prior to beginning work of this section.
 - 2. Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, Key Owner Personnel, and Project Inspector.
 - 3. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review Owner's keying standards.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.

1.8 WARRANTY

- A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:
 - 1. Locksets: "L" Series (3) years – "ND" Ten (10) years.
 - 2. Closers: Thirty (30) years –1260 twenty (20) years –Concealed High Security fifteen (15) years except electronic closers shall be two (2) years.
 - 3. Exit devices: Three (3) years.
 - 4. All other hardware: Two (2) years.

1.9 MAINTENANCE

- 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 MANUFACTURERS

| Item | Manufacturer | Acceptable Substitutes |
|------------------------------------|---------------|--------------------------|
| A. Hinges | Ives | Hager, Stanley, McKinney |
| B. Locks, Latches & Cylinders | Schlage | Or Approved Equal |
| C. Exit Devices | Von Duprin | Or Approved Equal |
| D. Closers | LCN | Or Approved Equal |
| E. Push, Pulls & Protection Plates | Ives | Trimco, BBW, DCI |
| F. Flush Bolts | Ives | Trimco, BBW, DCI |
| G. Dust Proof Strikes | Ives | Trimco, BBW, DCI |
| H. Coordinators | Ives | Trimco, BBW, DCI |
| I. Stops | Ives | Trimco, BBW, DCI |
| J. Overhead Stops | Glynn-Johnson | Or Approved Equal |
| K. Thresholds | Zero | Pemko, National Guard |
| L. Seals & Bottoms | Zero | Pemko, National Guard |

2.2 MATERIALS (IF NEEDED)

A. Hinges: Ives as scheduled.

1. Ives 5BB1HW x NRP (Heavy use exterior doors) 630 finish.
2. Ives 5BB1HW (Interior doors) 652 finish.
3. Hinges shall be sized in accordance with the following:
 - a. Height:
 - i. Doors up to 42" wide: 4-1/2" inches.
 - ii. Doors 43" to 48" wide: 5 inches.
 - b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
 - c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.
4. Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.
5. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.

B. Continuous Hinges: Ives as scheduled.

1. SL-224HD (Heavy use exterior doors & Remodels) 628 finish.

C. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.

1. Bathroom (Student – multi use) ND94
2. Faculty ND94
3. Administration ND91
4. Classroom Safe School Lock ND95
5. Bathroom (Typical) ND94
6. Janitor / Storage room ND96
7. Bathroom (Faculty - single compartment toilet)L9485 x 06A x L283-722
8. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:

- a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
 - b. Offset lever pull – minimum 1,600-foot pounds without gaining access
 - c. Vertical lever impact – minimum 100 impacts without gaining access
9. Cycle life – tested to minimum 16 million cycles per ANSI/BHMA A156.2 Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers
10. Cylinders: Refer to “KEYING” article, herein.
11. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
12. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
13. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
14. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
15. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
16. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.
- D. Door Holders: Ives as scheduled.
- 1. FS40 Series Automatic Holder (Wall) 626 finish
 - a. Backing required at wall holders
 - b. Allow for maximum door swing
- E. Protection Plates: Ives as scheduled.
- 1. Kick Plate: 8400-10" x 2" LDW 630 finish
 - 2. Mop Plate: 8400-5" x 2" LDW 630 finish
 - 3. Push / Pull Plate: 8200 x 8302-6x 4 x 16 630 finish
 - 4. Lock Protector: LP-13, LP-12 626 finish
 - 5. Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.

- F. Thresholds: As Scheduled and per details.
1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
 4. Thresholds shall comply with CBC Section 11B-404.2.5.
- G. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.
- H. Keying: Schlage as scheduled.
1. Furnish a Proprietary Schlage master key system as directed by the owner or architect. Key system to be designated and combination-d by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer. This is to be a Schlage Primus keying system. SCUSD to verify all keyways. Provide as follows:
 - a. 6 pin x Standard Core plug (D Series) 626 finish
 - b. 6 pin x Rim type x IC Core (Exit Device) 626 finish
 - c. 6 pin x 1-1/4" Mortise x IC Core (KR Mullions and CD) 626 finish
 2. A detailed keying schedule is to be prepared by the owner and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.
 3. Establish a new master key system for this project as directed by the keying schedule.
 4. Furnish all cylinders in the Schlage conventional style except the exit device and removable mullion cylinders which will be supplied in Schlage Full Size Interchangeable Core (FSIC). Pack change keys independently (PKI).
 5. Furnish PrimusXP "Classic" keyway Patent Protected Schlage cylinders where noted. Furnish all other cylinders in matching conventional "Classic" keyway. Furnish Patent Protected Schlage keys for all cylinders. (e.g., Primus XP Classic Keyway for patent protected / Maximum control) (with mix of conventional "Classic" keyway)
 6. Furnish construction keying for doors requiring locking during construction.
 - a. For FSIC systems provide 23-030-ICX Full Size Construction Cores

- b. For FSIC systems provide ten 48-101-ICX Construction Keys
 - c. For FSIC systems provide two 48-056-ICX Control Keys (const.)
 - d. For FSIC systems provide two control keys for installing the permanent cores (49- 056 for “Classic” keyways, 48-052-XP for “Classic Primus”) (49-003 for “Everest Conventional”, 48-005–XP for “Everest Primus”)
- OR-
- 7. Furnish construction keying for doors requiring locking during construction.
 - a. For “Split Key” Construction Cylinders (non-IC cylinders) specify “CK” for each keyed cylinder.
 - b. Provide ten Construction Keys (48-104 “Classic”, 48-008 “Everest”)
 - c. Provide two Extractor Tools (35-057)
 - 8. Furnish all keys with visual key control.
 - a. Stamp key “Do Not Duplicate”.
 - 9. Furnish mechanical keys as follows:
 - a. Furnish 2 cut change keys for each different change key code.
 - b. Furnish 1 uncut key blank for each change key code.
 - c. Furnish 6 cut master keys for each different master key set.
 - d. Furnish 3 uncut key blanks for each master key set.
 - e. Furnish 2 cut control keys cut to the top master key for permanent I/C cylinders.
 - f. Furnish 1 cut control key cut to each SKD combination.
 - g. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47- 413 (conventional) or 47-743-XP (PrimusXP) with above.
 - h. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
 - i. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
 - 10. Furnish Schlage Padlocks and the cylinders to tie them into the master key system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.
 - a. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47- 413 (conventional) or 47-743-XP (PrimusXP) with above.

- b. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
- c. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.

I. Fasteners:

- 1. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
- 2. Screws for butt hinges shall be flathead, countersunk, full-thread type.
- 3. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- 4. Provide expansion anchors for attaching hardware items to concrete or masonry.
- 5. All exposed fasteners shall have a Phillips head.
- 6. Finish of exposed screws to match surface finish of hardware or other adjacent work.
- 7. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

2.3 FINISHES

- A. Generally, to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.
- B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
- D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.

- C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives). A written record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 34" and 44" AFF.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.
- G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.
- H. Hardware Locations: Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

3.3 ADJUSTING AND CLEANING

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

3.4 FIELD QUALITY CONTROL

- A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

3.5 SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.
- B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.
- C. The Door Schedule on the Drawings indicates which hardware set is used with each door.
- D. Manufacturers Abbreviations (Mfr.)

| | | | |
|-----|---|---------------------------|---|
| GLY | = | Glynn-Johnson Corporation | Overhead Door Stops |
| IVE | = | Ives | Hinges, Pivots, Bolts, Coordinators, Dust Proof Strikes, Push Pull & Kick Plates, Door Stops & Silencers |
| KNX | = | Knox | Knox Boxes |
| LCN | = | LCN | Door Closers |
| LOC | = | LOCINOX | Gate Hinges / Closers |
| SCE | = | Schlage Electronics | Electronic Door Components |
| SCH | = | Schlage Lock Company | Locks, Latches & Cylinders |

- VON = Von Duprin Exit Devices
- ZER = Zero International Thresholds, Gasketing & Weatherstripping

E. Hardware Replacements (as / where noted on plans):

EACH DOOR LEAF TO HAVE:

| QTY | DESCRIPTION | MODEL | FINISH | MFR |
|------|-------------|-------|--------|-----|
| 1 EA | THRESHOLD | 655A | AL | ZER |
| 1 EA | DOOR SWEEP | 111AA | AA | ZER |

- When replacing, protect existing door assemblies. Provide new door sweeps and new extruded aluminum threshold set in continuous bed of mastic where noted on plans. Match width of jamb throat. DEMOLISH

F. Hardware Group 20.1: Ornamental Metal Gates – Pedestrian – Double Leaf:

Gate: G04

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|-------|---|---|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | EA | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer. Match gate finish. | |
| 1 | TOTAL | Padlock – Fork Latch | KS43G3200 | SCH |
| 1 | TOTAL | Padlock – Drop Bolt | KS43G3200 | SCH |
| 2 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position | | - |

NOTE: GATES MAY HAVE EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO PLANS AND SECTION 32 31 19.

G. Hardware Group 20.2: Ornamental Metal Gates – Pedestrian – Double Leaf:

Gate: G05, G08

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|-------|---------------------------------|---|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | EA | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer. Match gate finish. | |
| 1 | TOTAL | Padlock – Fork Latch | KS43G3200 | SCH |
| 1 | TOTAL | Padlock – Drop Bolt | KS43G3200 | SCH |
| 2 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Door Stop / Holder | FS43 Series | IVE |

NOTE: GATES MAY HAVE EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO PLANS AND SECTION 32 31 19.

H. Hardware Group 20.3: Ornamental Metal Gates – Pedestrian – Double Leaf:

Gate: G06

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|-------|---|---|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | EA | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer. Match gate finish. | |
| 1 | TOTAL | Padlock – Fork Latch | KS43G3200 | SCH |
| 1 | TOTAL | Padlock – Drop Bolt | KS43G3200 | SCH |
| 2 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | TOTAL | Door Stop / Holder (on right gate leaf) | FS43 Series | IVE |
| 1 | TOTAL | Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position (on left gate leaf) | | - |

NOTE: GATES MAY HAVE EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO PLANS AND SECTION 32 31 19.

I. Hardware Group 21.1: Ornamental Metal Gates – Pedestrian – Single Leaf – Access Control Hardware:

Gate: G03

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|------|--|--|-----|
| 2 | EA | Heavy Duty Self Closing Hinges | Mammoth 180 | LOC |
| 1 | EA | Access Control System, including all devices, readers, strikes, hardware | Refer to Section 28 10 00 and Sheet T000 for product information and details | |
| 1 | EA | Classroom Security Lock | ND95PD | SCH |
| 1 | EA | Full Height Lock Protector / Stop | Fabricated from 10 ga. bent steel | - |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Door Stop / Holder | FS43 Series | IVE |
| 1 | TOT | Solid Mullion (between gates G02 and G03) | Provided by gate MFR | - |

NOTE: GATES MAY HAVE EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO PLANS AND SECTION 32 31 19.

J. Hardware Group 21.2: Ornamental Metal Gates – Pedestrian – Single Leaf:

Gate: G02

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|----------------|---|---|-----|
| 2 | EA | Heavy Duty Self Closing Hinges | Mammoth 180 | LOC |
| 1 | EA | Classroom Security Lock | ND95PD | SCH |
| 1 | EA | Full Height Lock Protector / Stop | Fabricated from 10 ga. bent steel | - |
| 2 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Kickplate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Door Stop / Holder | FS43 Series | IVE |
| 1 | See Group 21.1 | Solid Mullion (between gates G02 and G03) | Provided by gate MFR | - |

- K. Hardware Group 22.1: Black Vinyl Coated Chain Link – Pedestrian – Single Leaf – Panic Hardware:

Gates: G16

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|------|-----------------------------------|---|-----|
| 2 | EA | Heavy Duty Self Closing Hinges | Mammoth 180 | LOC |
| 1 | EA | Exit Device | AX-CD99NL | VON |
| 1 | EA | Full Height Lock Protector / Stop | Fabricated from 10 ga. bent steel | - |
| 1 | EA | Rim Cylinder | 20-057 26D (Verify Keyway) | SCH |
| 1 | EA | Mortise Cylinder | 26-091 26D (Verify Keyway) | SCH |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Door Stop / Holder | FS43 Series | IVE |

NOTE: GATES HAVE EXPANDED METAL MESH OVER GATE AND ADJACENT FENCING. REFER TO SECTION 32 31 13.

- L. Hardware Group 22.2: Black Vinyl Coated Metal Gates – Pedestrian – Single Leaf – 4' Gate:

Gate: G01

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|------|------------------------------|---|-----|
| 2 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | EA | Communicating Lock | ND72PD (Match gate finish) | SCH |
| 2 | EA | Primus Cylinder | 20-765-XP | SCH |
| 1 | EA | Kick Plate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Door Stop / Holder | FS43 Series | IVE |

M. Hardware Group 22.3: Black Vinyl Coated Chain Link – Pedestrian – Single Leaf:

Gates: G09, G10, G15

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|-------|---|---|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | TOTAL | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer | |
| 1 | TOTAL | Padlock – Fork Latch | KS43D3200 | SCH |
| 1 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Kickplate | 8400 (10 ga x 10"H x full width of gate x B-CS); match gate color | IVE |
| 1 | EA | Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position | | - |

*NOTE: SALVAGE EXISTING FIRE ACCESS SIGN ON EXISTING GATE;
REINSTALL ON GATE G09.*

N. Hardware Group 22.4: Black Vinyl Coated Chain Link – Vehicular – Double Leaf:

Gates: G011, G014

EACH GATE LEAF TO HAVE:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|------|---|---|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. Match gate finish. | |
| 1 | EA | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer. Match gate finish | |
| 1 | EA | Padlock – Fork Latch | KS43D3200 | SCH |
| 1 | EA | Knox Box | KnoxBox3200 | KNX |
| 1 | EA | Cylinder | 23-030 (Verify Keyway) | SCH |
| 1 | EA | Drop Bolt, with staple at top and bottom for padlock, and sleeve for locking in open position | | - |

O. Hardware Group 20.7: Galvanized Chain Link Gates – Single Leaf:

GATE: G007

Each gate leaf to have:

| QTY | UNIT | DESCRIPTION | PRODUCT | MFR |
|-----|-------|---------------------------------|--------------------------------------|-----|
| 3 | EA | Heavy Duty Industrial Hinges | As recommended by gate manufacturer. | |
| 1 | TOTAL | Heavy Duty Drop Fork Gate Latch | As recommended by gate manufacturer. | |
| 1 | TOTAL | Padlock – Fork Latch | KS43G3200 | SCH |
| 1 | TOTAL | Cylinder | 23-030 (Verify Keyway) | SCH |

END OF SECTION.

DIVISION 9 – FINISHES

- 09 05 61 – Common Work Results for Flooring Preparation
- 09 29 00 – Gypsum Board Assemblies
- 09 51 13 – Acoustical Ceiling Panels
- 09 65 13 – Resilient Wall Base and Accessories
- 09 64 70 – Wood Floor Resurfacing
- 09 65 16 – Linoleum Sheet Flooring
- 09 65 19 – Linoleum Tile Flooring
- 09 67 24 – Urethane Slurry Flooring System
- 09 68 00 – Carpet
- 09 68 19 – Stair and Platform Nosings
- 09 77 10 – Fiber Reinforced Laminate (FRL) Wall Protection Panels
- 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels
- 09 91 00 – Painting

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SECTION 09 05 61 – COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This section applies to all floors identified in the contract documents to receive the specified types of floor coverings.
- B. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for moisture and pH.
- D. Preparation of new subfloors for installation of new floor coverings.
- E. Floor leveling and repair, as required.

1.3 RELATED REQUIREMENTS

- A. Section 03 30 00 – Cast-In-Place Concrete: Limitations on curing requirements for new concrete floor slabs.
- B. Section 07 92 00 – Joint Sealers.
- C. Section 08 71 00 – Door Hardware.
- D. Section 09 67 24 – Urethane Slurry Flooring System.
- E. Section 09 64 70 – Wood Floor Resurfacing.
- F. Section 09 68 00 – Carpet.

1.4 REFERENCES

- A. ASTM C109/C109M – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- B. ASTM C348 – Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
- C. ASTM C472 – Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
- D. ASTM D4259 – Standard Practice for Abrading Concrete to alter the surface profile of the concrete and to remove foreign materials and weak surface laitance.

- E. ASTM D7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
- F. ASTM E96/E96M – Standard Test Methods for Water Vapor Transmission of Materials
- G. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- H. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- I. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.6 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and pH limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- C. Product Data:
 - 1. Moisture remediation system.
 - 2. Underlayment Primer.
 - 3. Cementitious Self-Leveling Underlayment.
 - 4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes).
- D. Testing Agency's Report: Include:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and pH test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.

6. Submit report to Architect.
7. Submit report not more than two business days after conclusion of testing.

E. Adhesive Bond and Compatibility Test.

1.7 QUALITY ASSURANCE

- A. Moisture and pH testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 1. Provide access for and cooperate with testing agency.
 2. Confirm date of start of testing at least 10 days prior to actual start.
 3. Allow at least 4 business days on site for testing agency activities.
 4. Achieve and maintain specified ambient conditions.
 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

1.8 DELIVERY AND STORAGE

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65°F or more than 85°F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of

any recommendation from flooring manufacturer, provide a product with the following characteristics:

1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of pH found, and suitable for adhesion of flooring without further treatment. This is included for reference and remediation if needed during construction and shall not be included in the Base Bid.
1. Thickness: 1/8 inch (3 mm), maximum.
 2. If testing agency recommends any particular products, use one of those.

PART 3 – EXECUTION

3.1 CONCRETE SLAB PREPARATION

- A. Perform following operations in the order indicated:
1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
 2. Preliminary cleaning.
 3. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
 4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.

5. pH tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
6. Specified remediation, if required.
7. Patching, smoothing, and leveling, as required.
8. Other preparation specified.
9. Adhesive bond and compatibility test.
10. Protection.

B. Remediation:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
3. Excessive pH: If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2 PRELIMINARY CLEANING

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

3.3 MOISTURE VAPOR EMISSION TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.
- F. Report: Report the information required by the test method.

3.4 INTERNAL RELATIVE HUMIDITY TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

3.5 PH TESTING

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Note: This procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
- C. Use a wide range pH paper, its associated chart, and distilled or deionized water.
- D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the pH paper into the water, remove it, and compare immediately to chart to determine pH reading.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value is over 10.

3.6 PREPARATION

- A. See individual floor covering section(s) for additional requirements.

- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

3.7 ADHESIVE BOND AND COMPATIBILITY TESTING

- A. Comply with requirements and recommendations of floor covering manufacturer.

3.8 APPLICATION OF REMEDIAL FLOOR COATING

- A. Comply with requirements and recommendations of coating manufacturer.

3.9 PROTECTION

- A. Cover prepared floors with building paper or other durable covering.

END OF SECTION.

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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 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels
- D. Section 09 91 00 – Painting.

1.4 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.

1.5 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.

1.6 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.
- D. 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
- E. South Coast Air Quality Management District (SCAQMD): SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications
- F. 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 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. Exterior Glass Mat Gypsum Soffit: Fiberglass mesh.
4. Glass-Mat Gypsum Sheathing Board: 10-by-10 fiberglass mesh.
5. 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" |
| <p>^A 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.</p> <p>^B 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.</p> <p>^C Staple attachment is restricted to base layers of multi-layer systems only.</p> <p>^D 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.</p> | | | |

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. Thermal Insulation: As specified in Section 07 21 00 – Building 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.
 - 2. Texture: Spatter knock-down.
- C. Acoustical Finish: Water-based, chemical-setting or drying-type, job-mixed texture finish for spray application.
 - 1. Application Thickness: 1/2 inch.
 - 2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. NRC: 0.55 according to ASTM C423.

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.
- D. 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.
- E. 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 |
| CEILINGS: | | | |
| 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 | |
| CEILINGS: | | | | |
| 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 | | Double | 4.4 |
| Plaster | 1/2" | Single | 2.2 |
| Gypsum Ceiling Board | | 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

| |
|---|
| <p>exceed 2.2 psf. c Where ceiling framing is spaced 16" o.c., the maximum weight shall not exceed 4.4 psf.</p> |
|---|

- F. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- G. 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.
- H. 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.
- I. 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.
- J. 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.
- K. 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.
- L. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- M. 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.

- N. 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.
- O. 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.
- P. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- Q. 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.
- R. Fasteners: Refer to Part 2.11 in this specification section.

3.2 APPLYING INTERIOR GYPSUM BOARD

- 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.

3.3 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.

3.4 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.

3.5 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. Control Joints: Install control joints at locations indicated on Drawings. Or if not indicated, at spacings and locations according to ASTM C840 and in specific locations approved by Architect for visual effect.
- #### C. 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 is 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.

- D. Exterior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use where indicated.
- E. 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.

3.6 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.

3.7 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.

3.8 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 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 in existing grid system.
 - 2. Refer to plans for acoustical ceiling panels to be salvaged and reinstalled.

1.3 RELATED SECTIONS

- A. Division 23 Sections – HVAC.
- B. Division 26 Sections – Electrical Work.

1.4 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
 - 2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E119 Standard Test Method for Fire Tests of Building Construction and Material.
 - 4. ASTM E1264 Classification for Acoustical Ceiling Products.
 - 5. ASTM E1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
 - 6. 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.

1.5 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.
- 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 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.

1.6 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. VOC Emissions: GREENGUARD Gold Certified Third-party certified compliant with California Department of Public Health CDPH/EHLB/Standard Method Version 1.2, 2017. This standard is the guideline for low emissions in LEED®, WELL Building Standard™, Living Building Challenge® (LBC), CalGreen Title 24, ANSI/ASHRAE/USGBC/IES Standard 189; ANSI/GBI Green Building Assessment Protocol.

- 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.

1.7 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.

1.8 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.

1.9 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
- B. Warranty Period:
 - 1. Acoustical Panels: One (1) year 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.

1.10 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.

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. Armstrong World Industries, Inc.
 2. USG Interiors, Inc.
 3. CertainTeed Ceilings Corp.

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: 24" x 48" X 3/4".
 4. Edge Detail: Lay-in
 5. Meets ANSI S12.60 Classroom Guidelines.
 6. Noise Reduction Coefficient (NRC): Minimum 0.70, UL Classified, complying with ASTM C423.
 7. Ceiling Attenuation Class (CAC): Minimum 40, UL Classified, complying with ASTM E1414.
 8. Flame Spread: ASTM E1264; Class A.
 9. Light Reflectance (LR) White Panel: 0.82 minimum, complying with ASTM E1477.
 10. Recycled Content: Minimum 37 percent.
 11. Warranty: 30 year lifetime system warranty against visible sag.
 12. Acceptable Products: Armstrong Fine Fissured High NRC 1811, USG Radar Climaply HiNRC 22311, CertainTeed Fine Fissured HHF 497 HNRC, or equal.

2.3 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. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION

- A. 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.

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SECTION 09 64 70 – WOOD FLOOR RESURFACING

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 DESCRIPTION

- A. This document specifies the proper procedures and application for the resurfacing of an existing oak wood platform floor and stairs.

1.3 SUMMARY

- A. This Section includes the following scope of work:
 - 1. Sanding, screening, refinishing, and sealing of existing wood platform flooring and stairs, as shown on the plans.
 - 2. The contractor shall tape off and cover any in floor outlet covers or equipment receiving covers prior to finish application. Contractor shall assure that all floor fixtures are operable once project is complete.

1.4 REFERENCES

- A. 2022 California Building Code (CBC), with Amendments.
- B. National Wood Flooring Association (NWFA) Sand and Finish Guidelines, current edition.

1.5 SUBMITTALS

- A. Product Data: For each product indicated.
 - 1. Written acceptance of proposed resurfacing and refinishing work by manufacturer of existing wood platform flooring, to ensure products and procedures are compatible with the flooring, and to ensure no work performed will void the existing warranty.
 - 2. Sample of manufacturer's warranty.
 - 3. Material safety data sheets.
 - 4. Samples: Test samples of floor to be refinished shall be reviewed with project manager for approval before refinishing any areas.

1.6 QUALITY ASSURANCE

- A. Flooring work shall comply with NWFA's recommendations for resurfacing and refinishing existing oak wood flooring.

- B. Finish floor shall have a warranty for a minimum of eighteen months. Provide a sample of manufacturer's warranty with quote package.

1.7 WORKING CONDITIONS

- A. Resurfacing of an existing floor system shall not commence until all masonry, finish and/or wet trades, such as, concrete, painting, etc., plastering/dry walling, tile and overhead mechanical trades are complete. The building must be enclosed and weather tight.
- B. Permanent heat, light and ventilation shall be installed and operating before, during and after the resurfacing is complete. A temperature range of 55°F and 75°F and a relative humidity range compatible with expected environmental conditions when the facility is occupied is recommended, maintaining a maximum 15 percent seasonal difference between high and low humidity levels. Expected minimum/maximum indoor relative humidity will depend upon building design, geographic location, HVAC systems and operating schedules.
- C. Conditioning: The contractor shall be responsible to schedule operation of the environmental conditioning to maintain a conditioned area of work with the Owner in spaces to receive wood resurfacing and finishing for at least seven days before installation, during installation, and for at least ten days after installation. After post-installation period, maintain relative humidity and ambient temperature planned for building occupants.
- D. To mitigate any off gassing of the volatile solvent in the area of the floor being worked on, Contractor shall work with Owner to develop a written work plan outlining the activities to isolate the gymnasium area and mechanical systems from the portion of the building that will remain occupied during the construction time frame.
- E. Scheduling:
 - 1. The contractor shall protect all adjacent surfaces while this work is being done.
 - 2. The contractor shall be responsible for all clean up and remove all dust to include air handling filter replacement to the satisfaction of the Owner and Architect.

1.8 WARRANTY

- A. Finish Manufacturer's Warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers of the products indicated as acceptable in subsequent paragraphs are as follows. Other products or manufacturers will be considered by the Owner/Architect prior to bidding.
 - 1. Basis of Design: Hillyard Industries, Inc.

- B. Wood Floor Sealer and Wood Floor Finish products selected for use by the Contractor shall be by a single manufacturer. Other products and accessories selected for use by the Contractor must be approved by the manufacturer of the sealer and finish products used on the Project.

2.2 MATERIALS

- A. The finish and seal shall be products that are recommended / approved by NWFA.

2.3 WOOD FLOOR SEALER

- A. Description: Low VOC (350 g/L VOC maximum) oil-modified sanding sealer formulated to seal wood and provide surface for finish coating.
- B. Acceptable Products: Hillyard 350 Wood Seal.

2.4 WOOD FLOOR FINISH

- A. Description: Low VOC (350 g/L VOC maximum) oil-modified urethane varnish formulated to provide durable, solid and protective film.
- B. Acceptable Products: Hillyard 350 Gym Finish.

2.5 RUBBER BASE

- A. Refer to Section 09 65 13.
- B. Color: Match color of adjacent rubber base.

2.6 FINISHING ACCESSORIES

- A. As recommended by manufacturer and required by installer for complete installation, including but not limited to:
 - 1. Lambswool and/or synthetic foam applicators.
 - 2. Tack rags with manufacturers recommended cleaner(s).
 - 3. Screens and sanding paper in grits as recommended by manufacturer.
 - a. First cut (Course grit)
 - b. Second Cut (Medium grit)
 - c. Third Cut (Fine grit)
 - i. Follow selected finish manufacturers final cut recommendation to ensure proper adhesion of the finish.
 - 4. Complete solvent-based, oil-modified system. Total number of coats shall be four (4) minimum, with one tack coat and three finish coats when sanding and renovating.

- a. One (1) Coat Floor Sealer/tack, pliable, penetrating type.
 - b. Three (3) Finish Coats: Formulated for multicoated application on wood flooring.
 - i. Color: Clear coat high gloss finish. Contactor shall provide a sample test area on the existing floor for Owner review and approval three days before to starting of any new flooring work.
- B. Finish Application Tools shall be approved by the finish manufacturer.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine environment, substrates and working conditions.
- B. Inspect floor with Owners Representative to identify split boards or other damage to floor surface requiring repairs beyond the scope of refinishing.
- C. Verify that surfaces and working conditions are in accordance with manufacturer's recommendations.
- D. Correct unsatisfactory substrates and working conditions before proceeding with applications.

3.2 PREPARATION

- A. Remove all miscellaneous debris from floor, including gum and masking tape.
- B. If called for on the Drawings or elsewhere in the Bid Documents remove all cove base material around perimeter of wood floor. If cove base is to be salvaged and reinstalled provide temporary removable tags for reinstallation of coved base sections in same locations, otherwise dispose of the vent-cove material.
- C. Remove coverplates at all floor sleeve locations and thresholds as occur at all doorways and save for reinstallation.
- D. Countersink exposed nailheads as occur.
- E. Close off all ventilation return ducts and grilles to prevent airborne contaminants from being drawn through. Schedule this work with Owners Representative.
- F. Post 11" x 17" signs on all doors into gymnasium indicating "Floor Refinishing in Process DO NOT ENTER".

3.3 PROTECTION DURING WORK

- A. Protect floor from moisture at all times.
- B. Protect all adjacent surfaces and finishes when work is underway.

- C. Do not permit traffic on floor after sanding and before completion of finish system, except for installers applying paints or finishes.
- D. Protect sanded floor with suitable covering to provide access for application of first coats. Do not use materials that might cause condensation beneath cover.
- E. Prohibit nonessential traffic on floors until work is complete. In all cases comply with manufacturers curing requirements prior to allowing foot traffic on floors.
- F. Provide notification to Owners Representative when both light foot traffic is allowed and when regular athletic activities may commence.

3.4 COMPLETE REFINISHING PROCESS

A. Initial Sanding and Finish Removal:

1. Schedule sanding operations such that the first coat of sealer is completely applied on the same day that sanding is completed.
2. Machine-sand existing flooring down to bare wood with 3 grades of sandpaper (course, medium, fine) to remove offsets and nonlevel conditions, ridges, cups, and sanding machine marks which would be noticeable in any manner after finishing. Screen floor using orbital disc sander with fine grit screen after sanding.
3. Use edge sander for areas of floor that cannot be reached with drum sander. Use hand sanders for areas that cannot be reached with edge sander.
4. Floor shall be completely smooth after initial sanding process. Contractor shall provide additional cuts if floor is not smooth after three (3) cuts.

B. Dust Removal:

1. Thoroughly vacuum entire floor and areas around, including doors, windows, sills and corners to remove dust.
2. Perform final dust removal using a tack rag. Remove all traces of dust from floor, doors, window sills, etc.
3. Inspect floor to ensure that surfaces are free of drum stop marks, gouges, streaks or shiners, are clean and completely free from sanding dust, and are acceptable for finishing.

C. Seal Coats:

1. Do not begin application of seal coating until dust removal is complete.
2. Apply first coat of sealer on the same day that sanding is completed.
3. Apply coats within the time limits for recoating recommended by manufacturer and at manufacturers recommended rates.

4. Application:

- a. Apply first coat of sealer to floor per manufacturer's instructions.
- b. Allow sealer to dry a minimum of 12 hours before proceeding unless manufacturer recommends otherwise. Allow additional dry time if recommended by manufacturer or if ambient conditions require.
- c. Perform a buffing/sanding operation over entire floor with an orbital buffer and fine grade screen sanding disc.
- d. Remove dust from floor using vacuum and tack rag as described under Dust Removal.
- e. Apply second and third coats of sealer to floor per manufacturer's instructions, allowing sealer to dry and performing buffing/sanding operation and dust removal after each seal coat.

D. Finish Coats:

1. Apply coats within the time limits for coating recommended by the manufacturer. If time limits are exceeded provide additional sanding/buffing and dust removal as required by manufacturer.
2. Do not begin application of finish coats until dust removal is complete.
3. Do not allow product to puddle.
4. Typically apply finish coats in direction of wood grain.
5. Apply finish coats to floor per manufacturer's instructions and rates of application.
6. Allow finish coats to dry a minimum of 72 hours prior to allowing any foot traffic, and 7-10 days (as recommended by manufacturer) prior to allowing athletic activity to recommence in these spaces.

3.5 EXISTING MATERIALS REINSTALLATION

- A. Do not reinstall any existing materials that would be in contact with floor finish until finish is considered acceptable for regular activities by the floor finish manufacturer.
- B. Clean existing floor sleeve coverplates and thresholds and reinstall using original fasteners or new fasteners as required. New fasteners are to match original fasteners in material and finish.
- C. Floor sleeve coverplates are to be reinstalled flush to top floor surface. If necessary trim or shave wood beneath coverplates to provide fine adjustments required for flushness.
- D. Reinstall all thresholds at doors.
- E. Clean and reinstall existing cove base material using adhesive recommended by

manufacturer if salvage and reinstallation of the existing cove base is called for on the Drawings or elsewhere in the Bid Documents.

- F. Install new cove base material, using adhesive recommended by manufacturer if new cove base material is called for on the Drawings or elsewhere in the Bid Documents.

3.6 CLEAN-UP AND FINAL CLEANING

- A. Just prior to substantial completion, remove all protective coverings and tape, remove all traces of dust and dirt, and buff floors to the required sheen.
- B. Remove all unused materials, equipment and rubbish from the property. All materials requiring disposal shall be disposed of by the Contractor in accordance with Federal and State laws and regulations.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel on proper cleaning and maintenance procedures.

3.8 FINISHING PROCEDURES

- A. NOTE: Follow selected finish manufacturers recommendations
- B. Sand the floor using a minimum of three cuts.
 - a. Floors with many layers of finish may need additional cuts to remove all excess material.
 - b. Vacuum and Tack the entire athletic floor system between each cut.
 - c. The floor may need to be tacked and vacuumed multiple times.
- C. Apply coatings per finish manufacturer's recommendations.
- D. Abrade the entire surface using a fine grit screen or as recommended by the finish manufacturer.
 - a. Abrade until the floor is dull and uniform in appearance.
 - b. Logos and/or markings that are added to the floor by a third party need to be properly abraded by that company to ensure proper adhesion of the floor finish.
 - c. Vacuum and Tack the entire athletic floor system
- E. Inspect entire floor to ensure that surface is acceptable for coating and is completely free from sanding dust.
- F. Screen between all coats of finish that are applied or as recommended by the finish manufacturer.
- G. Follow selected finish manufacturer's recommendation on time allotted before foot

traffic and activities can presume.

3.9 MAINTENANCE

- A. Upon completion of the resurfacing of the oak flooring, the owners, attendants or individuals in charge are responsible for the upkeep of the building and are to see that the care and maintenance instructions of the NWFA.

3.10 WARRANTY

- A. All components of the floor finish system shall be protected against failure and or performance deficiencies by warranties covering a product manufacturer's materials, installer workmanship, and material supplier for a period of not less than eighteen months at no cost to the Owner. This includes any bubbling, peeling or flaking due to finish compatibility issues.
 - 1. The contractor shall conduct a maintenance training session with the caretakers of the wood flooring.
 - 2. The contractor shall field verify the existing conditions during pre-solicitation walkthrough and within five (5) days of substantial completion.
 - 3. All punch list corrections shall occur within five (5) days of after being notified in writing.
 - 4. Contractor shall provide the owner with the written wood floor manufacturer's warranty as well as the 18-month warranty from the installer.

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: Rubber Wall Base.

1.3 RELATED SECTIONS

- A. Section 03 30 00 – Cast in Place Concrete
- B. Section 09 29 00 – Gypsum Board Assemblies.
- C. Section 09 64 70 – Wood Floor Resurfacing.
- D. Section 09 65 16 – Linoleum Sheet Flooring.
- E. Section 09 64 19 – Linoleum Tile Flooring.
- F. Section 09 68 00 – Carpet.
- G. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels
- H. Section 09 91 00 – Painting.

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" and 6", where 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.

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 65 16 – LINOLEUM SHEET FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes Linoleum Sheet Flooring.
- B. Sections related to this section include:
 - 1. Demolition: Removal of existing flooring.
 - 2. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 3. Expansion Joint Covers: Refer to Division 7 Specialties Section for expansion joint covers to be used with resilient flooring.
 - 4. Finishes: Refer to Division 9 Finishes Section for maintenance of flooring, and adjacent flooring types.
 - 5. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.

1.3 REFERENCES

- A. 2022 California Building Code (CBC), with Amendments.
- B. Manufacturer's Technical Data Sheets, Installation Guidelines, Floor Care Guidelines, and Safety Data Sheets (MSDS or SDS)
- C. ASTM International (ASTM):
 - 1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E492 – Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
 - 3. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 4. ASTM E662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

5. ASTM E989 – Standard Classification for Determination of Impact Insulation Class (IIC)
 6. ASTM E1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
 7. ASTM F141 – Standard Terminology Relating to Resilient Floor Coverings
 8. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 9. ASTM F1482 – Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
 10. ASTM F1861 – Standard Specification for Resilient Wall Base
 11. ASTM F1869 – Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 12. ASTM F2034 – Standard Specification for Linoleum Sheet Floor Covering
 13. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 14. ASTM F2419 – Standard Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 15. ASTM F2471 – Standard Practice for Installation of Thick Poured Lightweight Cellular Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 16. ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter
 17. ASTM F2678 – Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring
 18. ASTM F3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring
- D. National Fire Protection Association (NFPA):
1. NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the "Conditions of the Contract" and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's technical data and installation recommendations for each type of flooring and accessory products specified.
- C. Shop Drawings:
1. Submit shop drawings showing layout, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 2. Show details of profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit three (3) sets of samples of each type, color and finish of flooring and accessory products specified, with an indication of full range of color, pattern and texture variation. Provide samples with a minimum size of 6" x 9" for flooring products and 6" in length for accessories.
- E. Quality Assurance Submittals:
1. Submit manufacturer's Product Technical Data Sheet, specifying performance characteristics, criteria and physical requirements.
 2. Submit manufacturer's written installation recommendations.
- F. Closeout Submittals:
1. Submit one (1) digital and three (3) hard copies of the maintenance and operations data. This should include methods for maintaining the installed products and any precautions against cleaning materials or methods that are detrimental to the product and their performance.
 2. Submit one (1) digital and three (3) hard copies of the warranty as specified herein.
- G. Replacement Material: After completion of work, deliver to project site replacement materials from the same manufactured lot as materials installed. Package materials with protective covering and identify each with descriptive labels.
1. Flooring Materials: No less than 50 square feet of each type, pattern and color installed.
 2. Accessories: No less than 10 linear feet for each 500 linear feet or fraction thereof each different type and color installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Whenever possible, provide each type of flooring as provided by a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation and floor care recommendations and manufacturer's warranty requirements. Comply with requirements according to the "Project Management and Coordination" in Division 1 Project Meetings Section.
- C. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
1. Substrate Porosity Testing: ASTM F3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 2. pH testing: ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 3. In-situ Relative Humidity Testing: ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 4. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 5. Surface Moisture Testing: ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 6. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
- D. Flooring Contractor Qualifications:
1. The Awarded Flooring Contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturer's required specifications, technical, installation and maintenance related documents.
 2. The Awarded Flooring Contractor shall have completed at least three projects of similar magnitude, material and complexity, and must provide project reference details including contact names and telephone numbers.
 3. Prior to the start of installation, the Awarded General Contractor is required to coordinate attendance with the Awarded Flooring Contractor, any Subcontractor's and the flooring manufacturer a Process Review Session to review the flooring manufacturer's installation recommendations for all products specified.
- E. Installer Qualifications:

1. An installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 2. A qualified installer of the specified flooring materials must have a minimum of three (3) years local experience and have successfully completed a minimum of five (5) projects with the same or similar materials, quantities, and complexity as this project.
 - a. If requested provide a list of similar flooring projects completed within the last two (2) years.
- F. Maintenance Qualifications: Prior to the substantial completion of the installation, the Awarded General Contractor is required to coordinate attendance with the owner's cleaning and maintenance contractors and the flooring manufacturer a Process Review Session to review the flooring manufacturer's care and maintenance recommendations for all products specified.
- G. Regulatory Requirements: Provide flooring products with the following fire performance characteristics as determined by testing identical products in accordance with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source or NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 2. ASTM E662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials or NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- H. Standard of Quality Mock-Up: For the purpose of evaluating the quality of workmanship, install a mock-up of the specified flooring completed by the pre-qualified installers following the manufacturer's installation recommendations. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard. Comply with requirements according to the "Quality Control" in Division 1 Mock-Up Requirements Section.
1. Size of Mock-Up: 6' x 6'.
 2. Maintenance of Mock-Up: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
 3. Approval of Mock-Up: Upon approval of the mock-up, this installation shall be considered the standard of quality and basis of comparison for the balance of the project. Areas to be found deficient by specification standards or application procedures shall be repaired or replaced at the contractor's expense.
 4. Incorporation of Mock-Up: The mock-up may be incorporated into final construction upon Owner's approval.

- I. Post-Installation Meetings: Conduct post-installation meetings to review methods and procedures related to floor care and warranty requirements.

1.6 WARRANTY

- A. Project Warranty: Comply with requirements according to the "Conditions of the Contract" in Division 1 Closeout Submittals Warranty Section for project warranty provisions.
- B. Manufacturer's Warranty: Submit the manufacturer's standard warranty document executed by authorized company official for Owner's acceptance. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 1. Warranty Period: Thirty (30) year limited warranty commencing on Date of Original Purchase from manufacturer.
- C. Installation Warranty: Submit the flooring contractor's installation warranty signed by the General Contractor and Installer for Owner's Acceptance, agreeing to repair or replace work which has failed because of defects in workmanship. Failure shall include, but not limited to, tearing, cracking, separation, deterioration or loosening from substrate, seam failure, ripples, bubbling or puckering. Upon notification of such installation deficiencies, within the warranty period, make necessary repairs or replacement at the convenience of the Owner. Other guaranties or warranties may not be substituted by the Contractor for the terms of this warranty. Installation warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents
 1. Warranty Period: Two (2) year limited warranty commencing on Date of Substantial Completion from flooring contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Division 1 Product Requirements Sections.
- B. Ordering: Comply with the manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
 1. **Flooring materials must be ordered a minimum of sixty (60) days prior to the scheduled start of installation.**
 - a. Any and all costs associated with noncompliance (i.e. air freight, liquidated damages, etc.) will be the full responsibility of the floorcovering contractor.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 1. All materials (flooring, adhesives, weld rod and accessories) should be stored in areas that are fully enclosed and weathertight. The permanent HVAC

should be fully operational and controlled and set at a minimum temperature 65°F (18.3°C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F (23.9° C ± 5.5°C) with a 50% ± 10% ambient relative humidity.

2. Store rolls standing upright, labels up, and ensure that the color, roll and batch numbers can be easily read.
3. Comply with the manufacturer's recommendation for the acclimation of all materials in the space where they will be installed for at least 48 hours prior to the installation unless longer conditioning periods are required by the manufacturer.

1.8 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:

1. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature of 65°F (18.3° C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75°F ± 10°F (23.9° C ± 5.5°C) with a 50% ± 10% ambient relative humidity. These conditions **MUST** be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.
2. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.
3. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.
4. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 65°F (18.3°C) for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Substrate Conditions:

1. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.

- a. Flooring Contractor assigned to report responsibility back to Owner and/or Architect.
2. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
 - a. Substrate Porosity Testing: ASTM F3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - b. pH testing: ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - c. In-situ Relative Humidity Testing: ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - d. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - e. Surface Moisture Testing: ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 - f. Bond Testing: Conduct testing and document results in accordance with the manufacturer’s recommendations.
3. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by the manufacturer.
4. Installation should not begin until the work of all other trades has been completed, especially overhead trades.
5. Where demountable partitions and other items are indicated for installation on top of flooring material, install flooring material before these items are installed.
- D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 – PRODUCTS

2.1 LINOLEUM SHEET FLOORING

A. Basis of Design Manufacturer:

1. Manufacturer: Forbo Flooring, Inc. (www.forboflooringNA.com)

2. Representative Contact: Joe Mikos, 209.740.7228, joe.mikos@forbo.com.
- B. All substitutions shall be submitted per requirements of Division 1.
- C. Product Information:
1. Basis of Design: Marmoleum® Piano or Concrete.
 2. Description: Homogeneous linoleum sheet made primarily of natural materials consisting of linseed oil, wood flour, and rosin binders, mixed and calendared onto natural jute backing. Pattern and color shall extend throughout total thickness of material.
 3. Finish: Topshield2™ applied during the manufacturing process
 4. Width: 2 Meters (79")
 5. Length: 32 Meters (105 Linear Feet)
 6. Gauge: 2.5mm (1/10")
 7. Backing: Jute
 8. Color and Pattern: Colors and patterns shall be selected by Architect. Patterns shall be defined in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the Architect. All selections shall be made from the manufacturer's full product lines (including premium colors).
 - a. Up to three (3) colors to be selected in a linear and/or checkerboard pattern. Final colors / pattern to be determined by Architect and Owner.
 9. Adhesive: As recommended by manufacturer for specific product installation, from the following:
 - a. Forbo L 885 Adhesive
 - b. Forbo Sustain 1195 Adhesive
 - c. Forbo Sustain 1299 Adhesive
 - d. Forbo Sustain 100
 - e. Forbo 660 Adhesive
 10. Conventional Fit Seams: All Marmoleum® sheet products shall be installed utilizing conventional fit seams.
 - a. Paste Weld: Forbo Marmoweld ETU color-matched as selected by Architect from manufacturer's standard patterns and colors.

2.2 ACCESSORIES

- A. Resilient Edge Strips: Strips shall be homogeneous vinyl or rubber composition with a tapered or bull nose edge no less than 1" wide, colored to match flooring or as selected by Architect from standard colors available.
- B. Metal Edge Strips: Strips shall be of width shown and of required thickness to protect the exposed edge of the flooring with units in maximum length available to minimize the number of joints.
- C. Wall Base: Refer to Section 09 65 13.
- D. Floor Care Products: Provide products as required in Section 3.8 Cleaning.

2.3 RELATED MATERIALS

- A. Related Materials: Refer to other sections for related materials as follows.
 - 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 2. Expansion Joint Covers: Refer to Division 7 Section for expansion joint covers to be used with resilient flooring.
 - 3. Finishes: Refer to Division 9 Finishes Section for maintenance of flooring.
 - 4. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.

2.4 SOURCE QUALITY

- A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART 3 – EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

- A. Compliance: Comply with manufacturer's product technical data, including product technical bulletins, installation recommendations and floor care recommendations.

3.2 INSPECTION

- A. Site Verification of Conditions: The Flooring Contractor and Installer shall examine and verify conditions previously described in other sections under which flooring and accessories are to be installed to be in accordance with the manufacturer's installation recommendations and must notify the General Contractor in writing of conditions detrimental to proper and timely completion of work. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.
- B. Material Inspection: Visually inspect all materials prior to installation in accordance with the manufacturer's installation recommendations. Material with visual defects shall not be installed and shall not be considered as a legitimate claim if they are installed.

3.3 PREPARATION

- A. General: Comply with manufacturer's written installation recommendations for preparing substrates indicated to receive flooring products and accessories.
- B. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- C. Surface Preparation:
 - 1. General: Prepare substrate in accordance with manufacturer's recommendations and ASTM industry standards. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.
 - 2. Substrate: Substrates to receive flooring must be structurally sound, rigid, smooth, flat, clean, and permanently dry. The substrates must be free of all foreign materials including, but not limited to, dust, solvent, paint, wax, oils, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew, and other foreign materials that might affect the rate of moisture dissipation from the concrete, the adhesion of flooring to the concrete or cause a discoloration of the flooring from below.
 - 3. Concrete Substrate: Concrete substrates shall be cured per the concrete manufacturer's recommendations. They must have a minimum compressive strength of 3,000 psi and a minimum dry density of 150 pounds per cubic foot. Refer to Division 3 Concrete Sections for patching, repairing crack materials and leveling compounds with Portland cement-based compounds.
 - a. Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - b. Reference Standard: Comply with the latest version of ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. Substrate Testing: Before beginning the installation, all testing requirements must be conducted: moisture testing, concrete porosity, pH and bond testing. In order to ensure that the moisture condition of concrete substrates is within acceptable limits, it is essential that moisture testing be conducted and documented on ALL concrete substrates regardless of age or grade level, including those where resilient flooring has already been installed. Moisture testing should only be conducted once a stable, conditioned environment has been established in accordance with the latest version of the specified test methods. All other testing types shall be conducted on all substrate types. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If at the time of testing the test results exceed the limitations set forth by the flooring manufacturer, the installation must not proceed until the problem has been corrected. The Contractor responsible for the substrate shall be responsible for the costs associated with analysis of the substrate and subsequent remediation requirements.

1. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride test is being placed.
 - b. If using Forbo Sustain 1299 or Forbo Sustain 100 adhesive: The concrete surface must be dry and have a value of 5 or less.

2. In-situ Relative Humidity Testing: ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. If using Forbo L 885 adhesive: The concrete internal relative humidity must not exceed 85%.
 - c. If using Forbo Sustain 1195 adhesive: The concrete internal relative humidity must not exceed 95%.
 - d. If using Forbo Sustain 1299 adhesive: The concrete internal relative humidity must not exceed 99%.
 - e. If using Forbo Sustain 100 adhesive: Remove this testing requirement.
 - f. If using Forbo 660 adhesive: The concrete internal relative humidity must not exceed 80%.

3. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. If using Forbo L 885 adhesive: The concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours.
 - c. If using Forbo Sustain 1195 adhesive: The concrete moisture vapor emissions must not exceed 10.0 lbs. per 1,000 square feet in 24 hours.
 - d. If using Forbo 660 adhesive: The concrete moisture vapor emissions must not exceed 6.0 lbs. per 1,000 square feet in 24 hours.
 - e. If using Forbo Sustain 1299 or Forbo Sustain 100 adhesive: Remove this testing requirement.

4. Substrate Porosity Testing: ASTM F 3191 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. Water should penetrate into the substrate within 5 – 20 minutes to be considered acceptable. If water penetrates too rapidly or too slowly, adjustments to the substrate must be made to provide the proper surface profile. Substrates determined to be overly porous, dusty or generally insufficient may need to be primed using a primer according to the manufacturer's recommendations to regulate the porosity level of the substrate.

5. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride tests are removed.
 - b. If using Forbo L 885 adhesive: The surface pH of the concrete must not exceed a pH of 10.0. Concrete surfaces with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.
 - c. If using Forbo Sustain 1195 adhesive: The surface pH of the concrete must not exceed a pH of 11.0. Concrete surfaces with pH readings less than 7.0 or above 11.0 will require remediation prior to installation.
 - d. If using Forbo Sustain 1299 or Forbo Sustain 100 adhesive: The surface pH of the concrete must not exceed a pH of 12.0. Concrete surfaces with pH readings less than 8.0 or above 12.0 will require remediation prior to installation.
 - e. If using Forbo 660 adhesive: The surface pH of the concrete must not exceed a pH of 9.0. Concrete surfaces with pH readings less than 7.0 or above 9.0 will require remediation prior to installation.

6. Bond Testing:
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. When evaluating adhesive mat bond tests using Forbo L 885, Sustain 1195, Sustain 1299, or Sustain 100 adhesive: Significant force should be required to remove the test sample. The bond failure should occur

within the adhesive layer when the test sample is removed. There should be approximately the same amount of adhesive on the substrate and the material backing.

- c. When evaluating adhesive mat bond tests using Forbo Sustain 100 adhesive for immediate occupancy: Wait 45 minutes. Near the edge of the material, use the edge of a steel seam roller and with some force, to make a line on the material to try to displace the adhesive. Make a cut next to the line and remove the strip. Evaluate the adhesive where the material was removed. There should 100% complete transfer of the adhesive and no displacement of the adhesive from the line. If there is displacement, wait another 5 - 10 minutes and repeat. Continue to repeat this step until there is no displacement of adhesive. This will also determine the amount of time required before occupying the space.
- d. When evaluating adhesive mat bond tests using Forbo 660 adhesive: The point of failure during bond testing should be in the material. The anticipated result is that the material will be destroyed when removing the sample.

3.4 INSTALLATION

- A. **The installation guidelines in this document are a representation of the installation requirements. It is required that the contractor follows the most current full version of the installation guidelines from the manufacturer.**
- B. Material Installation: Measure the area to be installed and determine the direction in which the material will be installed and seam placement. Seams should be a minimum of 6" away from underlayment and concrete joints, saw cuts, etc. Cut the required length for the first sheet off of the roll, adding approximately 3"- 6" for extra trimming. Fit the first sheet along the main (long) wall and at the ends using standard fitting methods. Position the fitted sheet in place against the main wall. The factory edge must be trimmed in order to produce a clean edge suitable for seaming. The Forbo Seam & Strip Cutter has been developed to efficiently and effectively trim the factory edge. In lieu of the Forbo Seam & Strip Cutter, a straight edge, utility knife and hooked blade knife may also be used. Position the straight edge approximately 1/2" - 3/4" from the factory edge and score the material using the utility knife along the straight edge. After scoring, complete the cut using a hooked blade knife following the score line. Hold the blade at a slight angle to the surface of the material so the seam edge will have a slight undercut. After trimming the seam edge, draw a pencil line on the substrate lengthwise along the trimmed edge. This line will serve as a spread line when applying the adhesive. Do not reverse the sheets. Install all Marmoleum® sheets in the same direction. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- C. Adhesive Application:
 1. For Forbo L 885, Sustain 1195, Sustain 1299, or Sustain 100 adhesive:

- a. 1/16" x 1/16" x 1/16" square notch trowel
 - b. Spread rate is approximately 125 ft²/gallon]
2. For Forbo 660 adhesive:
- a. 1/16" x 1/16" x 1/16" square notch trowel
 - b. Spread rate is approximately 110-120 ft²/gallon]
- D. Seaming: All Marmoleum® sheet products shall be installed utilizing conventional fit seams. A properly executed conventional fit seam will have no gaps or fullness. If the material is cut too full, it will result in bubbled or peaked seams. Cut the material at an angle so as to slightly undercut the material. This will compensate for any slight expansion that may occur. Roll the seam with a steel seam roller, making sure that the flooring material is placed into wet adhesive. Slight gaps can be addressed with Forbo Marmoweld ETU.
- E. Paste Welded Monolithic or Seamless Flooring Installation: Carefully apply Forbo Marmoweld ETU directly into the 1mm prepared seam with the applicator card. Work in manageable sections of 3 feet to 5 feet at a time by carefully pushing Forbo Marmoweld ETU into and across the seam. Remove excess wet Forbo Marmoweld ETU from the sides of the seam with the applicator card. Let the welded seam dry for a minimum of 30 minutes.
- F. Installation Techniques:
1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 - a. Use adhesive applied to the substrate in compliance with the flooring manufacturer's recommendations, including those for proper spreading of the adhesive, adhesive missing and adhesive open and working times.

7. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
8. Finish Flooring Patterns: Up to three (3) colors to be selected in a linear and/or checkerboard pattern. Final colors / pattern to be determined by Architect and Owner.

3.5 FIELD QUALITY REQUIREMENTS

- A. Manufacturer Field Services: Upon request of the Owner, General Contractor or Architect, the manufacturer can provide support to ensure installation is in accordance with the manufacturer's written recommendations or to review the manufacturer's written care recommendations.

3.6 PROTECTION

- A. Protection: Do not allow heavy traffic or rolling loads for at least 72 hours following the installation. Additional time may be necessary if the installation is over a non-porous substrate. Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.7 INITIAL MAINTENANCE PROCEDURES

- A. General: Include in Contract Sum Amount cost for initial maintenance procedures and execute procedures after flooring installation as recommended by flooring manufacturer.
- B. Initial maintenance to be conducted by awarded Flooring Contractor.
- C. Ambering: Ambering is the slight yellow hue to Marmoleum® when it is first removed from the packaging. This is a natural phenomenon that happens with Marmoleum® and is completely normal. Linseed oil, a natural oil extracted from flax seeds and one of the main ingredients in Marmoleum® is what causes this yellow hue. This very important ingredient in Marmoleum® provides several unique characteristics: (1) Linseed oil, along with wood flour, makes the floor naturally antistatic, repelling dust, making Marmoleum® easy to clean; (2) When exposed to air and light, the linseed oil oxidizes from within the Marmoleum® and continues for the life of the product. This makes the material harden over time and become more durable; and (3) As time passes, the ambering will fade as Marmoleum® is exposed to light, but its unique characteristics will not. The process may take as little as a few hours in bright sunlight, but it can take longer with artificial light. Areas that are not exposed to any light will retain the yellow hue until they are exposed to light. If an area of Marmoleum® is covered for an extended period, it's possible the yellow hue will re-appear. All colors of Marmoleum® are subject to ambering, however it can be more noticeable in certain colors. Light blues, greens, greys and beiges will display a more visible yellow hue than darker colors. To discover the true color of Marmoleum®, follow these few simple steps:

1. Take a piece of Marmoleum® and cover one half with heavy paper, cardboard or another piece of Marmoleum®.
2. Place these pieces in direct sunlight for approximately 1 hour.
3. After the time has passed, remove the cardboard or heavy material and see the visual difference firsthand.

3.8 CLEANING

- A. Initial Maintenance: Newly installed floors must be protected from construction soil, traffic and damage. Initial cleaning procedures should be performed on all new installations exposed to normal construction soil and traffic. It is recommended to wait a minimum of five days before conducting any wet cleaning procedures in order to allow the adhesive to dry and cure properly. This timeframe can vary, depending on the substrate, site conditions and/or the adhesive used.
1. **Manufacturer or installer to provide training to District custodial / janitorial staff on how to properly care for this product.**
- B. Procedure:
1. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's recommendations prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.
 2. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
 3. Marmoleum® with Topshield 2™ is pre-sealed and pre-finished. It is occupancy ready and no additional finish is required at the time of installation. Forbo does not recommend or require the application of floor finish to Forbo Marmoleum®. If the application of floor finish is desired, refer to Forbo's Technical Bulletin "Applying Floor Finish to Forbo Marmoleum® with Topshield2™" for the recommended steps required to ensure the floor finish will bond to the Topshield2™.
 4. Remove all surface debris by dust mopping, sweeping or vacuuming.
 5. Mix a cleaning solution by diluting a neutral pH cleaner in strict accordance with the manufacturer's recommendations. The pH of the cleaning solution must be between 6.0 – 8.0 pH.
 6. Apply the cleaning solution to the floor and allow 5 – 10 minutes of dwell time. Additional dwell time may be necessary for heavily soiled floors. NOTE: It is recommended to double scrub heavily soiled floors when using an automatic scrubber.
 7. Scrub the floor with either a 175 RPM floor machine or an automatic scrubber using a 3M™ Red Pad #5100 or equivalent. For heavier soil loads or to remove adhesive residue, use a 3M™ Topline Pad #5000 or equivalent, but this pad is NOT to be used regularly in place of the 3M™ Red Pad #5100.

8. Pick up the cleaning solution with a wet/dry vacuum or an automatic scrubber.
9. If using a cleaner that requires rinsing, rinse the entire surface with a clean mop using clean, cool water. Pick up the rinse water with wet/dry vacuum or an automatic scrubber.
10. Allow the floor to dry completely before allowing traffic.

END OF SECTION.

SECTION 09 65 19 – LINOLEUM TILE FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes Linoleum Tile Flooring:

1.3 RELATED SECTIONS

- A. Section 09 05 61 – Common Work Results for Flooring Preparation.
- B. Section 09 65 13 – Resilient Wall Base and Accessories.
- C. Section 09 68 00 – Carpet.

1.4 REFERENCES

- A. Refer to the latest version of all documents listed in this section.
- B. 2022 California Building Code with Amendments.
- C. Manufacturer's Technical Data Sheets, Installation Guide, Floor Care Guide, and Safety Data Sheets (MSDS or SDS).
- D. ASTM International (ASTM):
 - 1. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - 2. ASTM E492 – Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
 - 3. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 4. ASTM E662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 5. ASTM E989 – Standard Classification for Determination of Impact Insulation Class (IIC)
 - 6. ASTM F141 – Standard Terminology Relating to Resilient Floor Coverings
 - 7. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

8. ASTM F1861 – Standard Specification for Resilient Wall Base
 9. ASTM F1869 – Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 10. ASTM F2195 – Standard Specification for Linoleum Tile Floor Covering
 11. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 12. ASTM F2419 – Standard Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 13. ASTM F2471 – Standard Practice for Installation of Thick Poured Lightweight Cellular Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring
 14. ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter
 15. ASTM F2678 – Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring
- E. National Fire Protection Association (NFPA):
1. NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 – Test Method for Specific Optical Density of Smoke Generated by Solid Materials

1.5 SUBMITTALS

- A. General: Submit each item in this Article according to the "Conditions of the Contract" and Division 1 Specification Sections.
- B. Product Data: Submit three (3) copies of the manufacturer's technical data and installation recommendations for each type of flooring and accessory products specified.
- C. Shop Drawings:
 1. Submit shop drawings showing layout, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 2. Show details of profiles and product components, including anchorage, accessories, finish colors, patterns and textures.

- D. Samples: Submit three (3) sets of samples of each type, color and finish of flooring and accessory products specified, with an indication of full range of color, pattern and texture variation. Provide samples with a minimum size of 6" x 9" for flooring products and 6" in length for accessories.
- E. Quality Assurance Submittals:
1. Submit manufacturer's Product Technical Data Sheet, specifying performance characteristics, criteria and physical requirements.
 2. Submit manufacturer's written installation recommendations.
- F. Closeout Submittals:
1. Submit maintenance and operations data. This should include methods for maintaining the installed products and any precautions against cleaning materials or methods that are detrimental to the product and their performance.
 2. Submit warranty as specified herein.
- G. Replacement Material: After completion of work, deliver to project site replacement materials from the same manufactured lot as materials installed. Package materials with protective covering and identify each with descriptive labels.
1. Flooring Materials: No less than 50 square feet of each type, pattern and color installed.
 2. Accessories: No less than 10 linear feet for each 500 linear feet or fraction thereof each different type and color installed.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Whenever possible, provide each type of flooring as provided by a single manufacturer, including recommended primers, adhesives, sealants, patching and leveling compounds.
- B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation and floor care recommendations and manufacturer's warranty requirements. Comply with requirements according to the "Project Management and Coordination" in Division 1 Project Meetings Section.
- C. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
1. Substrate Porosity Testing: ASTM F3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 2. pH testing: ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

3. In-situ Relative Humidity Testing: ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
4. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
5. Surface Moisture Testing: ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
6. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.

D. Flooring Contractor Qualifications:

1. The Awarded Flooring Contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturers required technical, maintenance, specifications and related documents.
2. The Awarded Flooring Contractor shall have completed at least three projects of similar magnitude, material and complexity, and must provide project reference details including contact names and telephone numbers.
3. Prior to the start of installation, the Awarded General Contractor is required to coordinate attendance with the Awarded Flooring Contractor, any Subcontractor's and the flooring manufacturer a Process Review Session to review the flooring manufacturer's installation recommendations for all products specified.

E. Installer Qualifications:

1. An installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
2. A qualified installer of the specified flooring materials must have a minimum of three (3) years local experience and have successfully completed a minimum of five (5) projects with the same or similar materials, quantities, and complexity as this project.
 - a. If requested provide a list of similar flooring projects completed within the last two (2) years.

F. Maintenance Qualifications: Prior to the substantial completion of the installation, the Awarded General Contractor is required to coordinate attendance with the owner's cleaning and maintenance contractors and the flooring manufacturer a Process Review Session to review the flooring manufacturer's care and maintenance recommendations for all products specified.

G. Regulatory Requirements: Provide flooring products with the following fire performance characteristics as determined by testing identical products in accordance

with the latest version of ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. ASTM E648 – Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source or NFPA 253 – Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 2. ASTM E662 – Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials or NFPA 258 – Test Method for Specific Optical
- H. Post-Installation Meetings: Conduct post-installation meetings to review methods and procedures related to floor care and warranty requirements.

1.7 WARRANTY

- A. Project Warranty: Comply with requirements according to the "Conditions of the Contract" in Division 1 Closeout Submittals Warranty Section for project warranty provisions.
- B. Manufacturer's Warranty: Submit the manufacturer's standard warranty document executed by authorized company official for Owner's acceptance. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
1. Warranty Period: Thirty (30) year limited warranty commencing on Date of Original Purchase from manufacturer.
- C. Installation Warranty: Submit the flooring contractor's installation warranty signed by the General Contractor and Installer for Owner's Acceptance, agreeing to repair or replace work which has failed as a result of defects in workmanship. Failure shall include, but not be limited to, tearing, cracking, separation, deterioration or loosening from substrate, seam failure, ripples, bubbling or puckering. Upon notification of such installation deficiencies, within the warranty period, make necessary repairs or replacement at the convenience of the Owner. Other warranties or warranties may not be substituted by the Contractor for the terms of this warranty. Installation warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents
1. Warranty Period: Two (2) year limited warranty commencing on Date of Substantial Completion from flooring contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Division 1 Product Requirements Sections.
- B. Ordering: Comply with the manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1. Flooring materials must be ordered a minimum of sixty (60) days prior to the scheduled start of installation.
 - a. Any and all costs associated with noncompliance (i.e. air freight, liquidated damages, etc.) will be the full responsibility of the floorcovering contractor.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1. All materials (flooring, adhesives, weld rod and accessories) should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65°F (18.3°C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F (23.9° C ± 5.5° C) with a 50% ± 10% ambient relative humidity.
2. Store modular cartons stacked per the manufacturer's recommendations.
3. Comply with the manufacturer's recommendation for the acclimation of all materials in the space where they will be installed for at least 48 hours prior to the installation unless longer conditioning periods are required by the manufacturer.

1.9 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:

1. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature 65° F (18.3° C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F (23.9° C ± 5.5° C) with a 50% ± 10% ambient relative humidity. These conditions MUST be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.
2. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.
3. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.
4. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.

1. Temperature Conditions: 65°F (18.3°C) for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Substrate Conditions:

1. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.
 - a. Flooring Contractor assigned to report responsibility back to Owner and/or Architect.
2. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
 - a. Substrate Porosity Testing: ASTM F3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - b. pH testing: ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - c. In-situ Relative Humidity Testing: ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - d. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - e. Surface Moisture Testing: ASTM F2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 - f. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.
3. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by the manufacturer.
4. Installation should not begin until the work of all other trades has been completed, especially overhead trades.
5. Where demountable partitions and other items are indicated for installation on top of flooring material, install flooring material before these items are installed.

D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field

measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 – PRODUCTS

2.1 LINOLEUM TILE FLOORING

- A. Manufacturer: Forbo Flooring, Inc. (www.forboflooringNA.com)
1. Representative Contact: Joe Mikos, 209.740.7228, joe.mikos@forbo.com.
- B. Product: Forbo Marmoleum® Modular:
1. Description: Homogeneous linoleum tile made primarily of natural materials consisting of linseed oil, wood flour, and rosin binders, mixed and calendared onto a polyester backing. Pattern and color shall extend throughout total thickness of material.
 2. Finish: Topshield2™ applied during the manufacturing process
 3. Sizes: Approximately 9.8" x 39.37" (25cm x 100cm).
 4. Gauge: 2.5mm (1/10")
 5. Backing: Polyester
 6. Color and Pattern: Colors and patterns shall be selected by Architect. Patterns shall be defined in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the Architect. All selections shall be made from the manufacturer's full product lines (including premium colors).
 - a. Provide for three (3) colors to be installed in a pattern as determined by Architect and Owner.
 7. Adhesive: As recommended by manufacturer for specific product installation, from the following:
 - a. Forbo T 940 Adhesive
 - b. Forbo Sustain 1195 Adhesive
 - c. Forbo Sustain 1299 Adhesive
 - d. Forbo 660 Adhesive
 - e. Forbo EZ-ON 100™

2.2 ACCESSORIES

- A. Resilient Edge Strips: Strips shall be homogeneous vinyl or rubber composition with a tapered or bull nose edge no less than 1" wide, colored to match flooring or as selected by Architect from standard colors available.

- B. Metal Edge Strips: Strips shall be of width shown and of required thickness to protect the exposed edge of the flooring with units in maximum length available to minimize the number of joints.
- C. Wall Base: Refer to Section 09 65 13.
- D. Floor Care Products: Provide products as required in Section 3.8 Cleaning.

2.3 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

2.4 RELATED MATERIALS

- A. Related Materials: Refer to other sections for related materials as follows.
 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 2. Wood Substrates: Refer to Division 6 Carpentry Section for wood subflooring and wood underlayment.
 3. Finishes: Refer to Division 9 Finishes Section for maintenance of flooring.
 4. Resilient Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient accessories.
 5. Expansion Joint Covers: Refer to Division 10 Specialties Section for expansion joint covers to be used with resilient flooring.

2.5 SOURCE QUALITY

- A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART 3 – EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS

- A. Compliance: Comply with manufacturer's product technical data, including product technical bulletins, installation recommendations and floor care recommendations.

3.2 INSPECTION

- A. Site Verification of Conditions: The Flooring Contractor and Installer shall examine and verify conditions previously described in other sections under which flooring and accessories are to be installed to be in accordance with the manufacturer's installation recommendations and must notify the General Contractor in writing of conditions detrimental to proper and timely completion of work. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.

- B. Material Inspection: Visually inspect all materials prior to installation in accordance with the manufacturer's installation recommendations. Material with visual defects shall not be installed and shall not be considered as a legitimate claim if they are installed.

3.3 PREPARATION

- A. General: Comply with manufacturer's written installation recommendations for preparing substrates indicated to receive flooring products and accessories.
- B. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- C. Surface Preparation:
1. General: Prepare substrate in accordance with manufacturer's recommendations and ASTM industry standards. Work shall not proceed until all unsatisfactory conditions are corrected to acceptable conditions to the Owner and Architect.
 2. Substrate: Substrates to receive flooring must be structurally sound, rigid, smooth, flat, clean, and permanently dry. The substrates must be free of all foreign materials including, but not limited to, dust, solvent, paint, wax, oils, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew, and other foreign materials that might affect the rate of moisture dissipation from the concrete, the adhesion of flooring to the concrete or cause a discoloration of the flooring from below.
 3. Concrete Substrates: Concrete substrates shall be cured per the concrete manufacturer's recommendations. They must have a minimum compressive strength of 3,000 psi and a minimum dry density of 150 pounds per cubic foot. Refer to Division 3 Concrete Sections for patching, repairing crack materials and leveling compounds with Portland cement based compounds.
 - a. Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - b. Reference Standard: Comply with the latest version of ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. Substrate Testing: Before beginning the installation, all testing requirements must be conducted: moisture testing, concrete porosity, pH and bond testing. In order to ensure that the moisture condition of concrete substrates is within acceptable limits, it is essential that moisture testing be conducted and documented on ALL concrete substrates regardless of age or grade level, including those where resilient flooring has already been installed. Moisture testing should only be conducted once a stable, conditioned environment has been established in accordance with the latest version of the specified test methods. All other testing types shall be conducted on all substrate types. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If at the time of testing the test results exceed the limitations set forth by the flooring manufacturer,

the installation must not proceed until the problem has been corrected. The Contractor responsible for the substrate shall be responsible for the costs associated with analysis of the substrate and subsequent remediation requirements.

1. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride test is being placed.
 - b. The concrete surface must be dry and have a value of 5 or less when using Forbo Sustain 1299 adhesive or EZ-ON 100™ Adhesive.
2. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete internal relative humidity must not exceed 75% when using Forbo T 940 adhesive.
 - c. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1195 adhesive.
 - d. The concrete internal relative humidity must not exceed 95% when using Forbo Sustain 1299 adhesive.
 - e. The concrete internal relative humidity must not exceed 80% when using Forbo 660 adhesive.
3. Calcium Chloride Testing: ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - a. Conduct three (3) tests for the first 1,000 square feet (100 square meters) and at least one additional test for each additional 1,000 square feet (100 square meters).
 - b. The concrete moisture vapor emissions must not exceed 5.0 lbs. per 1,000 square feet in 24 hours when using Forbo T 940 adhesive.
 - c. The concrete moisture vapor emissions must not exceed 10.0 lbs. per 1,000 square feet in 24 hours when using Forbo Sustain 1195 adhesive.
 - d. The concrete moisture vapor emissions must not exceed 6.0 lbs. per 1,000 square feet in 24 hours when using Forbo 660 adhesive.

4. Substrate Porosity Testing: ASTM F3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. Water should penetrate into the substrate within 5 – 20 minutes to be considered acceptable. If water penetrates too rapidly or too slowly, adjustments to the substrate must be made to provide the proper surface profile. Substrates determined to be overly porous, dusty or generally insufficient may need to be primed using a primer according to the manufacturer's recommendations to regulate the porosity level of the substrate.

5. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - a. Conduct testing at each calcium chloride test location as the calcium chloride tests are removed.
 - b. The surface pH of the concrete must not exceed a pH of 10.0 when using Forbo T 940 adhesive. Concrete surfaces with pH readings less than 7.0 or above 10.0 will require remediation prior to installation.
 - c. The surface pH of the concrete must not exceed a pH of 11.0 when using Forbo Sustain 1195 adhesive. Concrete surfaces with pH readings less than 7.0 or above 11.0 will require remediation prior to installation.
 - d. The surface pH of the concrete must not exceed a pH of 12.0 when using Forbo Sustain 1299 or EZ-ON 100™ adhesive. Concrete surfaces with pH readings less than 8.0 or above 12.0 will require remediation prior to installation.
 - e. The surface pH of the concrete must not exceed a pH of 9.0 when using Forbo 660 adhesive. Concrete surfaces with pH readings less than 7.0 or above 9.0 will require remediation prior to installation.

6. Bond Testing:
 - a. Conduct testing in accordance with the manufacturer's recommendations in various locations throughout the area where flooring is to be installed. Although the number of tests required may vary, enough tests should be performed to allow an evaluation of the entire area where material will be installed.
 - b. When evaluating adhesive mat bond tests using Forbo T 940, Sustain 1195, or Sustain 1299 adhesive, significant force should be required

to remove the test sample. The bond failure should occur within the adhesive layer when the test sample is removed. There should be approximately the same amount of adhesive on the substrate and the material backing.

- c. When evaluating adhesive mat bond tests using Forbo EZ-ON 100™ Adhesive, allow the correct open time-based on-site conditions. It is required to allow the adhesive to fully gel. Fully gelled adhesive will not provide wet transfer when touched with a finger. A slight oily residue may be noticed when touching, however the adhesive will not displace under pressure from the finger. Install the material and roll with 100 lb. roller to ensure proper adhesive transfer. Proper placement and rolling will result in a complete impression of the material backing into the face of the gelled adhesive. When properly used, Forbo EZ-ON 100™ Adhesive will provide significant bond strength immediately after installing the material. The adhesive will continue to build further bond strength as the polymers cure. Upon removal of the test sample, the imprint of the material backing should be seen on the face of the adhesive. Because the adhesive polymers will bond tenaciously to all substrates, when removing material, the adhesive layer may tear apart with some adhesive remaining on the substrate and some adhesive on the material backing. Removal of the material should require significant force when fully cured and will cause damage or stress to the material.
- d. When evaluating adhesive mat bond tests using Forbo 660 adhesive, the point of failure during bond testing should be in the material. The anticipated result is that the material will be destroyed when removing the sample.

3.4 INSTALLATION

- A. Material Installation: Measure the area to be installed and determine the direction in which the material will be installed. Marmoleum® Modular and MCT flooring products are fit using conventional tile fitting techniques. It is customary to start from the center of the room. In corridors and small spaces, it may be simpler to work lengthwise from one end, using the center line as a guide. After establishing the starting lines, spread the adhesive using a 1/16" x 1/16" x 1/16" square notch trowel. Be sure to spread adhesive all the way to the starting line without leaving any voids. Begin laying tiles at the starting point, ensuring that the tile is placed exactly along the layout lines. If the first few tiles are not installed accurately, the entire installation will be affected. The tiles must be installed into wet adhesive. Do not spread adhesive in an area larger than can be installed while ensuring 100% wet transfer to the backing of the material. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- B. Adhesive Application:
 1. Use trowel recommended by flooring manufacturer for Forbo T 940, Sustain 1195, or Sustain 1299 adhesive.

- a. 1/16" x 1/16" x 1/16" square notch trowel
 - b. Spread rate is approximately 125 ft²/gallon
2. Use trowel recommended by flooring manufacturer for Forbo EZ-ON 100™ adhesive.
 - a. 1/16" x 1/32" x 1/32" fine notch trowel
 - b. Spread Rate: Approximately 250 ft²/gallon
 3. Use trowel recommended by flooring manufacturer for Forbo 660 adhesive.
 - a. 1/16" x 1/16" x 1/16" square notch trowel
 - b. Spread rate is approximately 110-120 ft²/gallon
- C. Installation Techniques:
1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.
 - a. Use adhesive applied to the substrate in compliance with the flooring manufacturer's recommendations, including those for proper spreading of the adhesive, adhesive missing and adhesive open and working times.
 7. Immediately roll the flooring in all directions using a 100 lb. roller to ensure proper adhesive transfer. Additional rolling is required during adhesive setup to ensure that the material is flat and fully adhered. The use of a three-section wall roller or steel seam roller is required at walls, under toe kicks or anywhere the full weight of a 100 lb. roller cannot access or be applied.
- D. Finish Flooring Patterns: As determined by Architect and Owner.

3.5 FIELD QUALITY REQUIREMENTS

- A. Manufacturer Field Services: Upon request of the Owner, General Contractor or Architect, the manufacturer can provide support to ensure installation is in accordance with the manufacturer's written recommendations or to review the manufacturer's written care recommendations.

3.6 PROTECTION

- A. Protection: Do not allow heavy traffic or rolling loads for at least 72 hours following the installation. Additional time may be necessary if the installation is over a non-porous substrate. Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.7 INITIAL MAINTENANCE PROCEDURES

- A. General: Include in Contract Sum Amount cost for initial maintenance procedures and execute procedures after flooring installation as recommended by flooring manufacturer.
- B. Initial maintenance to be conducted by awarded Flooring Contractor.
- C. Ambering: Ambering is the slight yellow hue to Marmoleum® when it is first removed from the packaging. This is a natural phenomenon that happens with Marmoleum® and is completely normal. Linseed oil, a natural oil extracted from flax seeds and one of the main ingredients in Marmoleum® is what causes this yellow hue. This very important ingredient in Marmoleum® provides several unique characteristics: (1) Linseed oil, along with wood flour, makes the floor naturally antistatic, repelling dust, making Marmoleum® easy to clean; (2) When exposed to air and light, the linseed oil oxidizes from within the Marmoleum® and continues for the life of the product. This makes the material harden over time and become more durable; and (3) As time passes, the ambering will fade as Marmoleum® is exposed to light, but its unique characteristics will not. The process may take as little as a few hours in bright sunlight, but it can take longer with artificial light. Areas that are not exposed to any light will retain the yellow hue until they are exposed to light. All colors of Marmoleum® are subject to ambering, however it can be more noticeable in certain colors. Light blues, greens, greys and beiges will display a more visible yellow hue than darker colors.

3.8 CLEANING

- A. Initial Maintenance: Newly installed floors must be protected from construction soil, traffic and damage. Initial cleaning procedures should be performed on all new installations exposed to normal construction soil and traffic. It is recommended to wait a minimum of five days before conducting any wet cleaning procedures in order to allow the adhesive to dry and cure properly. This timeframe can vary, depending on the substrate, site conditions and/or the adhesive used.
- B. Procedure:
 - 1. Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance

with manufacturer's recommendations prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

2. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
3. Marmoleum® with Topshield 2™ is pre-sealed and pre-finished. It is occupancy ready and no additional finish is required at the time of installation. Forbo does not recommend or require the application of floor finish to Forbo Marmoleum®. If the application of floor finish is desired, refer to Forbo's Technical Bulletin "Applying Floor Finish to Forbo Marmoleum® with Topshield2™" for the recommended steps required to ensure the floor finish will bond to the Topshield2™.
4. Remove all surface debris by dust mopping, sweeping or vacuuming.
5. Mix a cleaning solution by diluting a neutral pH cleaner in strict accordance with the manufacturer's recommendations. The pH of the cleaning solution must be between 6.0 – 8.0 pH.
6. Apply the cleaning solution to the floor and allow 5 – 10 minutes of dwell time. Additional dwell time may be necessary for heavily soiled floors. NOTE: It is recommended to double scrub heavily soiled floors when using an automatic scrubber.
7. Scrub the floor with either a 175 RPM floor machine or an automatic scrubber using a 3M™ Red Pad #5100 or equivalent. For heavier soil loads or to remove adhesive residue, use a 3M™ Topline Pad #5000 or equivalent, but this pad is NOT to be used regularly in place of the 3M™ Red Pad #5100.
8. Pick up the cleaning solution with a wet/dry vacuum or an automatic scrubber.
9. If using a cleaner that requires rinsing, rinse the entire surface with a clean mop using clean, cool water. Pick up the rinse water with wet/dry vacuum or an automatic scrubber.

END OF SECTION.

SECTION 09 67 24 – URETHANE SLURRY FLOORING SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. High-performance resinous flooring systems.
 - 2. This project falls under the jurisdiction of the Sacramento County Environmental Health Division. 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. Related Sections:
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Section 08 71 00 – Door Hardware, for thresholds.
 - 3. Section 09 05 61 – Common Work Results for Flooring Preparation, as Urethane Slurry Flooring System will be installed in areas where quarry tile is being demolished.
 - 4. Section 09 29 00 – Gypsum Board Assemblies.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Installer Certificates for Qualification: Signed by manufacturer certifying that installers comply with specified requirements.
- C. Material Certificates: For each resinous flooring component, from manufacturer.
- D. Material Test Reports: For each resinous flooring system.
- E. Maintenance Data: For maintenance manuals.
- F. Samples: Submit one sample of coating, indicating coating applied on horizontal surfaces. Sample shall illustrate transition from Resinous Flooring system. Provide sample which is a true representation of proposed field applied finish; not laboratory applied finish. Provide minimum 12 feet by 4 feet field sample color and texture for owner approval as a mock up at location designated by General Contractor for review and written approval prior to installation of any other areas.
- G. Product Schedule: For resinous flooring.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. Installer Letter of Certification: Installer to provide letter stating that they have been in business for at least 10 years and listing 5 projects in the last 2 years of similar scope. For each project provide: project name, location, date of installation, contact information, size of project, and manufacturer of materials with system information.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Pre-installation Conference: Conduct conference at Project site before work and mockups begin.
- D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Do not cover up mockup area.
 - 1. Apply full-thickness mockups on 16 square foot floor area selected by Architect.
 - 2. Simulate finished lighting conditions for Architect's review of mockups.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 4. Mockup shall demonstrate desired slip resistance for review and approval by General Contractor prior to installing project areas.

1.4 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.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 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.
- 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.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. The Sherwin-Williams Company

2.2 MATERIALS

- A. Fastop™ Topfloor SL57, with cove, as manufactured by Sherwin-Williams, consists of FasTop™ 4040 (Cove pr), FasTop™ 4060, 5055 Aggregate (Cove), FasTop™ 4050, with 5050 Aggregate as slurry, 5310-8 Dry Silica Sand (20-40 Mesh) for broadcast and Elladur™ 4850 as a seal coat at a ¼" nominal.
- B. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].
 - 1. Resinous Flooring: 100 g/L.
 - 2. High-Performance Resinous Flooring
 - a. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance, resin-based, monolithic floor surfacing designed to produce a seamless floor.
 - b. System Characteristics:
 - i. Color and Pattern: As indicated from manufacturers listed above.
 - ii. Slip Resistance: Provide slip resistant finish.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Environmental Conditions

1. All applicators and all other personnel in the area of the RF installation shall take all required and necessary safety precautions. All manufacturers' installation instructions shall be implicitly followed.
2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
3. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
4. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
5. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
6. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 PREPARATION

- A. Inspection: Prior to commencing Work, thoroughly examine all underlying and adjoining work, surfaces and conditions upon which Work is in any way dependent for perfect results. Report all conditions which affect Work. No "waiver of responsibility" for incomplete, inadequate or defective underlying and adjoining work, surfaces and conditions will be considered, unless notice of such unsatisfactory conditions has been filed and agreed to in writing before Work begins. Commencement of Work constitutes acceptance of surfaces. Test and report for moisture level in substrate to verify compliance with manufacturer's requirements. Do not proceed unless acceptable test results are achieved.
- B. Only installers approved by the manufacturer in writing shall perform installation of the material.
- C. Surface Preparation: Remove all surface contamination, loose or weakly adherent particles, laitance, grease, oil, curing compounds, paint, dust and debris by blast track method or approved mechanical means (acid etch not allowed). If surface is questionable try a test patch. Create a minimum surface profile for the system specified in accordance with the methods described in ICRI No. 03732 to achieve profile numbers as follows:
 1. Thin film, to 10 mils CSP-1 to CSP-3
 2. Thin and medium films, 10 to 40 mils CSP-3 to CSP-5

- | | | |
|----|--|----------------|
| 3. | Self-leveling mortars, to 3/16" | CSP-4 to CSP-6 |
| 4. | Mortars and laminates, to 1/4" or more | CSP-5 to CSP-9 |

3.3 APPLICATION

- A. Install resinous floor over properly prepared concrete surface in strict accordance with the manufacturer's directions.
1. Install the primer and/or base coats over thoroughly cleaned and prepared concrete.
 2. Install topcoat over flooring after excess aggregate has been removed.
 3. Maintain a slab temperature of 60°F to 80°F for 24 hours minimum before applying floor topping.
- B. 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 inter-coat 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, comply with resinous flooring manufacturer's written instructions.
- C. Sealant: Saw cut resinous floor topping at expansion joints in concrete slab. Fill saw cuts with sealant prior to final seal coat application. Follow manufacturer's written recommendations.
1. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
 2. Slip Resistant Finish: Provide grit for slip resistance.
 3. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.4 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of the Work, clean up and remove from the premises surplus materials, tools, appliances, empty cans, cartons and rubbish resulting from the Work. Clean off all splatterings and drippings, and all resulting stains.
- B. Protection: Protect Work in accordance with manufacturer's directions from damage and wear during the remainder of the construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

- C. Contractor shall insure that coating is protected from any traffic until it is fully cured to the satisfaction of the coating manufacturer.

END OF SECTION

SECTION 09 68 00 – CARPET

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Broadloom and carpet tile.
2. Integrated walk-off mats
3. Base finish and accessories
4. Subfloor testing and preparation.
5. Installation of vapor retarder.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 00 72 00 – Exhibit C: Abatement of Hazardous Materials.
3. Section 02 41 19 – Selective Demolition.
4. Section 09 05 61 – Common Work Results for Flooring Preparation.
5. Section 09 65 13 – Resilient Wall Base and Accessories.
6. Section 09 65 19 – Linoleum Tile Flooring.

1.2 REFERENCES

- A. ANSI/ASTM E648-15e1 – Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
- B. ASTM F1869-16 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 QUALITY ASSURANCE

A. Manufacturer, Contractor, and Installer Qualifications:

1. Manufacturer: Company specializing in contract flooring with ten-years minimum experience.
2. Flooring Contractor: Company with five years minimum documented experience, approved by manufacturer for the installation of the specified products and shall have access to all manufacturers required technical, maintenance, specifications and related documents.
3. Installer:
 - a. Floor covering installer must be factory trained and certified for the installation of the specific products being installed.

- b. Installer to provide project inspector proof of certification prior to starting work.
 - c. Certified installer must be present on job site while work is in progress.
4. Testing Laboratory:
- a. Certified, bonded, qualified and experienced agency to perform pH and Relative Humidity (RH) emission tests.
- B. Pre-Floor Covering Installation Meeting:
- 1. Contactor to notify Construction Manager with a minimum of 5-days' notice when anticipated to be ready for pre-floor covering installation meeting. (After subfloor preparation is complete and ready for floor covering installation.)
 - 2. Contractor, installer, and manufacturer representative are required to attend pre-floor covering meeting. Contractor is responsible for coordinating and scheduling their attendance.
 - 3. Construction Manager will schedule meeting with Contractor team, Project Inspector, and Architect.
 - 4. Purpose of Meeting: To review subfloor preparation, verification of readiness for floor covering installation and use of correct products, verification of the acclamation of correct finish materials and review installation requirements.
- C. Manufacturer's Field Services:
- 1. Manufacturer representative to attend the "Pre-Flooring" meeting.
 - 2. Upon Owner or Architect's request, and with at least 72-hour notice, provide manufacturer's representative site visit(s) for inspection of product installation.
 - 3. At the Owner's request, manufacturer representative to attend operation and maintenance training meeting for Owner's custodial staff prior to acceptance of floor covering installation.

1.4 SUBMITTALS

- A. Provide a complete submittal package with all components required within this section. Submit per Section 01 33 00.
- 1. Product Data: Provide product data describing physical and performance characteristics, sizes, patterns, colors, material safety data sheets, and method of seaming and manufacture's installation instructions for all proposed products.

2. Shop Drawings:
 - a. Provide a floor plan indicating all proposed seam locations and integrated walk-off mats. Indicate method of joining seams, and direction of carpet.
3. Samples:
 - a. Submit samples for color selection illustrating color and pattern for floor material with samples of matching walk-off mats, rubber base and transition material proposed for installation.
 - b. Submit sample of solvent welded seam.
4. Maintenance Data: Submit manufacturers recommend cleaning and maintenance data. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
5. Recycled Content Percentage Submittals.
6. Submit a statement signed by the manufacturer's Executive Officer or independent certification third-party that the provided carpet materials have the specified recycled material percentage.
7. Submit documentation of manufacturer's take-back program for carpet. Including:
 - a. Confirmation that the new carpet being installed will be accepted (at the point of future replacement) through a manufacturer's operated program for recycling or reuse;
 - b. Written description of such a process for the recycling and/or recovery of used/worn products;
 - c. Contact information for the take-back program.
8. Existing Carpet Recycling Plan and Recycling Certification. Submit documentation describing the reclamation plan for existing carpet. Include appropriate contact information, overview of procedures, and limitations and conditions applicable to the project Carpet recycling options consist of:
 - a. Repurposing - reusing the product in another application such as facilitating the donation of used carpeting to charities and other nonprofit organizations.
 - b. Closed Loop Recycling - turning waste materials into new materials of the same value, such as vinyl backing into vinyl backing and nylon yarn into nylon carpet yarn.
 - c. Open Loop Recycling – creating other product types from reclaimed carpet. For example, turning nylon face fiber into automotive parts or carpet padding, including nylon face fiber in recycled backings

- d. Waste-to-Energy - using carpet for waste-to-energy. In the case of waste-to-energy, manufacturer shall justify why carpet cannot be recycled as this method should be a last resort.
- e. Landfill or incineration – are not approved disposal methods
- f. At the completion of the project, a certificate shall be furnished verifying the reclamation of the carpet and the pounds of material diverted from the landfill.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 33 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule and products for cleaning.
- C. Provide in-service training with Owner's custodial staff prior to acceptance of flooring for proper care and maintenance of carpet. Also review and provide recommended type of furniture casters and glides.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected for exposure to harmful weather conditions and at a temperature and humidity conditions recommended by manufacturer. Materials should be stored in areas that are fully enclosed, weather tight with the permanent HVAC system set at a uniform temperature of at least 68°F (20°C) for 72 hours prior to, during and after installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70°F ambient temperature at floor level three days prior to, during, and 24 hours after installation of materials.
- C. Prior to testing for moisture vapor emission rate, space shall be enclosed, fully weather-tight, wet-work in space shall be completed and nominally dry, work above ceilings finished. The test site should be at the same temperature and humidity expected during normal use.
- D. Maintain lighting at a minimum uniform level of 50 or more-foot candles in areas where the floor system is being installed.
- E. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- F. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weather tight, wet-work in spaces is complete and dry, and ambient

temperature and humidity conditions are maintained at levels planned for building occupants.

- G. Floor temperature should be 60°F minimum for proper adhesive curing and performance.
- H. If subfloor is contaminated with an oily residue either from removal of “cutback” during asbestos abatement or from a previous end use such as metal fabrication, this residue MUST be totally removed or covered prior to applying modular adhesive and carpet.

1.8 CONCRETE SUBFLOOR TESTING

- A. Testing for internal relative humidity of concrete slabs must be conducted in accordance with the current version of ASTM F2170, not to exceed manufacturer’s requirements (ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes).
- B. The Flooring Contractor shall verify in writing to the Owner, a minimum of thirty (30) days prior to scheduled carpet installation, the following substrate conditions:
 - 1. Moisture: Initial emission rate, as tested with in-situ probes, per ASTM F2170.
 - 2. Alkalinity: pH level. Testing the pH at the surface of a concrete slab must be conducted in accordance with the current version of ASTM F710, not to exceed manufacturer’s requirements (ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.)
- C. High Moisture and /or Alkalinity Readings:
 - 1. Modernization Construction (Existing Concrete Slab):
 - a. If the Contractor’s test results indicate that the slab relative humidity (RH) readings are below those of flooring manufacturer’s requirement, then the Owner’s representative will initiate independent testing to confirm results.
 - i. If the independent test results do not substantiate the Contractor’s findings, then the Contractor will be directed to proceed with the Vapor Retarder installation and the retesting cost will be back charged to the contractor.
 - ii. If the independent test results confirm the Contractor’s findings, then the Contractor shall initiate a credit to the Owner for the cost of installation of the Vapor Retarders as specified in section 07 26 00 that were not installed.
- D. Comply with manufacturer’s written requisites for field conditions including but not limited to testing for moisture, confirmation of vapor retarder, floor prep, bond test, photo documentation, etc.

1.9 EXTRA MATERIALS

- A. Provide a minimum of 4 square yards of each color installed. In addition, provide all usable scraps one sq. yd. or larger in size. Remnants shall be packaged, identified and delivered to the Owners Representative, who will retain any he chooses for future repairs before they are removed from the job site.
- B. Provide a minimum of 10 lineal feet of base and transition pieces of each material and color specified or 2 % whichever is greater.

1.10 WARRANTY

- A. Manufacturer's Warranty: Twenty (20) year minimum manufacturer warranty commencing on recordation date of the Notice of Completion.
 - 1. Should carpet, tend to creep, bulge, be defective in manufacturing, or show a substantial amount of wear - carpet shall be replaced with new carpeting at no cost to the Owner. Manufacturer to submit written warranty covering the following:
 - a. 20 Year minimum, non-prorated Guarantee shall also include:
 - i. No resiliency loss of backing.
 - ii. No zippering.
 - iii. Static protection (will not lose static property—will not give static discharge above 3.5KV).
 - iv. No edge ravel or zippering.
 - v. Delamination.
 - vi. Surface wear (maintains at least 90% surface pile weight).
 - vii. No staining.
 - viii. Dimensional Stability.
 - ix. Moisture Resistance.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Carpet: **AS SELECTED BY DISTRICT FROM THE FOLLOWING**:
 - 1. Carpet (Vinyl Cushioned Tufted Textile) and integrated walk-off mats: Color as selected by Owner Representative from Manufacturer's standard range. No other substitutions will be allowed.
 - a. Tandus Flooring – Broadloom Roll.
 - i. "Aftermath II" Series with custom Antron fibers, 6'-0" roll, glue down. Powerbond cushion RS vinyl backing system and seam sealer.
 - b. Milliken Commercial – Broadloom Roll
 - i. "Formwork", 13'-6" roll, glue down. Endura-Loc backing system.

- c. Tandus Flooring – Carpet Tiles
 - i. “Aftermath II” Series with custom Antron fibers, 6’-0” roll, glue down. Powerbond cushion RS vinyl backing system and seam sealer.
 - d. Milliken Commercial – Carpet Tiles
 - i. “Journal Line By Line”, 50cm x 50cm, glue down. PVC-Free WellBac Comfort Cushion.
 - e. Walk-Off System
 - i. “Abrasive Action II” walk-off system at all exterior doors in carpeted rooms. Color to be coordinated with carpet color selection.
 - ii. “OBEX Tiles” carpet entryway system at all exterior doors in carpeted rooms. Color to be coordinated with carpet color selection.
- B. Rubber Wall Base: Refer to Section 09 65 13. Cove style, conforming to ASTM F 1861 or FS-SS-W-40, Type 1. New Construction - 4” high and 1/8-inch (3.2mm) gauge. Modernization-type projects and new construction cafeteria spaces - 6” high and 1/8-inch (3.2mm) gauge. No manufactured corners.
- 1. Burke Industries.
 - 2. Armstrong.
 - 3. Musson Rubber Co.
 - 4. Roppe Rubber Corp.
 - 5. Approved equal.
- C. Resilient Edge and Adapter/Transition Strips: Refer to Section 09 65 13. 1/8-inch-thick, tapered or bullnose, minimum of 1 inch wide.
- 1. Roppe
 - 2. Johnsonite
 - 3. Flexco Floors
 - 4. Approved equal.
- D. Leveling and Patching Compounds:
- 1. White premix latex; type recommended by carpet manufacturer. Install as recommended by manufacturer for specific application.
- E. Primer:
- 1. Tandus Centiva: C-36E primer.
 - 2. Milliken: No required.

- F. Adhesives: Low VOC, waterproof, and as recommended by product manufacturer.
1. Tandus Centiva: C-16E Adhesive
 2. Milliken: Mosaic Moisture XT Spray.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Modernization Construction (Existing Concrete Slab):
1. If existing flooring was determined to be asbestos containing and required abatement, verify that the abatement work has been accepted by the Owner's representative prior to commencing work.
 2. Testing for internal relative humidity of concrete slabs must be conducted in accordance with the current version of ASTM F2170, not to exceed manufacturer's requirements (ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes).

3.2 PREPARATION

- A. Modernization Construction (Existing Concrete Slab):
1. Remove existing finishes, adhesives, and other materials as necessary to properly prepare existing substrates. (Refer to asbestos abatement procedures.)
 2. Install underlayment where flooring is being installed on a wooden subfloor per the manufacturer's instructions.
 3. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
 4. Fill low spots, cracks, joints, holes and other defects with filler prior to flooring installation.
 5. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
 6. Prohibit traffic from area until filler is cured.
 7. Prepare floor substrate to be smooth, rigid, flat, level, permanently dry, clean and free of foreign materials such as dirt, paint, grease, oils, solvent, curing and hardening compounds, sealers, asphalt and old adhesive residue. Vacuum clean substrate.
 8. Apply primer to concrete surfaces.

3.3 CARPET INSTALLATION

- A. Install in accordance with manufacturers' instructions and recommendations with fully welded seams.

- B. Install flooring square with room axis and in accordance with approved shop drawing.
- C. Layout roll-goods in a manner to minimize seams and avoid seams in traffic areas. End butt joints shall be kept to a minimum, shall be staggered, and shall occur where approved on detail plan layout. Use the largest sections possible to minimize seams. Avoid cross seams, filler pieces and strips. Match edges for color shading and pattern at the seams in compliance with the manufacturer recommendations.
- D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- E. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture, including pipes, outlets, edgings, thresholds, nosing and cabinets.
- F. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- G. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
- H. Adhere carpet to prepared substrate without producing open cracks, voids, raising and puckering at joints, telegraphing to adhesive spreader marks, or other surface imperfections in completed installation.
- I. Fully solvent weld all seams. Seams shall be unnoticeable in finished installation.
- J. Verify carpet match before cutting to ensure minimal variation between dye lots.
- K. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and unfrayed.
- L. Lay carpet on floors with run of pile in same direction as anticipated traffic.
- M. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- N. Complete installation shall conform to the Carpet Installation Standard of Carpet and Rug Institute (CRI).

3.4 INTEGRATED WALK-OFF MAT INSTALLATION

- A. Install in accordance with manufacturers' instructions and recommendations.
- B. Install modular tile like any "dry-back" modular with a full-spread wet adhesive.
- C. Installation instructions for Tandus Floorcoverings' Powerbond Non-RS (dry-back) Modules can be used as "reference only."
- D. Adhesives below are offered to install modular tile product based upon application and intended use:
 - 1. #024 Solvent Free Outdoor Adhesive (Tandus SKU/Style # 919).

2. #002 Premium Grade Multi-Purpose Adhesive (Tandus SKU/Style # 920).
 3. PS100 Pressure Sensitive Releasable Adhesive (Tandus SKU/Style # 923).
 4. Milliken Mosaic XT.
- E. Modular tile should be securely attached to the sub-floor in compliance with ADA Accessibility Guidelines, latest edition, for Building & Facilities, Section 4.5.3.
- F. Provide integrated walk-off mats at all exterior door location where carpet is indicated to be installed. The walk-off mats shall extend a minimum of the door width plus six inches (6") and six feet (6'-0") in the direction of travel or as indicated on the drawings.

3.5 INSTALLATION – BASE MATERIAL

- A. Install resilient wall base on entire wall perimeter including toe spaces and open ends of cabinets. Set all bases in adhesive as recommended by the manufacturer. All joints in bases shall be plumb, flush, tight and inconspicuous. Seat top edge and back of base firmly against the wall. Wrap base around all outside corners and no seams within 12" of corners. Interior corners shall be mitered and tightly fitted.

3.6 PROTECTION

- A. Prohibit traffic from carpet areas for 24 hours after installation.
- B. Protect flooring from damages by other trades prior to owner occupancy.

3.7 FINAL CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage. Remove and dispose of all small scraps, cartons, and rubbish upon completion of the work. Remove all loose threads with sharp scissors.
- B. Clean carpet of all spots with proper spot remover, and vacuum carpet surfaces.

END OF SECTION

SECTION 09 68 19 – STAIR AND PLATFORM NOSINGS

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.

1.1 SUMMARY

- A. Work Included: Furnishing and installation of stair nosings over specified substrates.

1.2 RELATED SECTIONS

- A. Section 09 64 70 – Wood Floor Resurfacing.
- B. Section 09 65 13 – Resilient Base and Accessories.

1.3 REFERENCES

- A. 2022 California Building Code, with Amendments.
- B. National Fire Protection Association (NFPA) 101 – Life Safety Code
- C. UL 410 – Standard Slip Resistance of Floor Surface Materials.
- D. ASTM E162 – Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: to have minimum of 10 years of experience with similar work.

1.5 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00 – Submittals:
 - 1. Product Data: Manufacturer’s printed product literature for materials used in system.
 - 2. Shop Drawings: Provide CAD drawings showing details, dimensions, extent of work, and other data necessary for the satisfactory installation of the products stated herein.
 - 3. Samples: 6" (150 mm) size for review showing final color. Label samples with origin and intended use.
 - 4. Manufacturer’s Instructions: Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets outlining hazards and safety precautions.

5. Test Reports: Showing compliance with required standards, ordinances and codes.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Handle and store products in a manner to prevent damage, deterioration and soiling to Products, other building components, assemblies, other Products, the structure, the Site and surrounding property and in accordance with manufacturer's instructions.
- B. Store packaged or bundled Products in original and undamaged containers and packaging with manufacturer's seals and labels intact. Do not remove from packaging or containers until required in the Work.
- C. Store products subject to damage from weather in weatherproof enclosures.

1.7 WARRANTY

- A. Provide a written and signed Warranty in the name of the Owner for a period of five (5) years from the date of Substantial Performance of the Work.
- B. Warranty to cover defects in materials and workmanship.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Ecoglo Inc. (www.us.ecoglo.com)
- B. Basis of Design Stair Nosing: C4-N20 Non-Slip Carpet Stair Nosing

2.2 MATERIALS

- A. Extruded Aluminum: 6060T5 extrusion anodized to Class 1, .0007" (20 microns) thickness.
- B. Non-Slip Surface: Silicon carbide integrally bonded into powder-coated aluminum substrates following curing at 350°F (180°C).

2.3 STAIR NOSINGS

- A. Product: C4-N20 Non-Slip Carpet Stair Nosing
- B. Description: Anodized aluminum extrusion with replaceable insert adhesively fixed into extrusion; powder coated extruded aluminum insert recessed into protective channels and silicon carbide non-slip material
- C. Installation: Installs flush with carpet, using a premium polyurethane adhesive and mechanical fasteners, or adhesive only. Supplied with pre-drilled countersunk holes. Includes stainless steel fasteners and concrete nylon anchors. Standard location is 2" from each end and approximately 12" apart

- D. Inserts: Can be attached or unattached. Unattached is recommended for on-site cutting. Inserts are installed with a premium polyurethane adhesive
- E. Size: 2.7" overall depth x 1.3" overall height x 8'-10' standard lengths (can on-site cut to length).
- F. Color (Anodized): Clear, Black, or Bronze
- G. Color (Anti-Slip): Black, Gray, or Yellow.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Before installation, examine surfaces on which the Work of this Section depends. Notify [Contractor] if substrates do not comply with requirements of this Section
- B. Do not proceed with Work of this Section until all unsatisfactory conditions have been corrected, if any.
- C. Commencement of Work will imply acceptance of surfaces.

3.2 PREPARATION

- A. Clean surfaces to remove dirt, dust, grease, oil, loose material, frost, paint, coatings, or other matter that may affect bonding or installation of photoluminescent products.
- B. Test substrates for fit with products before using adhesives or mechanical fastening.

3.3 INSTALLATION

- A. Unless otherwise indicated in the specifications, install products in accordance with manufacturer's instructions. Obtain written instructions directly from manufacturer.

3.4 CLEANING

- A. At completion of installation, clean soiled product surfaces in accordance with manufacturer's instructions.

3.5 WASTE MANAGEMENT AND DISPOSAL

- A. Separate waste materials for reuse and recycling at nearest used building materials facility.
- B. Divert unused caulking, sealants and adhesive materials from landfill through appropriate disposal depot.

3.6 PROTECTION

- A. Allow 24 hours for adhesive cure with no foot traffic permitted.
- B. Protect areas from damage using barriers, markers or temporary signs as required.

C. Do not allow heavy objects to come in contact with installed products.

END OF SECTION.

SECTION 09 77 10 – FIBER REINFORCED LAMINATE (FRL) WALL PROTECTION 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 this Section.

1.2 SUMMARY

A. Section includes:

1. FRL® (Fiber Reinforced Laminate) Wall Protection Panels for wall applications.
2. Accessories, including adhesives and sealants.
3. FRL panels to be installed on walls in MPR, below the existing wood trim. Refer to plans for detailed information.

B. Associated work in other sections:

1. Rubber Wall Base.

1.3 RELATED SECTIONS

- A. Section 09 29 00 – Gypsum Board Assemblies.
- B. Section 09 65 13 – Resilient Wall Base.
- C. Section 10 11 00 – Visual Display Surfaces.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's literature including product characteristics, accessories and limitations.
- B. Selection Samples: Submit samples of colors and finishes if requested by architect.
- C. Verification Samples: Submit samples of materials selected specified to verify color and finish.
- D. Industry Certifications and Standards: Submit copy of documentation indicating compliance.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Minimum of 5 years of experience manufacturing similar products.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations.

1.7 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty against defects in manufacturing.

PART 2 – PRODUCTS

2.1 PRODUCT AND MANUFACTURER

- A. Basis of Design Manufacturer: Panolam Industries International, Inc., One Corporate Drive, Suite 725, Shelton, CT 06484. (203) 925-1556. www.panolam.com.
- B. Basis of Design Product: FRL® (Fiber Reinforced Laminate) Wall Protection Panels

2.2 FIBER REINFORCED LAMINATES

- A. Panels shall comply with the following:
1. Thickness: 0.075 inches.
 2. Core Material: 1/2" industrial grade particle board.
 3. Color and Finish: As selected by architect from manufacturer's full range of Nevamar or Pionite colors and designs.
 - a. Up to 3 colors to be selected in a pattern determined by Owner and Architect.
 4. Surface Burning Characteristics: US Standard UL-723/ASTM E 84 Class A.
 5. Sustainability, Indoor Air Quality: GREENGUARD Gold Certification.
 6. IMO Certified for marine use, as required.
 7. Chemical resistant compliant with SEFA 8 requirements, as required.
 8. Wear Resistance (Cycles) NEMA 3.13: 3500 typical.
 9. Flexural Strength ASTM D790: 20,148 psi typical.
 10. Molding Profiles: Outside corners flat, outside corners round, division bars, inside corners, standard end caps.
 11. Adhesive: Construction Adhesive #4319 by Franklin Adhesives and Polymers or equal approved by panel manufacturer.
 12. Joint Caulking: Color Sil by Color Rite or equal approved by panel manufacturer; 100 percent silicone based colored caulking.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals.
 - 1. Clean substrate of dirt, dust, waxes, and other bond breaking substances prior to beginning installation. The wall must be finished to level 3.
 - 2. Install panels with bottom edge located to clear top of any rigid wall base. Rubber wall bases may be bonded over the FRL® panels using a polymer or urethane based adhesive.
 - 3. Apply adhesive uniformly using adhesive manufacturers recommended notched trowel to the entire back of panels completely to the edge.
 - 4. Lay FRL® panels in place leaving approximately 1/8 inch vertical installations 3/16 inch for horizontal installations between panel joints.
 - 5. Follow adhesive manufacturer's recommendations for set and application times.
 - 6. If you are attaching FRL® panels to a door or wood substrate, we recommend the use of contact glue. Please follow contact glue manufacturer's directions.
 - 7. Apply pressure to entire panel face with laminate type roller, removing trapped air and ensure proper adhesion between surfaces.
 - 8. If no trim is used, seal panel joints and top, side, and bottom edges with colored 100% silicone caulking to match panel color. Wipe smooth and remove excess caulk from FRL® panel face.

3.3 ADJUSTING AND CLEANING

- A. Replace installations out of plumb and not aligned with adjacent panels and construction.
- B. Clean panel face to remove soiling, stains, dust, and dirt using clean rags, and cleaning agents as instructed by manufacturer.
- C. Leave installation clean, free of residue and debris resulting from work of this section.

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 65 13 – Resilient Wall Base and Accessories
- C. Section 09 67 24 – Urethane Slurry Flooring System.
- D. Section 09 91 00 – Painting.
- E. Section 11 40 00 – Food Service Equipment.
- F. Division 22 – Plumbing.

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°) 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 x 0.120"D or 4'-0" W x 10'-0" L x 0.120"D. Choose largest size to fit each installation location, minimizing seams.
- E. Tolerance:
1. Length and Width: +/-1/8" (3.175mm)
 2. Square: Not to exceed 1/8" for 8'-0" foot panels.
- 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 SUMMARY

A. Section Includes: The following for priming and painting of all new construction as well as all of the dry rot repair areas noted in the plans, including, but not limited to:

1. Surface preparation.
2. Products and application.
3. Surface finish schedule.

B. Areas of work:

1. Exterior: Campus-wide exterior paint of existing painted surfaces.
 - a. Three (3) colors shall be used; colors shall be selected by Owner / Architect:
 - b. Color # 1 – Dark Tone: Fascia, trim, gutters, downspouts, exterior and interior of exterior doors, exterior and interior of exterior door frames.
 - c. Color # 2 – Light Tone: Soffits
 - d. Color # 3 – Light / Mid Tone: Building Walls, Siding, Stucco.
2. Interior: Campus-wide interior paint with multiple custom colors per grade level. This includes both sides of interior doors and frames, walls, accent surfaces, metal surfaces (where noted), ceilings, i.e. all surfaces currently painted. Colors shall be selected by Owner / Architect:

C. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. 01 22 00 – Alternates and Unit Pricing.
3. 05 50 00 – Metal Fabrications.
4. 07 62 00 – Flashings and Sheet Metal.
5. 07 71 23 – Gutters and Related Flashings.
6. 08 11 13 – Hollow Metal Doors and Frames.
7. 08 31 00 – Access Doors and Panels.
8. 09 29 00 – Gypsum Board Assemblies.

9. Division 22 – Plumbing.
10. Division 23 – Mechanical.
11. Division 26 – Electrical.

1.2 REFERENCES

- A. ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.4 SYSTEM DESCRIPTION

- A. Preparation of all surfaces to receive final finish.
- B. Painting and finishing work of this section using coating systems of materials including primers, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- C. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- D. Painting and finishing all exterior and interior surfaces of materials including structural, mechanical, and electrical work on site, in building spaces, and above or on the roof.
- E. Paint exposed surfaces 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.

1.5 SUBMITTALS

- A. Submit product data under provisions of Section 01 33 00.
- B. Provide manufacturer's technical information and instructions for application of each material proposed for use by catalog number.
- C. List each material by catalog number and cross-reference specific coating with specified finish system.
- D. Provide manufacturer's certificate that products proposed meet or exceed specified materials.
- E. Submit samples under provisions of Section 01 33 00.
- F. Submit two (2) samples 8-1/2 x 11 inch in size of each paint color and texture applied to cardboard. Resubmit samples until acceptable color, sheen and texture is obtained.

- G. On same species and quality of wood to be installed, submit two (2) 4 x 8-inch samples showing system to be used.

1.6 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with five (5) years' experience.
- B. Applicator: Company specializing in commercial painting and finishing with five (5) years documented experience.
- C. Regulatory Requirements:
 - 1. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this specification, comply with the more stringent provisions.
 - 2. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
 - 3. Coats: The number of coats specified is the minimum number acceptable. If full coverage is not obtained with the specified number of coats, apply such additional coats as are necessary to produce the required finish.
 - 4. Employ coats and undercoats for all types of finishes in strict accordance with the recommendations of the paint manufacturer.
 - 5. Provide primers and undercoat paint produced by the same manufacturer as the finish coat.
- D. Field Samples:
 - 1. Provide field samples under provisions of Section 01 33 00.
 - 2. On wall surfaces and other exterior and interior components, duplicate specified finishes on at least 100 sq. ft. of surface area.
 - 3. Provide full-coat finishes until required coverage, sheen; color and texture are obtained.
 - 4. Simulate finished lighting conditions for review of field samples.
 - 5. After finishes are accepted, the accepted surface may remain as part of the work and will be used to evaluate subsequent coating systems applications of a similar nature.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site and store and protect under provisions of Section 01 66 00.
- B. Deliver products to site in sealed and labelled containers; inspect-to verify

acceptance.

- C. Full unopened 1 GAL can (new) - Container labelling to include paint Formula, manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing. Paint containers not displaying product identification will not be acceptable.
- D. Store paint materials at minimum ambient temperature of 50 degrees F and a maximum of 90 degrees F, in well-ventilated area, unless required otherwise by manufacturer's instructions.
- E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:

- 1. Provide continuous ventilation and heating facilities to maintain interior surface and ambient temperatures above 50 degrees F with a maximum humidity level of 50 percent for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- 2. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- 3. Minimum Application Temperatures for Latex Paints: 50°F for interiors; 50°F for exterior; unless required otherwise by manufacturer's instructions.
- 4. Minimum Application Temperature for Varnish and Urethane Finishes: 65°F for interior or exterior, unless required otherwise by manufacturer's instructions.
- 5. Provide lighting level of 80 feet candles measured mid-height at substrate surface.

1.9 OWNER'S INSTRUCTIONS

A. Extra Material:

- 1. If product used was SCUSD Paint shop's #1 choice listed in these technical specs, please provide 1-quart only unopened container of each color and surface texture to Owner along with physical draw down and formula; however, if any other product other than our first choice is used, do not provide any attic stock and instead only provide physical draws with formula for each color used.
 - a. Separate draw downs and formula are required for each paint product, color, and sheen used.
- 2. Label each container with paint mixture formula, color, texture, and room locations in addition to the manufacturer's label.

1.10 WARRANTY

- A. All "Deep Tone" colors shall be warranted for 10-year color retention with a delta loss of no more than 75 cie lab units.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Unless specifically identified otherwise, product designations included at end of section are those of the Dunn Edwards, www.dunnedwards.com and shall serve as the standard for kind, quality, and function.
- B. Subject to compliance with requirements, other manufacturers offering equivalent products are:
 - 1. Dunn Edwards, www.dunnedwards.com.
 - 2. Kelly Moore, <https://kellymoore.com/professional/contractors/>
 - 3. Sherwin Williams, <https://www.sherwin-williams.com/painting-contractors/project-solutions/commercial>
- C. Substitutions: Under provisions of Section 01 25 13.

2.2 MATERIALS

- A. Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. "Deep Tone" colors to be composed of 100 percent acrylic pigments, factory ground, with a colored base.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- E. Chemical Components of Interior Paints and Coatings: Shall not exceed the limitations of Green Seal's Standard GS-11 for VOC content and the following restrictions:
 - 1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 - 2. Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
 - 3. Anticorrosive Coatings: VOC content of not more than 250 g/L.
- F. Varnishes and Sanding Sealers: VOC content of not more than 350 g/L.

- G. Stains: VOC content of not more than 250 g/L.
- H. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- I. Restricted Components: Paints and coatings shall not contain any of the following:
 - 1. Acrolein.
 - 2. Acrylonitrile.
 - 3. Antimony.
 - 4. Benzene.
 - 5. Butyl benzyl phthalate.
 - 6. Cadmium.
 - 7. Di (2-ethylhexyl) phthalate.
 - 8. Di-n-butyl phthalate.
 - 9. Di-n-octyl phthalate.
 - 10. 1, 2-dichlorobenzene.
 - 11. Diethyl phthalate.
 - 12. Dimethyl phthalate.
 - 13. Ethylbenzene.
 - 14. Formaldehyde.
 - 15. Hexavalent chromium.
 - 16. Isophorone.
 - 17. Lead.
 - 18. Mercury.
 - 19. Methyl ethyl ketone.
 - 20. Methyl isobutyl ketone.
 - 21. Methylene chloride.
 - 22. Naphthalene.
 - 23. Toluene (methylbenzene).
 - 24. 1, 1, 1-trichloroethane.
 - 25. Vinyl chloride.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Located Wood: 15 percent, measured in accordance with ASTM

D2016.

4. Exterior Located Wood: 15 percent, measured in accordance with ASTM D2016.
 - a. Beginning of installation means acceptance of existing surfaces.

3.2 PREPARATION

A. Work Not to Be Painted:

1. Painting is not required on surfaces in concealed and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces and duct shafts.
2. Do not paint metal surfaces such as stainless steel, chromium plate, brass, bronze, and similar finished metal surfaces.
3. Do not paint anodized aluminum or other surfaces which are specified to be factory pre-finished.
4. Do not paint sandblasted or architecturally finished concrete surfaces.
5. Do not paint prefinished acoustic materials or acoustic suspension systems.
6. Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or identifications.
7. Do not paint exterior hot-dipped galvanized materials/products as specified elsewhere.

B. Surface Preparation:

1. Remove all tacks, stickers, staples adhesive glue, picture hangers, protruding nails, tape and adhesive glue, and all other foreign materials from surfaces prior to priming or painting. Mask off and protect existing room identification tags including Asbestos tags on door frames.
2. All exterior surfaces to be painted will be pressure washed to remove all loose paint, blisters, bridged cracks, surface-chalk and loose debris at no less than 3200-PSI, or sand blasted.
3. If prior is not possible, washing all surfaces with TSP made by Synco or Jasco, by hand means, scraping and sanding of all surfaces is required prior to pre-priming for proper patching and painting of surfaces.
4. Prior to any painting, any wood or metal deficiencies should be replaced including but not limited to, doors, facial boards, overhang wood, siding, trim etc.
5. All glossy surfaces WILL be sanded prior to any paint application. NO EXCEPTIONS.

6. Clean all roofing tar from facial boards and metal flashing etc.
7. All factory primed new material wood, metal etc, will be sanded prior to priming and painting.
8. All surfaces to be patched will be pre-primed with the proper material as per manufacture specifications for substrate.
9. Any efflorescence will be primed as per Dunn-Edwards EFF-Stop concrete and masonry filler manufactures specifications.
10. Wash all doors, casings and other surfaces with TSP made by Synco or Jasco to remove oily dirt, dust, smoke, and other residues that could prevent proper adhesion of any paint products.
11. For all fillers and patching compounds used, surfaces will be primed before, after application, and before finish paint being applied.
12. Do not paint over all murals until artist waiver is filled out and provided. Please check with the SCUSD Paint Shop Supervisor before project starts.
13. All prep work will be done like the SCUSD standard NO EXCEPTIONS. This includes patching, scraping, sanding, caulking, and removal of all drips, sags, runs and removal of all foreign matter on or in painted surface.
14. All interior window trim, door trim, cabinets, cubbyholes, pin-board, counter tops in addition, wall panel joints shall be caulked.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply prime coat to surfaces which are to be painted or finished.
- D. Apply each coat to uniform finish.
- E. Sand lightly between coats to achieve required finish.
- F. Allow applied coat to dry according to the Manufacturers Specifications before the next coat is applied.
- G. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime back surfaces of interior and exterior woodwork with primer paint.
- J. Prime back surfaces of interior woodwork scheduled to-receive stain or varnish finish

with water-based Urethane varnish.

- K. Paint mill finished door seals to match door or frame.
- L. Paint primed steel glazing stops in doors to match door or frame.
- M. Cloudiness, spotting, lap marks, brush marks, runs, sags, spikes and other surface imperfections will not be acceptable.
- N. Where spray application is used, apply each coat of the required thickness. Do not double back to build up film thickness of two (2) coats in one pass.
- O. Where roller application is used, roll and redistribute paint to an even and fine texture. Leave no evidence of roller laps, irregularity of texture, skid marks, or other surface imperfections.
- P. Finishing Mechanical and Electrical Equipment:
 - 1. Refer to Division 23 and Division 26 for schedule of color coding and identification banding of equipment, ductwork, piping, and conduit.
 - 2. Paint shop primed equipment. Do not paint shop prefinished items.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
 - 5. Replace identification markings on mechanical or electrical equipment when painted accidentally.
 - 6. Paint interior surfaces of air ducts, and connector and baseboard heating cabinets that are visible through grilles and louvers with one (1) coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and connector and baseboard cabinets to match face panels.
 - 7. Paint exposed conduit and electrical equipment occurring in finished areas with existing matching wall color.
 - 8. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 - 9. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 - 10. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
 - 11. Paint grilles, registers, and diffusers which do not match color of adjacent surface.

12. Paint all mechanical and electrical equipment, vents, fans, and the like occurring on roof.
13. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts.
14. Do not paint over labels or equipment identification markings.
15. Do not paint mechanical room specialties such as compressors, boilers, pumps, control panels, etc.
16. Do not paint switch plates, light fixtures, and fixture lenses.

3.4 CONSTRUCTION

A. Priming:

1. All new or bare galvanized metal will first be etched and then primed with appropriate galvanized latex or oil base primer, use cleaner and primer measures as per manufactures specification.
2. All door and Casings may be sprayed. Doors may also be tight rolled with a 3/8th inch nap roller. All casings to be brushed or laid off with a brush. ABSOLUTELY NO EXCEPTIONS.
3. All holes and cracks are to be filled with the proper exterior patching compound and latex caulking with silicone.
4. All rusty ferrous and ferrous metal are to be primed with a rust-inhibitive red, gray or white oxide all galvanized metal will be primed with a galvanized primer.

B. Finish Coat:

1. All existing walls and overhangs to be coated with 100% acrylic exterior eggshell exterior paint.
2. All fascia boards to be coated with 100% acrylic exterior semi-gloss paint.
3. All metal poles, ungalvanized OR painted handrails, and iron gates are to be finished in water-borne alkyd urethane semi-gloss finish paint.
4. All doors and casings to have water-borne alkyd urethane finish, including tops, bottoms, and proper edges of doors and casings according to trade standards. All doors can be sprayed or tight rolled with a 3/8th inch nap roller or sprayed. All Casings must have sprayed or brushed finishes. NO EXCEPTIONS.
5. All concrete pillars are to be done in water-borne alkyd urethane semi-gloss paint.
6. All trim finishes are to be done in water-borne alkyd urethane semi-gloss paint.

7. All colors and product material to be used are to be APPROVED by the SCUSD paint shop Supervisor before application NO EXCEPTIONS.
8. Interior lower walls below door header to be painted with water-borne alkyd urethane.
9. Interior doors, door trim and painted cabinets to be painted with water-borne alkyd urethane.
10. Interior kitchens and baths to be painted with water-borne alkyd urethane.

3.5 REPAIR / RESTORATION

A. Patching:

1. After completion of painting in any one room or area, repair surfaces damaged by other trades.
2. Touch-up or re-finish as required to produce intended appearance.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 00.
- B. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary.
- C. The Owner will engage the services of an independent testing agency to sample paint material being used.
- D. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
- E. The testing agency will perform appropriate quantitative materials analysis and other characteristic testing of materials as required by the Owner.
- F. If test results show materials being used and their installation do not comply with specified requirements or manufacturer's recommendations, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing and repaint surfaces to acceptable condition.

3.7 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.8 PROTECTION OF COMPLETED WORK

- A. Protect finished installation under provisions of Division 01.
- B. Erect barriers and post warning signs. Maintain in place until coatings are fully dry.
- C. Confirm that no dust generating activities will occur following application of coatings.

3.9 SCHEDULES

A. Color Schedule:

- 1. Exterior: Campus-wide exterior paint of existing painted surfaces.
 - a. Three (3) colors shall be used; colors shall be selected by Owner / Architect:
 - b. Color # 1 – Dark Tone: Fascia, trim, gutters, downspouts, exterior and interior of exterior doors, exterior and interior of exterior door frames.
 - c. Color # 2 – Light Tone: Soffits
 - d. Color # 3 – Light / Mid Tone: Building Walls, Siding, Stucco.
- 2. Interior: Campus-wide interior paint with multiple custom colors per grade level. This includes both sides of interior doors and frames, walls, accent surfaces, metal surfaces (where noted), ceilings, i.e. all surfaces currently painted. Colors shall be selected by Owner / Architect:

B. Color Schedule Guidelines:

- 1. Paint and finish colors shall be selected by the Architect from manufacturer's entire range to match District standard colors or compliment those colors with the approval of the SCUSD Paint Shop Supervisor.
- 2. Access doors, registers, exposed piping, electrical conduit and mechanical/electrical panels: Generally, the same color as adjacent walls.
- 3. Exterior and interior steel doors, frames and trim: Generally, a contrasting color to adjacent walls.
- 4. Doors generally are all the same color, but of a contrasting color from frame and trim.
- 5. Exterior and interior steel fabrications: Generally, a contrasting color to adjacent walls.
- 6. Exposed interior mechanical/ductwork: Generally, a contrasting color to adjacent walls or ceiling.
- 7. Ceilings / soffits are generally to be painted a different color than walls.
- 8. Approximately 20 percent of overall painting work will be required to be

"Deep Tone" colors. This work will require one (1) additional coat of paint beyond that as specified.

9. All existing walls and overhangs to be painted should be as determined in this section.
10. All fascia boards should be painted as determined in this section. Please check with SCUSD Paint Shop Supervisor for correct formula.
11. Exterior Body color to be as determined in this section; some school colors to be determined. Check with SCUSD paint shop Supervisor. Exterior trim colors to be determined by SCUSD paint shop Supervisor and school site.
12. Interior kitchens and baths to be painted to match existing paint finish material.
13. All pin boards if not replaced or re-covered with appropriate material, shall be patched then painted with SCUSD approved pin board paint and color.

C. Exterior Painting Schedule:

1. Concrete Substrates, Masonry, Clay, Stucco, Non-Traffic Surfaces:

- a. Prime Coat: Primer, alkali resistant, waterbased, interior/exterior, Dunn-Edwards, Eff-Stop Premium, ESPR00.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).
- d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
- f. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
- g. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).

or

or

or

or

2. CMU Substrates:

- a. Prime Coat: Block filler, latex, interior/exterior, Dunn-Edwards, Smooth BLOCFIL Select SBSL00 or Eff-Stop Premium ESPR00.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).

or

- d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).

3. Wood Substrates:

- a. Prime Coat: Primer, waterbased, exterior, Dunn-Edwards, Ultra-Grip Premium UGPR00 or EZ-Prime Premium EZPR00

- b. Intermediate Coat: Latex, exterior, matching topcoat.

- c. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, 100% acrylic, (Gloss Level 3).

or

- d. Topcoat: Latex, exterior, low sheen, Dunn-Edwards, Evershield, EVSH40, 100% acrylic, (Gloss Level 4).

or

- e. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Evershield, EVSH50, 100% acrylic, (Gloss Level 5).

4. Ferrous Metal Substrates: Waterborne Urethane Alkyd Enamel System:

- a. Prime Coat: Primer, rust inhibitive, waterborne alkyd, interior/exterior, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.

- b. Intermediate Coat: Waterborne urethane alkyd, interior/exterior matching topcoat.

- c. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).

or

- d. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).

or

- e. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

5. Non-Ferrous Metal Substrates: Waterborne Urethane Alkyd Enamel over a Latex Primer System:

- a. Prime Coat: Primer, waterbased, interior/exterior, Dunn-Edwards Ultrashield Galvanized Metal Primer ULGM00.

- b. Intermediate Coat: Waterborne urethane alkyd, interior/exterior, matching topcoat.

- c. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).

or

- d. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).

or

- e. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

D. Interior Painting Schedule:

1. Gypsum Board Substrates: **Multiple custom colors per grade level. Owner / Architect to choose and approve colors prior to painting.**

- a. Prime Coat: Primer sealer, latex, interior, Dunn-Edwards, Vinylastic Select VNSL00.
- b. Intermediate Coat: Latex, interior, matching topcoat
- c. Topcoat: Latex, interior/exterior, eggshell, Dunn-Edwards, Evershield, EVSH30, (Gloss Level 3).
- or
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3).
- or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
- or
- f. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

2. Wood Substrates: **Multiple custom colors per grade level. Owner / Architect to choose and approve colors prior to painting.**

- a. Prime Coat: Primer, acrylic, for interior wood, Dunn-Edwards, Ultra-Grip Select UGSL00 or Dunn-Edwards, Decoprime DCPR00.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
- or
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
- or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5)

3. Ferrous Metal Substrates: Ultra-Premium Low Odor / Zero VOC Latex over a Waterborne Alkyd Primer System: **Multiple custom colors per grade level. Owner / Architect to choose and approve colors prior to painting.**

- a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
- b. Intermediate Coat: Latex, interior, matching topcoat.
- c. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell,

- Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
- or
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
- or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).
4. **Non-Ferrous Metal Substrates: Multiple custom colors per grade level. Owner / Architect to choose and approve colors prior to painting.**
- a. Pre-Treatment: Water based, Krud Kutter, Metal Clean & Etch SCME-01
- b. Prime Coat: Primer, water based, Dunn-Edwards, Ultrashield Galvanized Metal Primer ULGM00.
- c. Intermediate Coat: Latex, interior, matching topcoat.
- d. Topcoat: Waterborne urethane alkyd, interior/exterior, eggshell, Dunn-Edwards, Aristoshield ASHL30, (Gloss Level 3)
- or
- e. Topcoat: Waterborne urethane alkyd, interior/exterior, low sheen, Dunn-Edwards, Aristoshield ASHL40, (Gloss Level 4).
- or
- f. Topcoat: Waterborne urethane alkyd, interior/exterior, semi-gloss, Dunn-Edwards, Aristoshield ASHL50, (Gloss Level 5).

| Cross-Over Chart | | | |
|--|---------------------------------------|---------------------------------------|---|
| Paint Type | Dunn-Edwards BOD | Kelly Moore | Sherwin Williams |
| 100% Acrylic Eggshell Exterior Paint | EVSH30 Evershield 100% Acrylic | 1294 Envy Exterior 100% Acrylic | KxxW000xx Series Emerald Exterior Acrylic Latex |
| 100% Acrylic Low Sheen Exterior Paint | EVSH40 Evershield 100% Acrylic | 1294 Envy Exterior 100% Acrylic | KxxW000xx Series Emerald Exterior Acrylic Latex |
| 100% Acrylic Semi-Gloss Exterior Paint | EVSH50 Evershield 100% Acrylic | 1298 Envy Exterior 100% Acrylic | KxxW000xx Series Emerald Exterior Acrylic Latex |
| Water-Borne Alkyd Urethane Eggshell Interior/Exterior Paint | ASHL30 Aristoshield Urethane Alkyd | 1997 Epic Urethane Alkyd Enamel | KxxW0xxxx Series Emerald Urethane Trim Enamel |
| Water-Borne Alkyd Urethane Low Sheen Interior/Exterior Paint | ASHL40 Aristoshield Urethane Alkyd | 1997 Epic Urethane Alkyd Enamel | KxxW0xxxx Series Emerald Urethane Trim Enamel |
| Water-Borne Alkyd Urethane Semi-Gloss Interior/Exterior Paint | ASHL50 Aristoshield Urethane Alkyd | 1998 Epic Urethane Alkyd Enamel | KxxW0xxxx Series Emerald Urethane Trim Enamel |

END OF SECTION

DIVISION 10 – SPECIALTIES

10 11 23 – Corkboards
10 14 23 – Signage

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SECTION 10 11 23 – CORKBOARDS

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: Corkboards, Trim, and Accessories.

1.3 RELATED SECTIONS

- A. Section 09 77 10 – Fiber Reinforced Laminate (FRL) Wall Protection Panels

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.
- C. 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 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. Selection Samples: For each finish product specified, two complete sets of physical color representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: Submit samples not less than 12 inch square and framed on two adjacent sides, to illustrate materials, finish, color, and configuration of each type of visual display board required.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for cleaning, stain removal and maintenance of all components.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be a manufacturer of corkboards 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 corkboard manufacturer for both installation and maintenance of the type of unit 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 boards with spaces sufficiently complete so that 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: Manufacturer's standard 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. Claridge Products (www.claridgeproducts.com)

2. Polyvision (www.polyvision.com)

2.2 MATERIALS FOR CORKBOARD PANELS

- A. Cork: Made from pure, natural ingredients including linseed oil, pine resin, cork and pigments that are calendared onto a jute backing to create a smooth, suede-like surface.
- B. Features:
 1. Environmentally friendly
 2. Tacks insert easily, are gripped firmly
 3. Does not crack, peel or crumble
 4. Washable stain-resistant finish
 5. Dimensionally stable
 6. Meets ASTM E84, NFPA 258 (fuel contribution) – Class B, and NFPA 255 (critical radiant flux) - Class II
 7. No toxins - no harmful by-products or emissions
 8. Naturally inhibits bacterial growth

2.3 PRODUCTS

- A. Products: Provide one of the following, as selected by Owner:
 1. Basis of Design Product: Grain Tackboard, by Claridge Products, Inc.
 - a. Tackboard: Claridge Cork surface, in a minimum of fifteen (15) colors.
 - b. Edge: Wood, as chosen from manufacturer's selections.

2.4 SIZE / QUANTITY

- A. As shown on plans.

2.5 FABRICATION

- A. Assembly: Provide factory assembled units. 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.

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 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.

SECTION 10 14 23 – SIGNAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic signs at building entrances, classrooms, restrooms, and as identified on drawings.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 08 11 13 – Hollow Metal Doors and Frames.
3. Section 09 29 00 – Gypsum Board Assemblies.
4. Divisions 22, 23 and 26 for Mechanical and Electrical Identification and Signs.

1.2 REFERENCES

A. Accessible signs shall conform with the following requirements as indicated:

1. California Building Code (CBC) Title 24, 2022 Edition.
2. ADA Accessibility Guidelines (ADAAG, latest adopted edition).
3. Contracted Grade 2 Braille shall be used whenever Braille symbols are specifically required (CBC Section 11B-703.3 Braille).
4. Means of Egress Identification: CBC 11B-216.4 & 11B-703.1.
5. Tactile Exit Signs: CBC 1013.4.
6. Restroom Identification Symbols: CBC 11B-216.8 & 11B-703.7.2.6.
7. Signs and Identification: CBC 11B-216.1 & 11B-703.1.
8. International Symbol of Accessibility: CBC 11B-703.7.2.1.
9. Direction and Information Signs: CBC 11B-703.1.
10. Symbols of Accessibility: CBC 11B-703.7.
11. Finish and Contrast: CBC 11B-703.5.1.
12. Character Proportions: CBC 11B-703.2.4.
13. Character Height: CBC 11B-703.2.5.

14. Raised Characters and Pictorial Symbol Signs: CBC 11B-703.2 & 11B-703.6.
 15. Braille: CBC 11B-703.3.
 16. Mounting Height and Location: CBC 11B-703.4.1 & 11B-703.4.2.
 17. Symbols of Accessibility: CBC 11B-703.7.2.
 18. Color of Accessibility Symbol: CBC 11B-703.7.2.1.
 19. Entrance Signs: CBC 11B-216.6.
- B. ASTM D4802 – Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet.
 - C. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - D. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - E. ASTM A666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop drawings listing sign styles, lettering and locations and overall dimensions of each sign.
- C. Two (2) samples illustrating full size sample sign with tactile characters, Braille and subsurface text or pictogram to demonstrate fabrication technique and Braille measurements which shall be used on proposed project.
- D. Letters samples: 1-inch-high letters for proportions required in REGULATORY REQUIREMENTS.
- E. Submit manufacturer's technical data and installation for each type of sign required.
- F. Submit samples of background colors, character colors, and one-inch high print outs of "I," "O" and "X" from proposed type styles. Indicate which type styles shall be used for required tactile characters and for required visual characters.
- G. Submit proposed sign schedule to comply with scoping requirements above.
- H. All signage shall be designed and constructed to comply with signage specifications and drawings.

1.4 QUALITY ASSURANCE

- A. Pre-installation Meeting:

1. Notify Architect when signs are ready for installation. Arrange for conference at job site. Do not proceed with installation until Architect's approval of specific locations and methods of attachment has been obtained.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site and protect from damage. Store until immediately prior to Notice of Completion.
- B. Manufacturers shall submit 3 references showing products for projects completed within the last 6 years. Both tactile and non-tactile signage shall be included in the work.
- C. Manufacture's Two-Year Warranties.
 1. Contractor shall provide labor and materials to repair or replace defective signs a directed by Owner. Defects shall include:
 - a. Tactile characters and/or Braille dots which come off or are removed.
 - b. Discoloration, wear and scratching off of the surface color.
- D. All signs and sign components, except for damage by mishandling by Owner, including installation by Owner, or vandalism.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products of following manufacturers form basis for design and quality intended.
 1. Gravotech. www.gravotech.com
 2. Or approved equal.

2.2 MATERIALS

- A. Plastic Signs:
 1. ADA Tactile and Braille Signs: Sand-Carved signs; thermosetting high-pressure laminate using Graphic Process Sand-Carved signs, exterior-grade, graphics, Braille and tactile copy required. Square corners, square cut eased corners and edges per CBC 11B-703.7.2.6.4.
 - a. Unframed Signs: GTAC-INT sign material as manufactured by Gravotac. Sized as required for text or room number.
 - b. Framed Signs: Single piece Modular Frames, concealed screw mounting, by Gravotac or equal.
 - c. ADA Tact: Manufacturer's standard process for producing copy complying with CBC and ADA Accessibility Guidelines. Text shall be

accompanied by California Grade 2 Braille. Produce precisely formed characters with square cut edges free from burrs and cut marks, permanently fused to substrate.

- d. Raised-Copy Thickness: Not less than 1/32 inch.
2. Non-Tactile Signs: Cast Acrylic Plastic Sheet; ASTM D4802 Category A-1, 1/4-inch overall thickness, laminated acrylic plastic sheets, Sub-surface Screened process graphics and symbols, exterior-grade at exterior locations, square 3/8-inch radius corners, square cut edge, drilled holes for countersunk screws, polished edges.
 - a. Unframed Signs: As noted above.
 - b. Framed Signs: 1/16 inch [1/8 inch] thick aluminum. [Square] [3/8 inch] [1/2 inch] [9/16 inch] radius corners.
 - c. Finish: black, satin silver, satin gold, bronze anodized OR Powder coated with color to be selected by Architect.
 3. Apply UV inhibitor overcoat for exterior signs.
 4. 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. Aluminum Signs:
1. Aluminum Sheet for Anodic Finish: Alloy 5005-H32 per ASTM B209 in 0.102-inch thickness.
 2. Framing Members and Posts: Special extrusions Alloy 6063-T5 per ASTM B221.
 3. Aluminum sheet with die-raised copy, anodic finish applied before fabrication. Background finish enamel applied after fabrication. Color as selected by Architect from manufacturer's standard range of colors.
 4. Fabrication: Raised copy, Tactile and Braille.
- C. Stainless Steel Signs:
1. Stainless-Steel Plate, Sheet, and Strip: Provide stainless-steel plate, sheet, and strip, Type 302 or Type 304, complying with ASTM A666.
 2. Fabrication: Raised copy, Tactile and Braille.
- D. Chemically Deep-etched Zinc Signs:
1. Solid metal plate: 0.125 [0.40] [0.064] [0.153] [0.250] inch thick.
 2. Fabrication: Raised copy, Tactile and Braille.

3. Finish: matte [semigloss] [gloss] [exterior gloss] sheen.
 4. Background: swirl-brushed [sandblast] [painted] [plated] zinc background finish.
 5. Factory applied color finishes, minimum two (2) colors. Colors: As selected by Architect.
 6. For Sizes and Dimensions verify with Architect.
 7. Rounded corners, 7/16-inch radius.
 8. Square edges.
 9. Etch depth: 0.08 inch
 10. Concealed Mounting: welded studs [drilled and tapped holes]
 11. Mounting Holes: Drilled and countersunk.
- E. Fasteners: Stainless steel screws, flat head, pin-in-head torx screws for vandal-proof and clear silicone adhesive.
- F. Lettering Type Style: Helvetica Regular, uppercase letters only, refer to REGULATORY REQUIREMENTS for letter-proportion compliance.
- G. Restroom Signage:
1. Male Restroom Signage:
 - a. Doorways leading to male restrooms shall be identified by equilateral triangle 1/4 inch thick with edges 12 inches long, with vertex pointing upward in contrasting color from door color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign.
 - b. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 8 inch Height by 6 inch Length minimum unless indicated on Drawings upon which appears a male pictogram 6 inches high, and the word "MEN" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by the California Contracted Grade 2 Braille indicator immediately below. Sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.
 - c. Conform to all CBC requirements, CBC 11B.703.1 and 11B-703.7.2.6.1.

2. Female Restroom Signage:

- a. Doorways leading to female restrooms shall be identified by circle 1/4 inch thick 12 inches in diameter circle in contrasting color from door color. Sign shall be mounted in center of door, 60 inches from finish floor to center of sign.
- b. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 8-inch Height by 6-inch Length minimum unless indicated on Drawings upon which appears a female pictogram 6 inches high, and the word "WOMEN" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by the California Contracted Grade 2 Braille indicator immediately below. Sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.
- c. Conform to all CBC requirements, CBC 11B.703.1 and 11B-703.7.2.6.2.

3. Gender Neutral Restroom:

- a. Doorways leading to unisex restrooms shall be identified by circle 1/4 inch thick, 12 inches in diameter with 1/4-inch-thick triangle superimposed on circle and within 12-inch diameter, total 1/2 inch thick in contrasting color from door color. Sign shall be mounted in center of door 60 inches from finish floor to center of sign. Color of triangle shall have 70 percent minimum contrast with color of circle.
- b. Room shall be further identified by rectangular room identification sign 1/4 inch thick, 8-inch Height by 6-inch Length minimum unless indicated on Drawings upon which appear as male and female pictograms and the word "RESTROOM" immediately below on the same sign in contrasting color. Letters: 5/8 inches minimum and 2 inches maximum high in contrasting color, raised minimum 1/32 inch fully tactile, accompanied by California Contracted Grade 2 Braille indicator immediately below, on same sign. The sign shall be located on wall on latch side of door, 60 inches from finish floor to center of sign, centered horizontally within 18-inch space adjacent to latch side of door or on nearest adjacent wall.
- c. Conform to all CBC requirement, CBC 11B.703.1 and 11B-703.7.2.6.3.

4. Restroom signs – Non-Wheelchair Accessible:

- a. Provide restroom signs with similar font, size and fabrication as accessible signs without the ISA (International Symbol of Accessible) and without tactile construction.

- b. Next to the Non-Wheelchair Accessible sign provide an additional sign same construction, with the wording: "WHEELCHAIR ACCESSIBLE RESTROOM LOCATED" with ARROW below the wording directing to the nearest location.
5. Substitute "BOYS" or "GIRLS" where appropriate.

2.3 FABRICATION

A. Regulatory Requirements:

1. Tactile Character Type: Tactile characters on signs shall be raised 1/32-inch (0.794 mm) minimum and shall be sans serif uppercase characters accompanied by Contracted (Grade 2) Braille. Helvetica Regular, uppercase letters only, refer to REGULATORY REQUIREMENTS for letter-proportion compliance. Italic, oblique script, highly decorative or unusual style forms not permitted. CBC Section 11B-703.2. Fabricate sign so that raised letter cannot be peeled off.
2. Character Proportions: Raised characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
3. Tactile Character Height: Raised characters shall be a minimum of 5/8 inch (15.9 mm) and a maximum of 2 inches (51 mm) high. CBC Section 11B-703.2.5.
4. Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character. CBC Section 11B-703.2.6.
5. Character spacing measured between the two closest points of adjacent raised characters within a message. Where characters have rectangular cross sections, spacing shall be 1/8 inch minimum and four (4) times the stroke width, maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and four (4) times the stroke width maximum at the base of the cross sections, and 1/8 inch minimum and four (4) times the stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum.
6. Line Spacing: Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
7. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background. Provide white characters on Navy Blue background to match District standard.
8. Braille: California (Contracted) Grade 2 Braille. Dot base diameter shall be 0.059 inch (1.5 mm) to 0.063 inch (1.6 mm). Dots shall be 0.100-inch (2.5 mm) on center in each cell with 0.300-inch (7.6 mm) space between corresponding dots in adjacent cells. Distance between corresponding dots

from one cell directly below, 0.395 to 0.400 inch. Dots shall be raised 0.025 to 0.037 inch above the background. Braille dots shall be domed or rounded.

9. Polish all edges.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive Work.
- B. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION

- A. Install signs only after surfaces are finished, in all restrooms, in center of door, or on wall adjacent to latch side as specified herein.

- B. Mounting:

1. Mounting Height and Location: Signs with raised characters and Braille shall be located 48 inches minimum to the baseline of the lowest line of Braille cells and 60 inches maximum to the baseline of the highest line of raised characters above the finish floor or ground surfaces. Mounting location shall be located so that a clear space of 18 inch minimum by minimum by 18 inch minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45-degree open position. CBC Section 11B-703.4.
2. Tactile Plastic Signs: Stainless steel screws (not just adhesive), pin torx, vandal-proof screw appropriate for substrate.
3. Non-tactile Plastic Signs:
 - a. Install with four (4) stainless steel countersunk flathead screws, pin torx, vandal-proof. Pre-drill holes to prevent breaking plastic, use countersunk drill bits to flush screw head with sign surface.
 - b. If required for proper installation and/or as approved by District, install with clear silicone adhesive meeting ASTM C834, with zero clearance between plastic and face of substrate. Double face adhesive tape not permitted.
 - c. Metal Signs: Install with four (4) flathead countersunk No. 8 stainless steel vandal-proof screws at pre-drilled holes, top of screw heads shall flush with sign surface, concealed mounting.

- C. Clean and polish.

3.3 FIELD QUALITY CONTROL

- A. DSA Inspections: Signs and identifications or other information shall be field inspected after installation and approved by Division of the State Architect prior to the

issuance of a final certificate of occupancy, or final approval where no certificate of occupancy is issued. The inspection shall include, but not limited to, verification (after installation) that Braille dots and cells are properly spaced and the size, proportion and type of raised characters are in compliance with CBC, Section 11B-703.1.1.2.

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DIVISION 11 – EQUIPMENT

11 40 00 – Foodservice Equipment
11 66 00 – Athletic Equipment

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SECTION 11 40 00 – FOODSERVICE EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes of furnishing all labor and material required to provide and deliver all food service equipment herein specified into the building, uncrate, assemble, set-in-place, level and completely install, exclusive of final utility connections.
- B. Furnish all material and labor required to completely provide, deliver and install all Food Service Equipment as specified herein and as shown on the drawings. This work shall be in strict accordance with the plans and specifications with all dimensions verified in the field prior to any fabrication.
 - 1. Coordinate the Food Service Equipment work with the respective trades performing preparatory work for the installation of the Food Service Equipment.
 - 2. Comply with all Federal, State and Municipal regulations which bear on the execution of this project. Food service aisles shall be a minimum of 36" wide and tray slides shall be mounted at 34" maximum above the finished floor. Food service equipment required to be accessible shall conform to all reach requirements in CBC 1104B-5, 1104B-6 and figures 11B-16 and 11B-17.
- C. Work Includes:
 - 1. Materials shown on the Food Service Equipment Schedule.
 - 2. Piping, valves, and plumbing accessories that are integral within the equipment.
 - 3. Furnishing control devices such as solenoid valves that are not integral with the equipment, for installation by Mechanical division 23 and/or Electrical Division 26.
 - 4. Wiring, wiring devices, controls and mechanical accessories that are integral in the equipment.
 - 5. Ventilating ducts, flues, controls and mechanical accessories that are integral in the equipment.
 - 6. Anchors, fasteners, fillers and sealants for mounting equipment securely in place.

7. Cooperation with all other contractors on the job including the furnishing of information in the form of drawings, wiring diagrams and other data.
 8. Touch-up painting after the installation of the food service equipment.
- D. Related Sections include the following:
1. Section 09 67 24 – Urethane Slurry Flooring System
 2. Section 09 77 20 – Fiberglass Reinforced Plastic (FRP) Wall Panels
 3. Division 22 – Plumbing
 4. Division 23 – Mechanical
 5. Division 26 – Electrical

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installer: Regularly engaged in providing food service equipment from manufacturers of this type of equipment a minimum of 5 years with at least 5 installations of this size and type that are at least each 3 years old.

B. Standard of Manufacture:

1. Food service equipment that is specified as "custom" having no manufacture name or model number shall be manufactured by a Food Service Equipment Fabricator with at least five (5) years' experience with engineering, design and fabrication of food service equipment. The manufacture shall be subject to the review of the Architect and/or Consultant and shall be approved by the National Sanitation Foundation. All Fabricated equipment shall be constructed in strict compliance with the latest standards of the National Sanitation Foundation and shall bear the mark of the National Sanitation Foundation in full compliance with all applicable codes and ordinances.
2. All electrically heated or operated equipment shall bear the seal of approval of the Underwriters Laboratories and shall comply with the National Electrical Code and all local Codes and Ordinances.
3. All food service equipment that is specified as "buy-out" having a specific manufacture name and model number shall comply with the latest editions of the National Sanitation Foundation.
4. All Gas heated or operated equipment shall be the seal of approval of the American Gas Association (AGA)
5. All Steam heated or operated equipment shall conform to the standard of the American Society of Mechanical Engineers (ASME) and shall be ASME approved.

6. Food shields and Sneeze guards shall meet all the requirements of National Sanitation Foundation (NSF) Standard 2.

1.4 SUBMITTALS

- A. See Section 01 33 00 – Submittals.
- B. Shop Drawings / Equipment Brochures:
 1. No ordering or fabrication of equipment shall take place until the equipment brochures and shop drawings have been reviewed in writing by the Architect and/or Consultant. Receipt of this review shall not relieve the Contractor from the responsibility of verifying all quantities and related dimensions, maintaining the specified quality of equipment, and verifying conditions of the job site.
 2. Equipment Brochures; within twenty (20) calendar days after award of the contract, brochures containing manufacturers specification sheets, dimensioned drawings and/or other pertinent data describing all items of standard manufacture shall be submitted for review by the Architect and/or Consultant. Sheets with the notation "Fabricated Item" and name of the fabricated item, as well as any required mechanical, plumbing or electrical requirements shall be inserted between the manufacturer's specification sheets describing the "buy-out" equipment.
 3. Rough-in and Equipment Location Drawings; within thirty (20) calendar days after award of the contract, complete rough-in and details for electrical and plumbing services with both vertical and horizontal dimensions, from column center-lines or exterior walls for location said connection points and rough-in locations shall be submitted for review by the Architect and/or Consultant. Equipment location plans shall be drawn to scale of not less than 1/4" = 1'-0" and include a schedule of equipment clearly identifying all items. Minimum drawings size shall be 24"x 36".
 4. Shop Drawings; within thirty (30) calendar days after award of the contract, shop fabrication drawings shall be submitted for review by the Architect and/or Consultant. Plans shall be drawn to scale of not less than 1/2"=1'-0". Additional plan views, elevations and sections at 3/4"=1'-0" shall be supplied of all counters and tables with complete dimensions. All shop practices regarding joints, gussets, bracing, tie-downs, supports, etc. shall be clearly defined as well as gauges and quality of metals and brands and model numbers of all miscellaneous fittings, plumbing and electrical trim. The drawings shall also show locations of blocking (supplied under another sections) for all wall and ceiling mounted Food Service Equipment. Minimum drawings size shall be 24"x36".
- C. Samples: Provide all samples if specification requested.
- D. Substitutions:
 1. Manufacturer's listed in this section are used as standards for quality. All Substitutions shall be approved by the Architect and/or Consultant prior to installation.

2. Refer to Division 1 - General Requirements for procedures governing substitutions
3. Only one substitution for each item will be considered.
4. Installation of any qualified substituted equipment is the Food Service Equipment Contractor's responsibility. Including any mechanical, electrical, structural changes required for the installation of qualified substitution shall be without additional cost to the Owner.

E. Deferred Approval Items:

1. For the items identified on the Equipment List as (Deferred Approval Item), the following submittal requirements shall be provided:
 - a. Product data.
 - b. Manufacturer's recommended methods of installation coordinated with actual field conditions for anchorage to actual substrate conditions.
 - c. Shop Drawings: Indicate types, sections, gages, materials, completely dimensioned layouts and configurations, hardware, fasteners, operators and shop finishes and other required coatings. Provide calculations for all required connections.
 - d. Structural calculations, detail drawings, and all additional necessary drawings and specifications for a deferred approval shall be signed by a Structural Engineer licensed in the State of California.
 - e. Provide a copy of the installer's certification and a copy of the manufacturer's written certification criteria. Provide list of a minimum of (5) five jobs installed by Installation Company with contact phone numbers of both the project's General Contractor and Owner.

1.5 DISCREPANCIES

- A. In the event of discrepancies within the Contract Documents, the Architect and/or Consultant shall be so notified in sufficient time prior to bid opening, ten (10) days to allow issuance of an addendum.
- B. If time does not permit notification or clarification of discrepancies prior to the bid opening, following shall apply: The drawings and drawing schedules shall govern in matters of quantity; the specifications in matter of quality. In the event of conflict within drawings involving quantities, or within the specifications involving quality, the greater quantity and high quality shall apply. Such discrepancies shall be noted and clarified in the contractors bid. No additional allowances will be made because of errors, ambiguities, or omissions which reasonable should have been discovered during the preparation of the bid.

1.6 RESPONSIBILITY

- A. The work as specified in this division shall include assuring that all required submittals conform to the intent and meaning of the documents, conditions at the job site, and all local codes and ordinances.
- B. Visit the job site to field check actual wall dimensions and utility rough-ins. Be responsible for furnishing, fabricating, and installing the equipment in accordance with the available space and utility services as they exist on the job site.
- C. Check all door openings, passageways, elevators, etc., to verify that the equipment can be transported to its proper location within the building. If necessary, check the possibility with the General Contractor of holding wall erection, placement of doorjambes, window, etc. for the purpose of moving equipment to its proper location.
- D. Notify the Architect and/or Consultant of any discrepancies between the plans and specification prior to fabrication of any equipment, to actual condition on the job.
- E. If any special hoisting equipment and operators are required, include cost as part of the bid for this work.

1.7 DELIVERY AND STORAGE

- A. All equipment specified herein shall be delivered to the job site; received and handled by the Contractor or his authorized agent. The Owner shall in no way be expected to store or handle any such equipment.
- B. All equipment shall be delivered in such a manner as to protect it against dirt, water, chemical or mechanical injury.
- C. Throughout the progress of the work, the Contractor shall keep the working area free of debris of all types resulting from his work.
- D. All packing material shall be removed from the project location by the Contractor.

1.8 COORDINATION

- A. Coordinate work with mechanical, electrical, plumbing, interiors and other trades whose work is in conjunction with equipment specified herein.

1.9 MEASUREMENTS

- A. Verify all dimensions shown on the drawings by taking field measurements at the job site prior to fabrication of equipment or ordering equipment. Proper fit and attachment of all parts is required and is the sole responsibility of the Food Service Contractor. If necessary, all equipment shall be fabricated so that it may be handled through finished door openings.

1.10 PRODUCT REQUIREMENTS

- A. Refer to Section 01 60 00.

1.11 GUARANTEE / WARRANTY

- A. All work shall be guaranteed by the Foodservice Equipment Contractor against all defects for a term of one (1) year from the date of notice of completion. This guarantee shall cover replacement of defective material at the Foodservice Equipment Contractor expense, including transportation and labor. This guarantee will not cover any cost for replacement of parts or work made necessary by carelessness or misuse of the equipment by others.
- B. The Food Service Equipment Contractor shall provide at his own expense the installation, start-up and service for one (1) year from the date of recording the notice of completion of the project; the replacement of all condensing units and other refrigeration devices supplied under this contract. In addition to this one (1) year free service, the condensing units shall have a five (5) year compressor warranty; said warranty commencing at the date of completion.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Metal for construction purposes, where entirely concealed, shall be steel of wrought iron sections galvanized by the hot-drip process after fabrication. Bolts, screws, rivets, and similar attachments to this galvanized work shall be galvanized or brass. Exposed screw and rivet work shall be finished to match adjacent surfaces, flush and buffed smooth. Finished work shall be free of tool or construction marks, dents, or other imperfections; and at the completion of the work, all metal shall be gone over with a portable machine and buffed and dressed to perfect surfaces.
- B. All materials shall be new and of first grade. All gauges specified herein shall be minimum and shall be established after polishing. They shall refer to:
 - 1. U.S. Standard Gauge for sheets and plates.
 - 2. Stainless steel shall be manufactured by one of the following: Allegheny Ludlum Steel Corporation, American Rolling Mills, U.S. Steel Corporation.
- C. The Contractor will be required to furnish a certified copy of the mill analysis of materials to the Architect and/or Consultant.
- D. Stainless steel sheets shall conform to ASTM A240, Type 304 Condition A, 18-8 having a No. 4 finish. No.2B finish shall be acceptable on surfaces of equipment not exposed to view. All sheets shall be uniform throughout in color, finish and appearance.
- E. Stainless steel tubing and pipe shall be Type 304, 18-8, having a No. 4 finish, and shall conform to either ASTM A213 if seamless or ASTM A249 if welded.
- F. Galvanized steel shall be approved grade of copper-bearing steel sheets with a minimum copper content of 20%. All sheets to be commercial quality, stretcher leveled, bonderized and re-rolled to insure smooth surface. Galvanized steel shall not be allowed in the construction and fabrication of any "Fabricated Assembly" items.

- G. All millwork materials shall be free from defect impairing strength, durability, or appearance; straight and free from warpage; and the best grade for their particular function. All wood shall be well seasoned and kiln dried and shall have an average moisture content of 8%, a maximum of 10%, and a minimum of 5%.
- H. Plywood and other woodwork of treatable species, where required by code, shall be fire-retardant treated to result in a flame spread rating of 25 or less with no evidence of significant progressive combustion when tested for 30 minutes duration under ASTM E-84 and shall bear the testing laboratory mark on the surface to be concealed.
- I. Concealed softwood or hardwood lumber shall be of poplar, Douglas fir, basswood, red oak, birch, maple, beech or other stable wood and shall be select or better grade, unselected for color and grain, surfaced four sides, square-edged, and straight. Basswood may be used where fire-retardant treated materials are required.
- J. Face veneers shall be matched for color and grain to produce balance and continuity of character. Mineral streaks and other discolorations, wormholes, ruptured grain, loose texture, doze, or shake will not be permitted. Face veneer leaves on each surface shall be full-length, book matched, center matched, and sequence matched. Surfaces shall be sequenced, and blueprint matched. Veneers not otherwise indicated shall be plain sliced. Backing veneers for concealed surfaces shall be of a species and thickness to balance the pull of the face veneers.
- K. Hardwood plywood for painted surfaces shall conform to U.S. Product Standard PS - 51-71, Type I, and shall have sound birch, maple or other approved close grain hardwood faces suitable for paint finish.
- L. Plastic laminate surfaces shall be laminated with thermosetting decorative sheets in the color, pattern and style as selected by the Architect. Horizontal surfaces shall be laminated with sheets conforming to Federal Specifications L-P-508F, Style D, Type I (general purpose), Grade HP, Class I, 1/16" thick, satin finish with rough sanded backs. Vertical surfaces shall be laminated with sheets conforming to Federal Specification L-P-598F, Style D, Type II (vertical surface), Grade HP, Class I, conforming, satin finish, 1/32" thick or heavier. Balance sheets for backs in concealed locations shall be .020" thick laminate backing sheets conforming to Federal Specification L-P-00508E, Style ND, Type V (backing sheet), Grade HP.
- M. Adhesive for application of plastic laminate to wood surfaces of counter tops shall be phenolic, resorcinol or melamine adhesive conforming to Federal Specification MMM-A-181C and producing a waterproof bond. Adhesive for applying plastic laminate to vertical surfaces shall be either a waterproof type or a water-resistant type such as a modified urea formaldehyde resin liquid glue conforming to Federal Specification MMM-A-188C. Contact adhesive will not be acceptable.
- N. Plate glass shall be 1/2" thick safety glass with polished edges.
- O. Sealant shall be equal to that manufactured by General Electric. Silicone construction 1200 sealant; in either clear or approved color to match surrounding surfaces.

- P. Sound deadening material shall be equal to that manufactured by H.W. Mortell Co., Kankakee, Illinois, and shall be sprayed by use of a mechanical device to a thickness of not less than 1/8" thick.

2.2 FINISHES

- A. Paint and coatings shall be of an NSF approved type suitable for use in conjunction with food service equipment. Such paint or coating shall be durable, non-toxic, non-dusting, non-flaking and mildew resistant, shall comply with all governing regulations and shall be applied in accordance with the recommendations of the manufacturer.
- B. All exterior, galvanized parts, exposed members of framework where specified to be painted shall be cleaned, properly primed with rust inhibiting primer, degreased, and finished with two (2) coats of epoxy-based grey hammertone paint, unless otherwise specified.
- C. Stainless steel, where exposed, shall be polished to a #4 commercial finish. Where unexposed, finish shall be #2B. The grain of polishing shall run in the same direction wherever possible. Where surfaces are disturbed by the fabricating process, such surfaces shall be refinished to match adjacent undisturbed surfaces.

2.3 SHOP FABRICATED EQUIPMENT CONSTRUCTION

- A. Leg stands for open base tables or dish tables shall be constructed of 1-5/8" dia. 16-gauge stainless steel tubing, with stringer and cross braces of the same material. Joints between legs and cross braces shall be welded and ground smooth. Flattened ends on tube stretchers are not permitted. Mechanical fittings are also not permitted.
 - 1. Stainless Steel Leg Sockets: Component Hardware Group, Inc. model A18-0206, or accepted equal; weld to underside of countertop framing or at bottom of enclosed cabinet unit and fastened with flush set screw locking device.
 - 2. Sanitary Type Stainless Adjustable Foot: Component Hardware Group, Inc. model A10-0851, or accepted equal
- B. Tabletops shall be 14-gauge stainless steel unless otherwise noted, with all shop seams and corners welded, ground smooth and polished. Tops of closed base fixtures shall be reinforced on the underside with a framework of 1-1/2" angles or 16-gauge stainless steel hat section; and on open pipe frames with a 4" channel at each pair of legs. The leg sockets shall be welded to this channel. The channel in turn stud welded to the top. Tops shall be reinforced so that there will be any noticeable deflection. Unless otherwise shown on the detail drawings, metal tops shall be turned down 2", and back at 15-degree angle, with 1-1/8" turn-under, except where adjacent to walls or other pieces of equipment. The wall side shall be turned up 10" and back 2" at a 45-degree angle. Ends of this splash are to be closed. Free corner of tops shall be spherical. All tops shall have 1/8" of sound-deadening material applied to the underside by use of spray equipment in an oven, smooth application for ease in cleaning.
- C. Enclosed bases or cabinet bodies shall be of the material and gauge hereinafter specified. They shall be enclosed on the ends and sides as required. The bases shall be reinforced at the top with a framework of 1-1/2" x 1-1/2" x 1/8" stainless steel

angles fully welded to the base with the stainless-steel angles 36" on center (maximum), with all corners of said framework mitered and fully welded. All vertical joints of the bases shall be fully welded, ground and polished. All free corners of enclosed bases or cabinet bodies and all corners against walls and other fixtures shall be square. In the case of fixtures fitting against or between walls, the bodies shall be set in 1" from the wall line, but the tops shall be extended back to the wall line to permit adjustment to wall irregularities. A flush fitting vertical trim strip (extension of the vertical end mullion without vertical seam of the same material as the body shall be provided at each end of the body and shall extend 1" to the wall line). These fixtures shall be constructed to set on bases or legs as hereinafter specified and shall be set in mastic in a vermin-proof manner.

- D. Shelves, mullions and aprons shall be fabricated flush with the cabinet body, welded, ground, and polished. Butt joints are not acceptable.
- E. Drawers, to be furnished with stainless steel flush pull, Component Hardware Group Inc., model number P63-1012 or equal installed into the 18-gauge double-pan drawer front panel.
 - 1. Stainless steel locks, Component Hardware Group, Inc., model number P30-4781 or equal for each drawer. All drawers are to be keyed alike.
 - 2. Stainless Steel full extension slides, Component Hardware Group, Inc., model no S52-0024 or equal NSF Approved. Provide two (2) per drawer. Slides to be installed so drawer will roll closed when released.
 - 3. Stainless steel removable drawer pan, Component Hardware Group, Inc., model number, S81-1520 or equal one (1) per drawer set loosely in a channel frame so it can be easily lifted out for cleaning. This supporting frame shall be welded stainless steel channel.
 - 4. Drawer face panel to be constructed of 18-gauge stainless steel double pan construction. (Single metal thickness drawer faces are not being expectable.)
- F. Hinged doors in base cabinets shall be of double pan construction, insulated and constructed of 18-gauge stainless steel. Doors shall have wire type pull Component Hardware Group Inc., model number P46-1010 or equal installed as shown in elevations. Door pulls to be NSF and ADA compliant.
- G. Interior shelves shall be solid, non-removable 16-gauge stainless steel, with ends and backs provided with a 1-1/2" high turn-up against the body of the fixture and welded to the same. Front edge is to be turned down 1-1/2" and under 1/2", at the bottom shelf, beyond the edge of the base to prevent sagging and vermin collection.
- H. Under shelves on open tables shall be constructed of 16-gauge stainless steel, flanged down 90 degrees 1/2". The corners shall be welded to the legs. Under shelves shall be 10" from the floor. Backs shall be turned up 2".
- I. Elevated shelves shall be constructed of 16 gauges stainless steel with edges turned down in a square edge, and back 1/8"; except where shelves are adjacent to walls or other fixtures, where they shall be turned up 2". Corners shall be spherical, mounted on 14-gauge stainless steel support brackets.

- J. Sinks and drain boards shall be constructed of 14-gauge stainless steel. The working edge of the sink shall be provided with 5/8" radius sanitary rolled edge in one piece with rounded corners. The drain boards shall be made as an integral part of the sink; all vertical and horizontal corners shall be rounded with 5/8" radius; and the working front edges shall be maintained at one level, taking up the pitch of the drain boards by dropping the sink to allow for same. Depth of sink bowl shall be determined from the top bowl. Sinks shall be provided with back and end splashes with top edge flanged back 2-1/4" at 45-degree angle and attached to the building wall with "zee" clips. Splash back of sinks and drain boards shall be grained in the same direction. Suitable openings shall be cut for hot and cold-water supplies and waste outlets. All surface plumbing trim as called for on the drawings and herein specified shall be provided. Bottom of each sink bowl with center drain connection shall be fitted with a 2" lever type action waste valve mounted into the sink and made watertight. Sink bowls and drain boards shall have 1/8" of sound-deadening material underneath, spray-applied.
- K. Rivets, bolts and screws shall not be permitted in any exposed location.
- L. All welding shall be of the heliarc method with welding rod of the same composition as the parts welded. Welds shall be complete, strong, and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds shall be free of mechanical imperfections and shall be continuously welded so that the fixture shall appear as one-piece construction. Butt welds made by spot solder and finished by grinding are not acceptable.
- M. All exposed joints shall be ground flush with adjoining material and finished to harmonize therein. Whenever material has been sunk or depressed by welding operation, such depressions shall be suitably hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots. In all cases, the grain of rough grinding shall be removed by successive fine polishing operations.
- N. All exposed welded joints in stainless steel construction shall be suitably coated with an approved metallic-based paint.
- O. After galvanized steel members have been welded, all welds and areas where galvanizing has been damaged shall have a zinc dust coating applied.
- P. Seams shall be continuous welds flush and ground smooth.
1. Field Joints: Flush welded, ground smooth and polished on the job, solder or rivets not allowed.
 2. Counter Tops: Field joints in stainless steel counter tops and drain boards butt welded with welds ground flush and smooth and polished to match original finish.
 3. Pass windows: Provide a complete all welded seamless counter from inside area to the outside ledge at each pass window location. Mechanical joints, butt joints or lap joints will not be accepted.

2.4 ELECTRICAL REQUIREMENTS

- A. Standard UL listed materials, devices and components shall be selected and installed in accordance with NEMA Standards and recommendations and as required for safe and efficient use and operation of the Food Service Equipment without objectionable noise, vibration, and sanitation problems.
- B. Motors up to and including ½ HP are to be wired for 120-volt, single phase. Fixtures totaling more than 1000 watts are to be wired for 208-volt, single phase. Fixtures having multiple number of heating elements, can be wired for three phase with the load balanced as equally as possible within the fixture.
- C. Heating elements having a connected load of up to and including 1000 watts are to be wired for 120-volt, single phase. Fixtures totaling more than 1000 watts are to be wired for 208-volt, single phase. Fixtures having multiple number of heating elements can be wired for three phase with the load balanced as equally as possible within the fixture.
- D. Equipment where applicable shall be furnished with three-wire cord and plug.

2.5 PLUMBING TRIM, SINKS

- A. All vegetable and pot washing sinks or other 14" deep sinks shall have Fisher Mfg. Co. Model 22209 series (2" drain size) quick opening drain. Fisher Mfg. Co. Model 60100 splash mounted faucet shall be mounted over each partition as shown on the drawings.
- B. All cook sinks, pantry sinks, or other 10" or 12" deep sinks shall have Fisher Mfg. Co. Model 22209 series (2" drain size or as shown on the drawings) quick opening drain. Fisher Mfg Co. Model 57649 faucets mounted as shown on the drawings.
- C. All Fisher Mfg., Co. faucets to be furnished as stainless steel to comply with AD1953 Standards and conform to NSF 61 Standard 9.
- D. Provide gas pressure regulators for installation by the Plumbing Contractor.
- E. Fire Suppression Gas Shut/Off Valve: Gas valve to be furnished by the Foodservice Equipment Contractor and furnished to the Plumbing Contractor for installation. Foodservice Equipment Contractor is to verify with plumbing division for gas line size. Valve to be located in an accessible location and if necessary with access panel.

2.6 HARDWARE

- A. Elevated shelf brackets shall be as shown on the Drawings.
- B. Drawer and door handles shall be as shown on the Drawings.
- C. Hinges for all metal doors shall be Klein Hardware Co. 7870 series, finished in satin chrome.

PART 3 – INSTALLATION

3.1 POSITIONING OF EQUIPMENT

- A. Installation procedure, details and scheduling shall be so arranged that the work of other contractors may progress without unnecessary delay, interference or damage.
- B. The Contractor shall do all fitting, joining, fastening, scribing, caulking and adjusting necessary to install any fixed item of equipment in its designated location; and shall locate and/or store portable, non-fixed items as directed by the Architect and/or Consultant with due regard for the security and protection from damage of the items involved.

3.2 WORKMANSHIP

- A. Commencement of work shall constitute agreement with and acceptance of all conditions as found.
- B. Equipment shall be installed as shown on the plans. Where abutting, curved or irregularly shaped angles or projecting corners of walls occur, equipment shall be made to conform. Where several pieces of equipment are to be assembled in a group, the group shall be complete as whole, with all necessary filler or connecting pieces as may be required to make a complete, sanitary and vermin-proof group.
- C. Welded parts shall be non-porous and free of imperfections. Welds on galvanized metal shall be ground smooth, sandblasted and sprayed with molten zinc or 1200 degrees F to a thickness of .004". Tinning of welds will not be acceptable. Welds of stainless steel shall be ground and polished to the original finish and all grained in the same direction.
- D. All fixtures, unless made of stainless steel, shall be finished in sprayed lacquer in color as chosen by the architect; or if specifically stated, in "plastic laminate"; in pattern and/or color as selected by the Architect.

3.3 POST INSTALLATION PROCEDURES

- A. Prior to being offered for final acceptance, all equipment shall be thoroughly cleaned. This shall include removal of all stains, paint spots, protective wrapping and coatings, tapes, grease, oil, plaster, dust, polishing compounds, etc. and cleaning of floors in food service areas (broom clean) and signed off by the General Contractor with a copy to the Architect and/or Consultant.
- B. After installation at least ten (10) days prior to offering for acceptance, all equipment shall undergo a "Start-up" procedure by a Factory Authorized service dealer. Equipment is to be inspected, tested, calibrated and adjusted for normal operation conditions. If inspection or testing indicated defects, such defects shall be corrected, and the inspection and test repeated to insure a perfect operation of all equipment, prior to final acceptance and for a period ninety day after final acceptance.
- C. Upon completion of the project, the Contractor shall furnish the Owner two (2) sets of dimensional prints, data sheets, spare parts lists and operating manuals for each piece of mechanical equipment; each set shall be neatly bound in a loose-leaf binder, each set shall be complete with and index of equipment and with a complete list of

service contracts with said agencies to perform these services. In addition to this list. The contractor shall submit for review of the Architect and/or Contractor and submittal to the Owner for his files, copies of service contracts with said agencies to perform these services. It shall be the responsibility of this contractor to fill out forward and all warranty forms as required.

- D. This contractor shall arrange demonstrations of the operation and maintenance of all buy-out” equipment by competent instructors. These demonstrations to take place within ten (10) days prior to the acceptance of the kitchen. All instruction periods shall be scheduled with the Architect and/or Consultant fourteen (14) days prior to commencement of same, and at times convenient to the Architect and/or consultant and Owner.

PART 4 – ITEMIZED EQUIPMENT SCHEDULE

4.1 FOOD SERVICE EQUIPMENT LIST AND DESCRIPTION

- A. Fabricated Equipment: Wherever the term “Fabricated Assembly” is used within the list noted below and description of Food Service Equipment, it shall be presumed to be followed by the phrase, “constructed to the configuration, dimension, detail and design as shown on the drawings and specifications and with workmanship and materials as specified above” and shall meet the fabrication detail requirements of the latest edition of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA), and National Sanitation Foundation (NSF Standard 2).
- B. All food service equipment shall be installed per the “Guidelines for Seismic Restraints of Kitchen Equipment” by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- C. All food service equipment shall comply with the standards of The California Code of Regulations, Title 24, Part No. 2.
- D. All food service equipment shall comply with the current California Energy Commission Appliance Efficiency Regulations.
- E. Equipment in the following schedule is listed by Item Numbers shown on Drawings.
- F. Equipment listed is schedule as (OFCl) means Owner Furnished Contractor Installed.

4.2 SCHEDULED ITEMS:

- A. ITEM #1 AIR CURTAIN:
 - 1. Quantity: One (1)
 - 2. Manufacturer: Berner (or equal)
 - 3. Model: SLC07-1036A
 - 4. Status: CFCI
 - 5. Sanitation Series Low Profile Air Curtain, 36"L, unheated, (1) 1/5 hp motor, for doors up to 7' high, specify exterior, interior or exterior mounting, UL, cULus, UL EPH, MADE IN USA
 - 6. Accessories:

- 1 ea. Five year parts warranty (unheated units)
- 1 ea. If special freight fees are requested, (See below) all applicable fees will be added to the invoice; fees subject to change; contact factory for addition information.
- 1 ea. Model A 120v/60/1-ph
- 1 ea. White powder coat exterior finish, standard
- 1 ea. Model 9503SD020-P Automatic Door Switch, plunger type, activates air door when door opens, single phase only & max. amp draw of 20 amps, 120-240V
Model 66ZPR000WMB-AZ-007-WP Z Wall Bracket, adjustable depth, white powder coated finish, priced per each (one pair)

B. ITEM #2 TWO (2) COMPARTMENT SINK:

- 1. Quantity: One (1)
- 2. Manufacturer: Eagle Group (or equal)
- 3. Model: FN2040-2-30-14/3
- 4. Status: CFCI
- 5. Spec-Master® FN Series Sink, two compartment, 104"W x 27"D, 14/304 stainless steel top, coved corners, 20" x 20" x 14" deep compartments, 30" drainboards on left & right, 9-1/2"H backsplash with 1" upturn & tile edge, 8" OC splash mount faucet holes, rolled edges on front & sides, includes 3-1/2" basket drains, stainless steel cross bracing on all sides, stainless steel legs & adjustable bullet feet, NSF
- 6. Accessories:
 - 1 ea. Model E101A Turn down back of splash per table with Z clip
 - 1 ea. Model 300804 Faucet, 14" long, splash-mounted mixing faucet, 8" centers, swing nozzle, NSF
 - 2 ea. Model 336002 Twist Handle Drain, 2" NPS connection

C. ITEM #3 COMBI OVEN, ELECTRIC:

- 1. Quantity: Two (2)
- 2. Manufacturer: RATIONAL (or equal)
- 3. Model: ICP 6-FULL ON 6-FULL E 208/240V 3 PH
- 4. Status: CFCI
- 5. iCombi Pro® 6-Full Size Combi Ovens, double stack, electric, (12) 18" x 26" sheet pan or (24) 12" x 20" steam pan or (12) 2/1 GN pan capacity, (6) stainless steel grids included, intelligent cooking system with (4) assistants; iDensityControl, iCookingSuite, iProductionManager, & iCareSystem, (6) operating modes, (5) cooking methods, (3) manual operating modes, 85° to 572°F temperature range, quick clean, care control, eco mode, 6-point core temperature probe, retractable hand shower, Ethernet interface, Wi-Fi enabled, 208/240v/60/3-ph, 22.4 kW each, CE, IPX5, UL, cULus, NSF, ENERGY STAR-®
- 6. Accessories:
 - 2 ea. Model 60.74.725 Combi-Duo Stacking Kit for iCombi 6-full size (electric or gas) on iCombi 6- or 10-full size (electric only)
 - 2 ea. NOTE: All discounts subject to approval by manufacturer
 - 2 ea. 2 years parts and labor, 5 years steam generator warranty

- 2 ea. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge
- 2 ea. Model 9999.2002 Pre-Installation Site Consultation, provides an installation consultation to ensure the site has proper space and connections for gas, electric, drain & water, one (1) Consultation is needed for every four (4) cooking systems, includes 100 miles (200 miles round trip). (see attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
- 2 ea. Model 9999.2252 RCI RATIONAL Certified Installation, new certified installation for each table-top iCombi of a combi-duo, 100 miles (200 round-trip) included. (See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
- 2 ea. Model 8720.1563US Installation Kit, for electric iCombi/SCC/CMP 62 (208/60/3ph & 240/60/3ph); electric iCombi/SCC/CMP 202 (480/60/3ph) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
- 2 ea. Model 1900.1150US Water Filtration Double Cartridge System, for full-size Combi-Duos or if used for more than (2) units, includes: (1) double head with pressure gauge, (2) R95-CL filter & (1) filter installation kit (for each additional unit add (1) additional head & additional cartridge. Maximum (4) cartridges)
- 2 ea. NOTE: The RATIONAL Water Filtration Systems helps provide consistent high quality water to your RATIONAL cooking systems. The patented carbon block technology reduces the effects of sediment, chloramines and chlorine while providing the required flow rates
- 2 ea. Model 60.31.205 Stand I Stationary Oven Stand for Combi-Duo (MarineLine), 7-3/4"H, open sides, with fixing mount, for iCombi 6-full size on 6-full size
- 2 ea. Model 60.76.316 Sous-Vide Core Temperature Probe, USB connection, for 6, 10, and 20 Full and Half size models
- 2 ea. Model 60.75.769 Heat Shield, for left side panel, type 6-full size Pro/Classic
- 1 ea. Model 60.75.768 Heat Shield, for right side panel, type 6-full size Pro/Classic

D. ITEM #4 GRIDDLE, ELECTRIC, COUNTERTOP:

- 1. Quantity: One (1)
- 2. Manufacturer: AccuTemp (or equal)
- 3. Model: EGF2083A2450-S2
- 4. Status: CFCI
- 5. Griddle, includes stand with seismic flanged feet, electric, 24" x 30" griddle area, 7 ga. 304 stainless steel cooking surface, digital thermostat & controls, 4" grease trough, 14 ga. stainless steel cabinet, 208v/60/3-ph, 9.6kW, 27 amps, cord with NEMA 15-50P, cULus, UL EPH, ENERGY STAR™, Made in USA
- 6. Accessories
 - 1 ea. 1 year parts & labor warranty, standard
 - 1 ea. Lifetime service and support guarantee

E. ITEM #5 INDUCTION RANGE, COUNTERTOP W/ STAND:

1. Quantity: One (1)
2. Manufacturer: CookTek (Middleby) (or equal)
3. Model: 620701
4. Status: CFCI
5. Induction Range, countertop, double hob (front to back), glass-ceramic top, sloped front, independent controls, built-in cooking timer, microprocessor with (100) power cook settings & auto shut-off, self-diagnostics, automatic pan detection, LCD display, integral cooling fan & grease filter, stainless steel exterior, 200-240v/50/60/1-ph, 7000 watts, 30.0 amps, 6 ft. cord, cETLus, NSF, CE, Made in USA
6. Accessories:
 - 1 ea. Two year limited parts and labor warranty in US/Canada only and 7 year enrollment in the CookTek Advanced Replacement Program (ARP)
 - 1 ea. Destination - US United States or Canada, NEMA 6-50P
7. EQUIPMENT STAND
 - a. Fabricated Assembly in length and configuration as shown on the drawings and shall include the following:
 - i. Work area top to be 14-gauge stainless steel with a 14-gauge stainless steel backsplash 2" thick with a 45-degree to top with enclosed back splash. Top to be constructed with 2" turn down on front and sides.
 - ii. Provide 1 5/8" dia. S/S tube legs with Component Hardware Group, Inc. A10-0851 adjustable foot insert.
 - iii. Contractor to provide seismic flanged feet.

F. ITEM #6 EXHAUST HOOD, TYPE 1:

1. Quantity: One (1)
2. Manufacturer: STREIVOR AIR SYSTEMS (or equal)
3. Model: WCBD 1656322.5
4. Status: CFCI
5. Model: WCBD 165 63 22.5
6. Maximum Appliance Type : 450F / Medium Duty
7. CKV Hood UL Listed 710 Hood Exhaust : 2888 CFM @ 0.63
8. (WC) SP
9. Commercial Kitchen Ventilation Specification: See plans for location and placement of item with reference to adjoining equipment. Furnish and install per Manufacturer's standard specifications and the following:
 - a. Install in the location as shown on drawings. It is the responsibility of the Installer to verify all clearances and stand offs from the hood to limited combustibles and/or combustible materials. Hood must be installed in accordance with the Manufacturer's specifications. Canopy Hoods to be installed a minimum of 78 inches above the

finished floor and level. ADA requires 80 inches minimum above the finished floor.

- b. The Hood assembly to be size and shape per the drawings. Hood to be U.L. listed #710, NSF listed and built in compliance with the prevailing NFPA Standard #96. The hood ends shall be fabricated from 16 gauge stainless steel or heavier and have a Performedge shape at the lower most part of the end. The remainder of the hood will be fabricated of material not less than 18 gauge. All exposed surfaces to be fabricated from Type 304 stainless steel with a #4 finish. All exposed welds to be ground smooth and polished to a #4 finish. Exhaust airflow volume and static pressure at the duct collar(s) shall not exceed those shown on the drawings.
 - c. Stainless steel matching enclosure panels from the top of the Hood to the finished ceiling to be furnished by KEC. (Verify ceiling height with plan.)
 - d. All electrical connections, materials and labor to connect high and low voltage electrical to the hood lights, temperature monitors, electrical components and/or the Fire Suppression System including micro-switch(es) by other. See fire suppression system for additional detail.
 - e. Hood Manufacturer to provide engineering and shop drawings for approval prior to fabrication.
 - f. Exhaust and Supply Fans to be furnished by Mechanical Division in compliance with local and National Codes. See Hood Manufacturer's specification sheets for CFM and static pressure requirements.
 - g. Duct connections by Mechanical. An air balance test should be performed before cooking start up to insure correct exhaust and supply airflow rates.
 - h. Hood must be manufactured UL 710 Listed, NFPA 96 compliant and installed in accordance with all prevailing codes and standards.
 - i. 3" Stand Off
10. Back: The hood assembly to be per the size and shape shown on the drawing. A 3" stand off (enclosed on all sides) to be included on the entire back outer perimeter of the hood. Stand off to be fabricated from 18 gauge stainless steel of the same material and with the same finish as the hood. All exposed corners with welded and polished to a #4 finish.
11. Extractor: FLSS Hood to be fitted with stainless steel baffle filters. Filters to be UL1046 Listed, NSF approved. The filters will be easily removable for cleaning.
12. Exposed Canopy Material: 304 Stainless Steel Type 304 Stainless Steel (SS) is in the "Austenitic group of SS" comprising approximately 18% chromium and 8% nickel. Type 304's resistance to corrosive acids makes it ideal for hoods, sinks and tabletops. Type 304 SS is comprised of no more than 0.8%

carbon and at least 50% iron. The chromium binds oxygen to the surface of the product to protect the iron from oxidation (rust).

Nickel also enhances the corrosion resistance of stainless steel. Therefore, the higher the nickel content, the more resistant the stainless steel is to corrosion. Type 304 SS is non-magnetic.

13. Non-Exposed Exhaust Plenum Material: 304 Stainless Steel Type 304 Stainless Steel (SS) is in the “Austenitic group of SS” comprising approximately 18% chromium and 8% nickel. Type 304’s resistance to corrosive acids makes it ideal for hoods, sinks and tabletops. Type 304 SS is comprised of no more than 0.8% carbon and at least 50% iron. The chromium binds oxygen to the surface of the product to protect the iron from oxidation (rust).
Nickel also enhances the corrosion resistance of stainless steel. Therefore, the higher the nickel content, the more resistant the stainless steel is to corrosion. Type 304 SS is non-magnetic.
14. Containment Panels:
 - a. Light Duty Left: Hood to be fitted with Light Duty containment panel on the left of the hood (size and shape per the drawings).
Containment panel to be fabricated from 18 gauge stainless steel of the same material and with the same finish as the hood. Containment Panel to include a continuous double hemmed edge on the front and bottom exposed edges. Containment Panel to be easily attached or detached to the side of the hood by means of stainless steel fasteners that screw into recessed non corrosive rib-nuts installed in the side of the hood that do not protrude through the side of the hood. All welds to be ground smooth and polished to a #4 finish.
 - b. Light Duty Right: Hood to be fitted with Light Duty containment panel on the right of the hood (size and shape per the drawings).
Containment panel to be fabricated from 18 gauge stainless steel of the same material and with the same finish as the hood. Containment Panel to include a continuous double hemmed edge on the front and bottom exposed edges. Containment Panel to be easily attached or detached to the side of the hood by means of stainless steel fasteners that screw into recessed non corrosive rib-nuts installed in the side of the hood that do not protrude through the side of the hood. All welds to be ground smooth and polished to a #4 finish.
15. Light Fixture:
 - a. Surface Mounted Warm LED: Hood to be fitted with UL & NSF Listed Surface Mounted Commercial Kitchen Hood light fixtures. Light fixture to have brushed aluminum housing, tempered glass, shatter resistant globe. Light fixture(s) to be prewired to a single connection point for each hood. To be fitted with LED lamp.
16. Lamps:
 - a. Surface Mounted Warm LED: LED lamp, 120vac, UL Listed for exhaust canopy hoods, 12 Watt, 960 Lumens, 4500K to 5500K,

maximum operating temperature 80 degrees C (176°F). 120 degree Beam angle, rated for 50,000 hour lamp life, mercury-free, instant (no ballast), exceeds Federal Energy Act requirement, no ultraviolet light emission. Fits any A19/E26/E27 fixture (globe must be installed to comply with UL listing).

17. Auto Fan Start: An Auto Fan Start is required for NFPA 96 Section 8.2.3.3. Auto Fan Switches may be located in each hood exhaust collar or the hood canopy. Auto Fan Switches in the canopy have a maximum spacing of 84".
18. Access Enclosure Hood Exhaust Collar Mounted: Hood Exhaust Collar to be fitted with UL 710 listed Access Enclosure(s) size and shape per the drawing with a removable cover plate that protects and allows access to monitoring equipment from inside of the hood exhaust plenum. The removable cover to be held in place by stainless steel fasteners. When the Enclosure's cover is removed it allows easy access for installation, adjustments and service to the equipment inside the hood exhaust collar. Access Enclosures to be fabricated from 18 gauge stainless steel of the same material and with the same finish as the hood. All welds to be ground smooth and polished to a #4 finish.
19. Hood Utility Cabinet: Hood Utility Cabinet (HUC) assembly to be per size and shape shown on the drawing. Cabinet constructed with angle iron frame and stainless steel body. All exposed surfaces to be fabricated of 18 gauge Type 304 stainless steel (s/s) with a #4 finish. All exposed welds to be ground smooth and polished to a #4 finish. Cabinet has an open top to enable utility connections from above ceiling and a stainless steel lift out removable door panel. The removable door panel to have a recessed s/s door pull, full grip type. The removable door panel to be held in place by a full length upper and lower channel.
20. Ceiling Enclosure: Stainless steel matching enclosure panels from the top of the Hood to the finished ceiling. (Verify ceiling height with plan.) Ceiling Enclosure panels to be fabricated of 18 gauge stainless steel (material type and finish to be the same as the hood). Any exposed welds to be ground smooth and polished to a #4 finish.
21. Double Wall Construction: Double Wall Panel(s) to be fabricated from 18 gauge stainless steel of the same material and with the same finish as the hood. Panel(s) contain a UL listed fiber insulation that is 1" thick. Panel dimensions and locations to be per size and shape shown on the drawing. Double Wall Panels to be welded to the hood by hood manufacturer.
22. Model: DemandAire Bronze Non-Variable Speed Control System
Item # 6Z
Hoods Controlled: #6
UL Listed 508A
 - a. See plans for location and placement of item with reference to adjoining equipment. See schematics for utility connection and operation. Furnish and install per Manufacturer's standard specifications and the following:

- i. Install in the location as shown on drawings. It is the responsibility of the Installer to verify all clearances.
- ii. Non-Variable Speed Control Systems are to be UL 508A listed and include automatic controls necessary to respond to cooking appliance operation as necessary to maintain full capture and containment of smoke, effluent and combustion products during cooking and idle.
- iii. Systems shall include failsafe controls that result in full fan flow upon a cooking sensor failure.
- iv. Systems shall include Ambient Temperature Monitoring (ATM) to monitor the temperature of the air in the kitchen space surrounding the hood system.
- v. Systems shall include Duct Temperature Monitoring controls that monitor the totality of cooking appliances below each hood. Temperature monitors are to be installed in the hood exhaust collar(s) to measure the hood exhaust air temperature.
- vi. Systems shall include UL 710 Listed access enclosure(s) that allow access to the temperature monitors from below the hood for installation and commissioning. Systems that include temperature monitors or other electrical components which are not accessible from below the hood(s) via UL 710 listed access enclosure(s) are not acceptable.
- vii. Systems shall compare hood temperatures to the ambient temperature of the kitchen space to determine the state of cooking appliances. Power supplied to the exhaust and/or supply fan(s) shall be provided based on cooking appliance demand using differential controls and an algorithm to optimize energy savings.
- viii. Systems shall include fan and lighting controls, diagnostic tools, system settings, and alarm notifications to be provided by means of a Human Machine Interface (HMI) with monochrome touch screen. The HMI is door mounted to a Type I UL Listed stainless steel enclosure which may be recessed into a wall, surfaced mounted on a wall, or flush mounted on the front of a hood utility cabinet.
- ix. Systems shall include a Programmable Logic Controller (PLC), 24 VDC power supply, relays, terminal blocks, color-coded wiring, housed in Type I UL Listed stainless steel enclosures which may be hood mounted in a utility cabinet or be wall mounted, surface or recessed.
- x. The HMI shall include manual controls including a 100% exhaust power switch and hood on/off light switch. The HMI shall include diagnostic tools and display screen for hood and

- ambient temperature status, fan motor status and control history, and audible/visual alarm notification.
- xi. The HMI shall include password protected settings for temperature monitor set points, fan off-delay time, alarm triggers and fire suppression system settings.
 - xii. Systems shall provide start/stop control signals to Motor Starters or BMS (not provided by the manufacturer unless specifically included herein) to control the exhaust and supply fans at non-variable speed based on cooking conditions below each hood based on inputs from hood and ambient temperature monitors, manual controls from the HMI, and fire suppression system actuation.
 - xiii. Systems Do Not Include Motor Starters consisting of Contactors and Overloads.
 - xiv. Hood and ambient temperature monitors shall be stainless steel Platinum 100 3-Wire Resistance Temperature Detectors (RTD).
 - xv. Systems shall be engineered with connections for shunting electrical equipment below the hood, shunting electric gas valves, shunting SmartAire Internal Hood Fans (IHF), shunting makeup air, operating exhaust fans at full capacity and signaling building alarm system during a fire suppression system actuation.
 - xvi. Systems shall have an integrated electric gas valve reset relay that is accessed via the HMI and requires manual reset of the power to the electric gas valve(s) after the fire suppression system has been rearmed following a fire suppression system actuation or loss of power.
 - xvii. Systems shall be capable of providing real time system status such as hood and ambient temperature data, system faults, fan power operating status and other information via Modbus TCP communication.
 - xviii. Manufacturer will provide control schematics, installation and operation manuals, and sequence of operation documents.
 - xix. Manufacturer will provide pre-installation phone consultation to answer questions regarding the system.
 - xx. Manufacturer may provide on-site commissioning support during startup of the hood system(s). See contract for on-site duration allocated for commissioning if applicable.
 - xxi. (Manufacturer will not provide) control panel supply power (120VAC, 20 amps), electric gas valve supply power (120VAC, 20 amps), high voltage motor supply power, Motor

Starter(s), or field wiring between control panel and RTD temperature monitors, fire suppression system microswitches, HMI, shunt trip breakers, BMS, exhaust and supply fan Motor Starters, exhaust and supply fan motors, electrical gas valve(s), and hood lights, unless specifically noted herein or any other unspecified materials or labor.

- xxii. The above exclusions, including labor and materials, to be provided by qualified contractor at no expense to Manufacturer.

G. ITEM #6.1 FIRE SYSTEM CABINET:

1. Quantity: One (1)
2. Manufacturer: STREIVOR AIR SYSTEMS (or equal)
3. Model: LT-30-R
4. Status: CFCI
5. Fire Protection System
6. Ansul R102 Fire Suppression System - Turn Key Fire System
7. Hood # (6) Ansul R102 UL 300 Listed Restaurant Fire Suppression System. Includes Fire System Drawing, Control Actuator, Cylinder(s) and Chemical Suppressant, Chemical and Detection lines pre-piped at the factory, 1ea manual pull station, appliance, duct and plenum nozzles. Installation, Start Up and System Test to be performed by a certified professional of Streivor's choosing.
8. NOT INCLUDED - Connection to Pollution Control Unit(s), Project Labor Agreements (PLA), NICET Certification.
9. NOT INCLUDED - Fire Suppression Pre-Test. If required, a site visit for each Fire Suppression Pre-Test must also be purchased.
10. NOT INCLUDED - Fire Permit, Additional Signage, Electric Gas Shutoff Valve, Reset Relay, Union installation rates, OCIP, Simultaneous activation of multiple systems, Y-Strainer.
11. FSS Drawing & Engineering - Included Fire Suppression System engineering, drawings, and applicable permits.
12. Prevailing Wage Install - Included (PLA Not Included) Includes prevailing wages for installation of Fire Suppression System.
13. K Class Fire Extinguisher - Ansul R102 Class K "Kitchen Use" wall mounted 6 Liter wet chemical Fire Extinguisher.
14. NOT INCLUDED - Streivor is not responsible for any Fire Suppression System electrical wiring or final wiring connections. Streivor is not responsible for any gas shut-off valve or water plumbing required for a fire suppression system. Y Strainer installation required by gas shut-off valve manufacturer to protect fire system gas shut-off valve.

H. ITEM #7 HAND SINK (ADA):

1. Quantity: One (1)
2. Manufacturer: Eagle Group (or equal)
3. Model: HSAP-14-ADA-FW
4. Status: CFCI
5. Hand Sink, wall mount, 14" wide x 16" front-to-back x 5" deep bowl, 16/304 stainless steel construction, splash mount gooseneck faucet with wrist handles & mixer valve, marine edge on front & sides, 1/2" NPS water inlet,

- chrome-plated P-trap, wrist handles, soap dispenser, basket drain, skirt assembly & paper towel dispenser, PHYSICALLY CHALLENGED, NSF
6. Accessories:
1 ea. Model 313305 T&S Extra Heavy Duty Gooseneck Faucet, wrist handles, splash mount 4" OC, NSF
1 ea. Model -LRS Left & right side splashes

I. ITEM #8 SERVING COUNTER:

1. Quantity: One (1)
2. Manufacturer: CUSTOM
3. Model: FABRICATED ITEM
4. Status: CFCI
5. Manufacturer: American Stainless-Steel Corp. (or equal)
6. Model: Fabricated Item
7. Status: CFCI
8. Fabricated assembly in length and configuration as shown on the drawings and shall include the following:
 - a. Base section to be 16-gauge stainless steel formed metal construction complete with 16-gauge stainless steel bottom and mid shelves. Work top to be 14-gauge stainless steel with a 14-gauge stainless steel backsplash 1" thick to wall, turn down ½" to "Z-clips" at where counter meets wall.
 - b. Top to be constructed with square edge 2" turn down at edge with 1" return on all sides.
 - c. Top to be continuous through window with no joints or seams and verify edge is free of sharp edges or burrs.
 - d. Provide adjustable seismic flanged feet. Refer to drawings for configuration and quantity.
 - e. Provide 16-gauge stainless steel undershelf as shown.
 - f. Contractor to verify clearances for roll down door tracks at splash where applicable.
 - g. Provide adjustable seismic flanged feet. Refer to drawings for configuration and quantity.

J. ITEM #9 SNEEZE GUARD, STATIONARY:

1. Quantity: One (1)
2. Manufacturer: Premier Metal & Glass (or equal)
3. Model: FM2N-A
4. Status: CFCI
5. 1" OD FRONT MOUNT GEARLESS ADJUSTABLE FOOD SHIELD WITH TOP SHELF AND REAR SUPPORTS; 3/8" CLEAR TEMPERED GLASS WITH POLISHED EDGES AND RADIUS CORNERS; REVERSIBLE END PANELS INCLUDED; ULTRASLIM LED LIGHTS WITH EXTERNAL DRIVER; SURFACE MOUNTING OPTION; BRUSHED STAINLESS FINISH; 174" CL LENGTH
 - a. General Specification for PMG Gearless Adjustable Food Shield
 - b. Entire unit to be fully welded and comprised of #304 stainless steel.
 - c. Adjustability to be accomplished without the use of tools.

- d. Gearless rotation mechanism to allow for full 360 degree rotation with no set stopping points, allowing infinite self-serve positions, along with full-serve compliance.
- e. Custom length stainless slide rod to allow front glass panel adjustability in vertical, horizontal and diagonal planes.
- f. Glass panels shall be tempered to adhere to ANZI Z97.1 standard.
- g. Glass panels to have polished edges and 1/4" radius corners.
- h. Glass to metal connections shall be buffered to ensure no metal to glass contact.

K. ITEM #10 HOT FOOD WELL UNIT, DROP-IN, ELECTRIC:

1. Quantity: One (1)
2. Manufacturer: Duke Manufacturing (or equal)
3. Model: WWG4
4. Status: CFCI
5. Waterless Hot Food Well Drop-In Unit, ganged, electric, dry operation, with (4) 12" x 20" hot food well, 60-1/4"W x 24-1/4"D x 12-3/4"H, stainless steel well, removable FDA approved silicone rubber liner, fully insulated galvanized exterior housing, touch screen control panel, without drain, 6' cord & plug, UL, cULus
 - a. Accessories:
1 ea. Model WWG-4-208 208v/60/1-ph, 9.6 amps, NEMA 6-20

L. ITEM #10.1 SNEEZE GUARD, STATIONARY:

1. Quantity: One (1)
2. Manufacturer: Premier Metal & Glass
3. Model: FM2N-A
4. Status: CFCI
5. 1" OD FRONT MOUNT GEARLESS ADJUSTABLE FOOD SHIELD WITH TOP SHELF AND REAR SUPPORTS; 3/8" CLEAR TEMPERED GLASS WITH POLISHED EDGES AND RADIUS CORNERS; REVERSIBLE END PANELS INCLUDED; ULTRASLIM LED LIGHTS WITH EXTERNAL DRIVER; SURFACE MOUNTING OPTION; BRUSHED STAINLESS FINISH; 174" CL LENGTH
6. General Specification for PMG Gearless Adjustable Food Shield
 - a. Entire unit to be fully welded and comprised of #304 stainless steel.
 - b. Adjustability to be accomplished without the use of tools.
 - c. Gearless rotation mechanism to allow for full 360 degree rotation with no set stopping points, allowing infinite self-serve positions, along with full-serve compliance.
 - d. Custom length stainless slide rod to allow front glass panel adjustability in vertical, horizontal and diagonal planes.
 - e. Glass panels shall be tempered to adhere to ANZI Z97.1 standard.
 - f. Glass panels to have polished edges and 1/4" radius corners.
 - g. Glass to metal connections shall be buffered to ensure no metal to glass contact.

M. ITEM #11 WIRE SHELVING:

1. Quantity Three (3)
2. Manufacturer: Metro (or equal)
3. Model: A2454NC
4. Status: CFCI
5. Super Adjustable Super Erecta® Shelf, wire, 54"W x 24"D, chrome plated finish, corner release system, NSF Shelving to be 4-tier units with the bottom shelf at a minimum of 12" above finished floor. Provide post clamps to adjacent shelving unit two at front and two at back. Provide wall mounting angle brackets at top of shelving as shown. Provide "S" hooks where shelving comes together at 90 degrees delete inside post all locations inside corners.
6. Accessories:
 - 12 ea 62P - 62-1/2"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8" chrome finish (4 shelves for every qty on schedule)
 - 12 ea. 9995Z- Super Erecta® "S"Hook, zinc
 - 12 ea. 9994Z- Super Erecta® Post Clamp, zinc
 - 12 ea. SAFP-2 Seismic Threaded Foot Plate Kit, (4) foot plates each with a single anchor hole. Zinc plated finish, for use with staked 1" Round Posts

N. ITEM #12 WIRE SHELVING:

1. Quantity: One (1)
2. Manufacturer: Metro (or equal)
3. Model: A2460NC
4. Status: CFCI
5. Super Adjustable Super Erecta® Shelf, wire, 60"W x 24"D, chrome plated finish, corner release system, NSF Shelving to be 4-tier units with the bottom shelf at a minimum of 12" above finished floor. Provide post clamps to adjacent shelving unit two at front and two at back. Provide wall mounting angle brackets at top of shelving as shown. Provide "S" hooks where shelving comes together at 90 degrees delete inside post all locations inside corners.
6. Accessories:
 - 4 ea. 62P - 62-1/2"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8" chrome finish (4 shelves for every qty on schedule)
 - 4 ea. 9995Z- Super Erecta® "S"Hook, zinc
 - 4 ea. 9994Z- Super Erecta® Post Clamp, zinc
 - 4 ea. SAFP-2 Seismic Threaded Foot Plate Kit, (4) foot plates each with a single anchor hole. Zinc plated finish, for use with staked 1" Round Posts

O. ITEM #13 WALL CABINET:

1. Quantity: One (1)
2. Manufacturer: Advance Tabco (or equal)
3. Model: WCH-15-36
4. Status: CFCI

5. Cabinet, wall mount, enclosed design with (2) hinged doors, 36"W x 15"D, with single intermediate shelf, 18/430 stainless steel construction, NSF
6. Accessories:
 - 1 ea. Model TA-13 Padlock compatible lock for drawers & hinged doors (fits padlocks with up to 3/8" diameter lock shaft) (does not fit sliding doors) (padlock not included)
 - 1 ea. Model TA-46 Door lock, one required for each hinge door or for each set of sliding doors

P. ITEM #14 MOP HOLDER:

1. Quantity: One (1)
2. Manufacturer: Advance Tabco (or equal)
3. Model: K-242
4. Status: CFCI
5. Model K-242 Mop Hanger, 23", accommodates (3)

Q. ITEM #15 MOP DRIP TRAY:

1. Quantity: One (1)
2. Manufacturer: Advance Tabco (or equal)
3. Model: K-243
4. Status: CFCI
5. Model K-243 Mop Drainage Tray, stainless steel

R. ITEM #16 RACK, PAN:

1. Quantity: Four (4)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed.

S. ITEM #17 MILK COOLER:

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed. Contractor to verify utility requirements and locations with owner furnished equipment.

T. ITEM #18 CABINET, MOBILE, WARMING AND HOLDING:

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed. Contractor to verify utility requirements and locations with owner furnished equipment.

U. ITEM #19 CABINET, MOBILE, WARMING AND HOLDING:

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed. Contractor to verify utility requirements and locations with owner furnished equipment.

V. ITEM #20 MOBILE WORKTABLE 24"X 72":

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed.

W. ITEM #21 WORKTABLE 24"X 72":

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed.

X. ITEM #22 REACH-IN FREEZER:

1. Quantity: One (1)
2. Manufacturer:
3. Model:
4. Status: OFCI
5. This item is owner furnished contractor installed. Contractor to verify utility requirements and locations with owner furnished equipment.

Y. ITEM #23 REMOTE REFRIGERATION:

1. Quantity: One (1)
2. Manufacturer: COOL TEC
3. Model: PP-1
4. Status: CFCI
5. Remote refrigeration systems as manufactured by Cooltec Refrigeration Corp Custom Multi-Circuited refrigeration package shall be furnished as complete refrigeration systems to service walk-in refrigerator Item No. 4 Contractor shall furnish and install, where shown on plans, U.L." Air-cooled Remote Refrigeration Package as shown on drawings. Refrigeration system shall be housed in a weather protected enclosure. The frame, enclosure, and panels shall be fabricated of galvanized steel. Entire frame shall be pre-assembled, welded, cleaned, and painted with a prime coat of zinc chromate then finished with a coat of baked enamel epoxy-based paint. The condenser shall be sectional, removable multi-circuited with rifled tube slotted finned and shall be designed for 20°F TD. Condenser fan motors shall be mounted on the top of the enclosure.

6. REFRIGERATION UNITS

- a. Air-cooled condensing units shall be hermetic/glacier scroll type (Copeland). Each unit shall be equipped with high-low pressure control, liquid drier, sight glass & head pressure control, time clocks and pump down solenoids.
- b. All compressor units shall be new factory assembled to operate with the refrigerant specified in the engineering summary sheet. Refrigerant R-404a shall be used on all commercial temperature units and low temperature units.

7. PRE-PIPING

- a. All refrigerant lines shall be extended to right side of the package in a neat and orderly manner. Suction lines must be insulated with Armaflex (1" thick for low temp, 3/4" thick for medium temp).
- b. All tubing shall be securely supported and anchored with clamps.
- c. Silver solder and/or sil-fos shall be used for all refrigerant piping. Soft solder is not acceptable.
- d. All piping to be pressure tested with nitrogen at 300 PSI. After the condensing unit and coil have been connected, the balance of the system shall be leak tested with all valves open.

8. CONTROL PANEL

- a. The package shall have factory mounted and pre-wired control panel complete with main disconnect breaker switch, compressor circuit breakers, fuses, contactors and time clocks wired for single point connection.
- b. Electrical contractor shall provide and install main power lines to panel and provide wire harness wiring for control and defrost heater between and the defrost clock and the refrigerant fixtures, all in accordance with the wiring diagram and local codes.

9. SAFETY CAUTION

- a. Each system and evaporator are shipped under nitrogen pressure. Always Use caution and exercise safety when preparing for final hook-up.

10. EVAPORATOR COIL

- a. Evaporator coils shall be direct expansion type fabricated of copper tubes with aluminum fins. All evaporator coils shall be provided with solenoid valve, thermostatic expansion valve, and electronic thermostat, piped and wired to the junction box for positive pump down.

- b. Evaporative coils shall be equipped with energy saving "EC" motors.

11. CONSTRUCTION NOTES FOR TRADES

a. CONTRACTOR

- i. Contractors shall verify all dimensions and coordinate with other trades.
- ii. Contractor shall prepare and weatherproof the platform and curbed openings for refrigeration piping and electrical conduit.
- iii. Contractor to provide underground trenching including all backfill for conduits.

b. REFRIGERATION CONTRACTOR

- i. Contractor shall use only clean dehydrated, sealed refrigeration grade A.C.R. copper tubing. Use only long radius elbows to reduce flow resistance and line breakage. Do not use 45-degree elbows at all.
- ii. Silver solder and/or sil-fos shall be used on all refrigerant piping. Soft solder is not acceptable. Use minimum 35% silver solder for dissimilar metals.
- iii. All piping must be supported with hangers that can withstand the combined weight of tubing, insulation, valves, and fluid in the tubing.
- iv. Use dry hydrogen in the copper tubing during brazing to prevent formation of copper oxides. Liquid and suction lines must be free to expand independently of each other. Do not exceed 100 feet without a change in direction or an offset. Plan proper pitching, expansion allowance, and p-Traps at the base of all suction's risers and at every 15 feet of every vertical rise. Install service valves at several locations for ease of maintenance. These valves must be approved for 450 PSI working pressure.
- v. All piping to be pressure tested with nitrogen at 300 PSI with all valves open and held for 12 hours. Electronic leak detectors shall be used to locate all leaks.
- vi. Complete system shall be evacuated to 500 microns with vacuum pump before charging the system.
- vii. Once system is charged and running, adjust all controls including pressure controls, expansion valves, thermostats, and time clocks. Return after 24 hours to verify proper operation of systems.

- viii. Refrigeration contractor to provide and install drain line heater with insulation in freezer to be connected by the electrical contractor. Refrigerant suction lines outside of refrigerated compartments, not run in conduit, shall be insulated back to compressor with Armstrong Arma-Flex AP-25/50 foamed plastic insulation or equal in accord with direction of the manufacturer. Minimum thickness shall be $\frac{3}{4}$ " inch for commercial temperature and 1" inch for low temperature. Seal all joints with Armstrong 520 adhesive, or equal. Insulation exposed to the weather shall be finished with two coats of Armstrong white Armaflex finish, or equal. Apply insulation in strict accordance with manufacturer's recommendations.
- ix. Contractor shall verify line lengths with job site conditions and line routing at individual installations. A maximum of up to 100 equivalent feet of liquid and suction lines. If over 100 feet contact manufacturer for resizing of line sizes and/or compressor as required by manufacturer.

c. ELECTRICAL CONTRACTOR

- i. Electrical contractor provide power for refrigeration package and connect control and defrost system as called for in the wiring diagram.
- ii. Electrical contractor to provide 5-wire color-coded service from the time clock at the refrigeration package to blower coil in fixture for automatic defrost.
- iii. Electrical contractor to connect drain-line heater in freezer.
- iv. All electrical wiring and installation shall be in accordance with the wiring diagram and local codes.

d. PLUMBING CONTRACTOR

- i. Plumbing contractor to provide type "M" copper drain lines for walk-in refrigerator and freezer, pitched $\frac{1}{2}$ " per foot of run. In freezer, heated drain line must be insulated to prevent freezing. Trap drain lines outside of refrigerated space to avoid entrance of warm and moist air.
- ii. Plumbing contractor to provide individual drain line for each evaporator unless otherwise called for in the plans.
- iii. All plumbing installation shall be in accordance with local codes.
 - 1) Factory personnel shall install this assembly with written certification provided by the manufacture to the Architect and Consultant.

- 2) Condensing units shall be air cooled semi-hermetic compressors.
- 3) Unit evaporators shall be sized and furnished as part of this item.
- 4) The system shall be provided with a weather cover and mounting channel unit and shall be completely treated with a rust preventative and two coats of baked enamel paint in color as selected by the Architect and where required shall be removable.
- 5) The condensing units shall be factory installed and factory wired to a common load center panel for one-point field electrical connection. All wiring from the condensing units to the load center shall be through an electrical raceway.
- 6) The load center control panel shall be U.L listed and N.E.C approved and weatherproof with individual breakers for each condensing unit and time clocks. All contractors, time clocks, relays, automatic starting switches and any necessary electrical components shall be installed with the load center panel.
- 7) All condensing units shall be manufactured by Copeland.
- 8) The system shall incorporate the following items:
 - a) Flexible vibration eliminator in the suction line.
 - b) Liquid line sight glass.
 - c) Liquid line dehydrator filter of ample capacity.
 - d) Suction line filter of ample capacity.
 - e) Thermal expansion valve for evaporator.
 - f) Heat exchanger for evaporator.
 - g) Refrigeration lines, hard copper Type "L" with "Silfos" brazed joints.
 - h) Defrost timers and interlock relays as required.
 - i) Winter control package.
- 9) Circuit breakers, automatic starting switch, motor protectors and pressure limit switches, all enclosed with interconnecting wire installed in a control panel ready for final connection by the Electrical Contractor.
- 10) Drain line heaters with insulated covers for all drain lines from unit evaporators to nearest indirect waste (floor sink).
- 11) Start-up, adjustment, and one-year parts and labor warranty. Five-year warranty on motor compressors.

e. REFRIGERATION PIPING:

- i. Copper tubing shall conform to ASTM B88, piping shall be type 'L' ARC, refrigerant piping shall be exposed to view as required by the American Standard Safety Code for Mechanical Refrigeration.
- ii. Suction lines shall be sized to give a minimum pressure drop from evaporator to machine of 2 lbs. For high temperature systems and 1 lbs. for low temperature systems and shall allow gas velocities of not less than 750 FPM in horizontal runs and 1500 FPM in vertical risers. Liquid lines shall be sized to give maximum pressure drop of 3 lbs. from receiver to evaporator.
- iii. Tubing shall be graded to prevent trapping of oil.
- iv. Refrigerant piping shall be properly secured with 'Uni-Strut' clamps located to conform to proper refrigerant piping practice.
- v. Insulation of refrigerant lines.
- vi. Refrigerant suction lines outside of refrigerated compartments, not run in conduit shall be insulated with Armstrong FR/ARMAFLEX22. Minimum thickness of $\frac{1}{2}$ " for medium temperatures and $\frac{3}{4}$ " for low temperature units Slitting of insulation shall not be permitted. Seal all joints with Armstrong 520 adhesive, or equal. Insulation exposed to the weather shall be finished with two coats of Armstrong white Armaflex finish, or equal. Apply insulation in strict accordance with manufacturer's recommendations.

f. TESTING and DEHYDRATING:

- i. Pressurized systems with nitrogen to 300 PSI, test for leaks, and after with each system shall be subjected to a vacuum to 100 microns for a period of 24 hours.

g. CHARGING SYTEM:

- i. Provide refrigerant and oil, charge all systems and run an operational check for three (3) days duration.
- ii. Work by other trades: Final wiring of connections, inter wiring of time clocks and defrost relays, drain tubing from unit evaporators to nearest indirect drain, building sleeves, penetrations, conduit and/ or pull boxes provided under applicable General, Plumbing and or Electrical Sections.
- iii. Unit evaporators and condensing units as shown on the drawings and as specified are intended as a guide only and

shall be verified and installed under the supervising of a competent refrigeration engineer.

- iv. Provide a metal backed baked (black and white) enamel wiring diagram for the system mounted on the outside panel of the unit evaporator and condensing unit.
- v. Provide shop drawings and brochures for review, showing exact overall dimensions and weights, utility requirements, all accessories and piping diagrams, all conforming to all applicable codes and regulations.
- h. PIPE COVER:
 - i. Please note that the location of the condensing units are to be outside and are to be complete with "winter controls and covers". The location of these condensing units will not exceed a distance of more than 200 feet from the walk-in. Actual location to be verified with Architect or General Contractor. This unit to comply with all codes and standards of NSF, UL, ICI30, Class I material. Factory Mutual Insurance System. Provide and extended warranty of all refrigeration systems. Installer to furnish a complete operational system including crane if necessary, to complete installation.

Z. ITEM #24 WALK-IN REFRIGERATOR:

- 1. Quantity: One (1)
- 2. Manufacturer: RMI (or equal)
- 3. Model: FABRICATED ITEM
- 4. Status: CFCI
- 5. Assembly shall consist of one (1) Refrigerator compartment; see drawings for size and configuration. Assembly to form the configuration as shown on the drawings. Assembly shall be furnished as herein specified. And as prepared by RMI or equivalent.
 - a. Assemblies shall be N.S.F (Standard 7) approved and formed in the configuration as shown on the contract drawings. Assemblies shall meet California Code of Regulations Title 20 Sections 11601 through 1608 dated July 2006 Appliance Efficiency Regulations.
 - b. Panel Construction: Shall consist of exterior and interior die-formed metal panels formed to ensure proper size. Section edges must have lineup pines and double row of closed-cell gaskets to insure panel alignment and proper seal at each joint. Corner panels to be 90-degree angles 12 inches in each direction. (No Wood Construction will be accepted).
 - c. Insulation: Walls and Ceiling 4" of foamed-in-place urethane insulation shall be used with a thermal conductivity of not more than 0.118 BTU per hour per square foot. U Factor shall not exceed 0.030. The insulation shall be rated self-extinguishing and fire-retardant type

as specified by UL. Insulation must remain stable at temperatures up to 260°F.

- d. Section Fasteners: All wall and ceiling sections joints shall be fastened together with steel cam-action speed locks. These fasteners shall not exceed a 46" on center spacing. All locks shall be actuated from inside with a standard hex type Allen wrench. All socket ports shall be finished off with a ½" diameter snap cover to match the color of the panels.
- e. Hinged Walk-In Doors: Door shall be installed as shown on the drawings. Door shall be urethane insulated, flush-in fitting type 42" wide x 80" high (as shown on the drawings) with triple-pane 1/4" thick plate glass view windows. Door finish to be 20-gauge stainless steel inside and out. Door and door section shall be listed by UL and equipped with the following:
 - i. Magnetic gasket
 - ii. Door closer
 - iii. Polished chrome deadbolt latch and cam-lift spring-loaded hinges
 - iv. Latches shall have a safety release to prevent entrapment of personnel within the box. Latches also have padlocking provisions.
 - v. Bottom of door shall have a double sweep gasket. Magnetic gasket shall be of a dart and ridge design that will allow for easy replacement by the end-user without the use of any tools. The door jamb shall be constructed of a fully welded anodized aluminum rigid frame. The perimeter of the frame shall be no less than two inches wide to provide integral backing to accommodate all required hardware.
 - vi. Each entrance door shall be provided with a 3-way rocker light switch with an indicating pilot light exterior. All switches are pre-wired, and factory tested per UL.
 - vii. A digital thermometer shall be included with each door section to indicate inside temperature.
- f. Lights: Each door section shall be equipped with a flush-mounted constant burning pilot light and switch on exterior and interior factory wired to an interior LED Fixture Kason 1806. Each compartment shall be provided with ceiling mounted vapor proof LED light fixture with clear prismatic injection-molded polycarbonate diffuser Kason model 1810 or equal, see drawings for quantity. Light fixtures shall be factory wired to the light switch at the entrance door. Lighting level shall be a minimum of 10-foot candles measured 30" off the finished floor.

- g. Finish: Finished: Exterior wall panels, exposed to kitchen shall be 22-gauge stainless steel finish. Ceiling panels and door panels shall be a minimum of .026" galvanized steel with baked enamel embossed white finish and where concealed shall be .026" galvanized steel. Interior wall and ceiling panels shall be .026" galvanized steel and finished in baked enamel embossed white finish.
- h. Accessories: Assembly shall be provided with the following accessories.
 - i. Door hinges: (3) per door, self-closing and chrome-plated Kason No.1256 Cam-Lift.
 - ii. Door Pulls: Chrome plated Kason No. 1229C with inside safety release.
 - iii. Door Closure: Kason No. 1094.
 - iv. Trim Molding: Where unit abuts the building wall they shall be trimmed with a closure strip to match the exterior walk-in wall finish. Provide removable "drop-in" closure panels at ceiling. Provide vertical closure strips at all building wall junctures.
 - v. Each compartment shall be provided with a high-temperature alarm system, Modular Corporation model No. 75 FLUSH mounted. This unit to be provided complete with built-in N/O & N/C dry contacts and pulse output for remote notification.
 - vi. Dial Thermometer: Provide one (1) 4" dia. built into each walk-in door panel.
 - vii. Pressure Relief Port: One (1) for each compartment Kason No. 1830 (heated at freezer only).
 - viii. Strip Curtains: each walk-in door shall have polyester-reinforced clear vinyl strip curtains.
 - ix. Entrance Doors: Each door shall have a 1/8" thick sheet aluminum diamond plate kick panel 3'-0" high on the exterior and interior door panels and adjacent door jambs.
 - x. The wall panels exposed to the kitchen shall have a 16-gauge stainless steel rub rail.
 - xi. Provide a stainless-steel interior and exterior coved toe base.
 - xii. Provide necessary backing in wall panel for the attachment.
- i. This assembly shall be installed by factory personal and or factory-approved installers with written certification provided by the manufacturer to the Architect and Consultant.

- j. Walk-in assembly shall be installed onto a concrete slab as shown on the drawings. Contractor is to verify finishes and thickness of kitchen floor and allow for proper clearance at walk-in door.

AA. ITEM #25 WIRE SHELVING:

- 1. Quantity: Two (2)
- 2. Manufacturer: Metro (or equal)
- 3. Model: A2448NK3
- 4. Status: CFCI
- 5. Super Adjustable Super Erecta® Shelf, wire, 48"W x 24"D, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF Shelving to be 4-tier units with the bottom shelf at a minimum of 12" above finished floor. Provide post clamps to adjacent shelving unit two at front and two at back. Provide wall mounting angle brackets at top of shelving as shown. Provide "S" hooks where shelving comes together at 90 degrees delete inside post all locations inside corners.
- 6. Accessories:
 - 8 ea. 62PK3- Super Erecta® SiteSelect™ Post, 62-1/2"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3 Green epoxy coated corrosion-resistant finish with Microban® antimicrobial protection (4 shelves for every qty on schedule)
 - 8 ea. 9995Z- Super Erecta® "S"Hook, zinc
 - 8 ea. 9994Z- Super Erecta® Post Clamp, zinc
 - 8 ea. HDFC- Decorative Leveling Foot for post, chrome

BB. ITEM #26 WIRE SHELVING:

- 1. Quantity: One (1)
- 2. Manufacturer: Metro (or equal)
- 3. Model: A2460NK3
- 4. Status: CFCI
- 5. Super Adjustable Super Erecta® Shelf, wire, 60"W x 24"D, Metroseal 3 (corrosion-resistant) finish, corner release system, with Microban® antimicrobial protection, NSF Shelving to be 4-tier units with the bottom shelf at a minimum of 12" above finished floor. Provide post clamps to adjacent shelving unit two at front and two at back. Provide wall mounting angle brackets at top of shelving as shown. Provide "S" hooks where shelving comes together at 90 degrees delete inside post all locations inside corners.
- 6. Accessories:
 - 4 ea. 62PK3- Super Erecta® SiteSelect™ Post, 62-1/2"H, adjustable leveling bolt, posts are grooved at 1" increments & numbered at 2" increments, double grooved every 8", Metroseal 3 Green epoxy coated corrosion-resistant finish with Microban® antimicrobial protection (4 shelves for every qty on schedule)
 - 4 ea. 9995Z- Super Erecta® "S"Hook, zinc
 - 4 ea. 9994Z- Super Erecta® Post Clamp, zinc
 - 4 ea. HDFC- Decorative Leveling Foot for post, chrome

END OF SECTION.

SECTION 11 66 00 – ATHLETIC EQUIPMENT

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 SECTION INCLUDES

- A. Outdoor Athletic Equipment:
 - 1. Outdoor Basketball Equipment.
 - 2. Outdoor Tetherball Equipment.
- B. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District, in caution yellow color.

1.3 RELATED SECTIONS

- A. Section 09 91 00 – Painting.
- B. Section 32 12 00 – Asphalt Paving.
- C. Section 32 12 36 – Pavement Sealer, Striping, and Signage.
- D. Section 32 16 00 – Site Concrete.

1.4 REFERENCES

- A. 2019 California Building Code, with Amendments.
- B. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. Federal Standard 191 – Textile Test Methods.
- D. NFPA 101 – Life Safety Code.
- E. NFPA 255 – Surface Burning Characteristics of Building Materials.
- F. NFPA 701 – Methods of Fire Tests for Flame-Resistant Textiles and Films.

1.5 DESIGN REQUIREMENTS

- A. Field Measurements: Coordinate locations and heights of all outdoor athletic equipment with Owner and Architect. Verify dimensions by field measurements.

1.6 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, footing requirements, sections, and details, indicating locations, quantities, dimensions, tolerances, materials, fabrication, connections, hardware, fasteners, finish, options, and accessories.
 - 2. Show locations of all athletic equipment slated to be installed.
- D. Samples: Submit manufacturer's color samples.
- 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 play field 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.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide gymnasium and play field equipment from single manufacturer.
- B. Manufacturer's Qualifications: Minimum of 5 consecutive years' experience manufacturing gymnasium and play field equipment similar to the specified.
- C. Installer's Qualifications: Trained and approved by manufacturer.
- D. Regulatory Requirements: Play field equipment shall conform to latest rules and regulations, as required:
 - 1. International Basketball Federation / Federation International de Basketball (FIBA).
 - 2. National Association for Girls and Women in Sport (NAGWS).
 - 3. National Basketball Association (NBA).
 - 4. National Federation of State High School Associations (NFHS).

1.8 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.

1.9 WARRANTY

- A. Provide minimum one (1) 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. Basis of Design:
 - a. Porter Athletic, Inc., www.porterathletic.com
- B. Substitutions: To be approved by Owner and Architect per Section 01 25 13 – Product Substitutions.

2.2 OUTDOOR BASKETBALL EQUIPMENT

- A. Outdoor Basketball Backstops: Basis of Design, Porter Athletic, Model No. 175.
 - 1. Backstop: 4-1/2-inch O.D. gooseneck upright and 4-foot extension. Complete with support post system, backboard, and goal with net.
 - 2. Face of Backboard: 5'-0" (1.53 m) extended from center line of formed upright support.
 - 3. Upright Support: 4-1/2" O.D. heavy-walled galvanized pipe formed to approximate 18" radius.
 - 4. Vertical Section: Extend 3'-0" into concrete footing and secured with anchor lugs.
 - 5. Horizontal Section: Fabricated with slotted mounting plate to level backboard and goal.
 - 6. Bolts from Front-Mounted Goal: Mount directly through backboard and into Center-Strut mounting plate to eliminate strain on bank, should player hang on front-mounted goal.

7. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District.
- B. Outdoor Basketball Backboards: Basis of Design, Porter Athletic, Model No. 234-3 fan-shaped, cast-aluminum backboard.
1. Provide each outdoor backstop with backboard.
 2. Backboard: Official size, 54" x 39", and shape. Orange perimeter and target-area markings.
 3. Material: Cast-in-permanent-mold process from high-tensile, No. 319 aluminum. Cast with structural reinforcing ribs on backside with heavy, 1-1/2-inch deep perimeter flange to provide maximum rigidity.
 4. Backside of Backboard: 8 tapped holes, 3/8-16, to fit normal mounting attachments without exposed bolt heads on front face of unit.
 5. Backboard Drilling: For front-mount goal, 5-inch by 5-inch hole pattern. Compatible with direct-mount support structures.
 6. Goal Mounting Holes: Four (4), molded with integral, hex-shaped cavity located on front side of backboard to independently mount backboard to rear-support structure center-strut to provide option of removing goal for seasonal use or to prevent vandalism or unauthorized use.
 7. Finish: White powder coated.
- C. Outdoor Basketball Goals: Basis of Design, Porter Athletic Inc. Model No. 235 high-strength Super Goal.
1. Provide each outdoor backstop with goal.
 2. Rim: Fabricated from 5/8-inch diameter, high-strength, cold-drawn alloy steel, round-formed to 18-inch inside diameter ring.
 3. Inside of Ring: Positioned 6 inches from face of backboard by heavy, L-shaped, formed- steel mounting plate with 5-inch by 4-inch and 5-inch by 4-1/2-inch mounting-hole centers for front mounting.
 4. Brace Rim: Rigidly braced by 5/8-inch diameter, high-strength, cold-drawn alloy steel, round-formed and welded in position for maximum support.
 5. Net Attachment Clips: 12 no-tie net attachment clips.
 6. Net: White nylon net or Chain net, as specified by Architect.
 7. Mounting Hardware: Plated.
 8. Finish: Official orange powder coated.

2.3 OUTDOOR TETHERBALL EQUIPMENT

- A. Outdoor Tetherball Equipment: Basis of Design, Porter Athletic, Model 00763-200
1. Post and Footing: 2-3/8" O.D. Tetherball post, including upright, 5/16" x 3" eyebolt, 5/16" hex nut, and pipe cap. Extends 10'-0" above court, and extends 9" into 2'-0" D x 1'-6" W concrete footing, as directed by manufacturer.
 2. Cord and Ball: Official Heavy-duty tetherball and cord.
 3. Yellow Caution Band: Paint athletic equipment poles from 2'-0" AFF to 5'-0" AFF, or as noted by the District.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and supporting structure to receive play field equipment. Notify Owner and 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 play field 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 basketball backstops, backboards, goals, and tetherball poles for plumb and level.
- B. Adjust operating equipment to function properly and for smooth operation without binding.

3.4 CLEANING

- A. Clean play field 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 PROTECTION

- A. Protect installed play field equipment to ensure equipment will be without damage or deterioration at time of substantial completion.

END OF SECTION.

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 13 00 – Facility Sanitary Sewage
- 22 16 00 – Condensate Drain
- 22 42 00 – Commercial 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 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
 4. California Mechanical Code
 5. California Plumbing Code
 6. California Electric Code
 7. California Fire Code
 8. California Building Energy Efficiency Standards
 9. California Green Building Standards
 10. California Energy Code
 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. Code edition for the above shall be as noted on the drawings and as adopted by the California Division of the State Architect.
- C. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.
- D. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.
- E. 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.
 - D. Obtain the first permits to operate any compressed air tanks that are required to be furnished under this work, pay all costs, and perform all tests required to obtain

permits. Post permits under glass in a conspicuous place on or near the tanks, as required by these authorities.

1.6 UTILITY CONNECTIONS

- A. Arrange for utility connection and coordinate work with utility company.
- B. 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 – Common Work, Valves & Accessories, Insulation, and Piping.
 - a. When required by schedule, a separate Plumbing Underground submittal package will be reviewed upon request.
 2. Plumbing – Fixtures
 3. Plumbing – Equipment
 4. 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.

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.
3. Submittal of copies of the Plumbing Contract Documents shall not take place of Coordinated Shop drawings.

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 plumbing piping overlaid and coordinated with all 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, 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 EXISTING SERVICES

- A. Provide and install all required connections to existing systems as required by the Drawings and specifications.
- B. Integrate existing systems with all new work to provide a complete working system.
- C. Provide minimum 72-hour minimum notice to Owner of service interruptions. All service interruptions shall be kept to the minimum possible time. When requested by Owner service interruptions shall occur outside of normal working hours at no additional cost to owner.

3.9 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.

3.10 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 California Building Code, Section 1616A.1.18 through 1616A.1.26 and ASCE 7-16. Chapters 13, 26, and 30.
- B. Provide seismic sway bracing for all suspended piping 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".

3.11 START-UP PROVISIONS FOR MECHANICAL WORK

- A. General: Major equipment (such as booster pumps) 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. Prior to the observation to determine final acceptance, operate all mechanical systems as required to demonstrate that the installation and performance of these systems conform to the requirements of these specifications.
 - 1. Operate and test all equipment and systems for a period of at least five consecutive 8 hour days to demonstrate the satisfactory overall operation of the project as a complete unit.
 - 2. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
 - 3. During the test period, make final adjustments and balancing of equipment, systems controls, and circuits so that all are placed in first class operating condition.
- G. Where Utility District rebates are applicable, demonstrate that the systems meet the rebate program requirements

- H. Mark final positions of balancing valves after balancing is complete.

3.12 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

3.13 DEMONSTRATION AND TRAINING

- A. Provide a minimum of 16 hours of training and orientation of Owners staff in proper care and operation of Plumbing Equipment.
- B. An authorized representative of the equipment manufacturer shall train Owner-designated personnel in maintenance and adjustment of equipment. The representative may be an employee of the equipment manufacturer, or a manufacturer-certified contractor. Submit written certification from the manufacturer stating that the representative is qualified to perform the Owner training for the equipment installed.
 1. As part of the submittal process, provide a training agenda outlining major topics and time allowed for each topic.
 2. Some items of specified equipment require that training must be performed by the manufacturer, using manufacturer's employees. See specific equipment Articles in these Specifications for this requirement.
 3. Contractor shall provide three copies of certification by Contractor that training has been completed, signed by Owner's representative, for inclusion in Operation and Maintenance Manual. Certificates shall include:
 - a. Listing of Owner-designated personnel completing training, by name and title.
 - b. Name and title of training instructor.
 - c. Date(s) of training.
 - d. List of topics covered in training sessions.
 4. Refer to specific equipment Articles for minimum training period duration for each piece of equipment

3.14 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

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. Valve Boxes
 3. Access Doors
 4. Roof Flashing
 5. Dielectric Unions
 6. Pipe and Equipment Identification
 7. Fireproofing
 8. Painting
 9. Concrete
 10. Excavating And Backfill
 11. Electrical Work
 12. 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.
 4. Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number. This information is to be included in Plumbing Coordinated Shop Drawings.

1.3 CLOEOUT SUBMITTALS

- A. Warranty: Submit executed warranty.
- B. Certification: Submit Contractors Certification

- C. Provide valve map with actual locations of tagged valves. Provide list with function and location. Provide 11X17 drawings highlighting all valves, valve number, and function.
- D. 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

1.4 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 WARRENTY

- 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. Structural Design Of Equipment And Seismic Restraints:
 - 1. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2022 California Building Code, Section 1616A.1.19 and ASCE7-16, Chapters 13, 26, and 30.
 - 2. Mechanical equipment supports shall be designed by a licensed Structural Engineer.
 - 3. Provide seismic sway bracing for all suspended piping in accordance with the Seismic Restraint System Guidelines, OPM-0043-13 by Mason.
 - 4. Acceptable Manufacturer:
 - a. Mason
 - b. B-Line
 - c. Or Equal

- B. 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.
- C. 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. For uninsulated copper tubing, use B-Line B3100F, or equal, felt lined hanger.
- D. Pipe Saddles:
 - 1. Use B-Line B3153, or equal, protective insulation shield with "loc" tabs.
- E. 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. Provide stainless steel access doors where installed on stainless steel panels.
- C. Access doors shall match those supplied in Division 8 in all respects, except as noted herein.
- D. 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.
- E. Provide stainless steel access doors for use in toilet rooms, shower rooms, kitchens, and other damp areas. Provide steel access doors with prime coat of backed -on paint for all other areas.
- 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 K (plaster)
 - 2. Style DW (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 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 shall have 24-gauge galvanized sheet metal storm collar securely clamped to the flue 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 and flue passing through roof. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe or flue.
 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 or flues 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 PIPING AND EQUIPMENT IDENTIFICATION

- A. This section includes requirements for:
1. Nameplates
 2. Tags
 3. Stencils
 4. Pipe Markers
- B. General:

1. Each piece of equipment and piping system furnished and installed under this work shall be identified and the direction of flow indicated by a prefabricated coiled plastic colored label.

C. NAMEPLATES

1. Description: Laminated three-layer plastic with engraved letters.
 - a. Letter Color: White.
2. Letter Height: Equipment, control panels 1 inch.
3. Letter Height: Thermostats and small control components, 1/4 inch.
4. Background Color: Black.

D. TAGS

1. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
2. Chart: Typewritten letter size list in anodized aluminum frame.

E. STENCILS

1. Stencils: With clean cut symbols and letters of following size:
 - a. Access Doors and Similar Operational Instructions: Minimum 3/4" high letters.
2. Stencil Paint: As specified in Section 09 91 00, semi-gloss enamel, colors conforming to ASME A13.1.

F. PIPE MARKERS

1. Comply with ASME A13.1.
2. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
3. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.
4. Service Markers: Identify buried plugged or capped pipe with concrete marker, 4 inch diameter by 30 inches long, set flush with grade. Provide engraved brass nameplate identifying pipe stub.

G. Acceptable Manufacturers:

1. Seton Identification Products

2. Bradly Corporation
3. Or equal

2.7 FIREPROOFING

- A. Fireproofing to be installed at all pipe, fixture and equipment 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.
 - 3. Support steel piping used for gas at the following lengths:
 - a. 1/2-inch diameter at 6-feet maximum
 - b. 3/4-inch and 1-inch at 8-feet maximum
 - c. 1-1/4-inch and larger at 10-feet maximum spacing
- M. Provide continuous support channel for all polypropylene piping, and provide 6-foot maximum spacing for hangers, with a minimum of one hanger per length of pipe.
- N. 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 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.

3.3 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.

3.4 ROOF FLASHING

- A. Provide pipe flashings as noted on the Drawings.
- B. Flue flashings and storm collars shall be securely clamped around flue or 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 PIPE AND EQUIPMENT IDENTIFICATION

- A. Preparation
 - 1. Degrease and clean surfaces to receive adhesive for identification materials.
 - 2. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.
- B. Installation:

1. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
 2. Install tags with corrosion resistant chain.
 3. Apply stencil painting in accordance with Section 09 90 00.
 4. Install plastic pipe markers in accordance with manufacturer's instructions.
 5. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
 6. Identify domestic hot water heating equipment, including water heaters, pumps, expansion tanks, etc. with plastic nameplates.
 7. Identify control panels and major control components outside panels with plastic nameplates.
 8. Identify valves in main and branch piping with tags.
 9. Tag automatic controls, instruments, and relays. Key to control schematic.
 10. Identify piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
 - a. 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.
 11. Provide red ceiling dots to locate valves above T-bar type panel ceilings. Locate in corner of T-bar panel closest to equipment.
- C. 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.
- D. Lettering size and label colors are to be per ASME/ANSI A13.1 Pipe Marking Standards.

3.7 FIREPROOFING

- A. Pack the annular space between the pipe sleeves and the pipe 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.

3.8 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.

3.9 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.

3.10 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 5,000 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.

3.11 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. 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.

3.12 DEMOLITION

- A. Refer to Division 1 sections for general demolition requirements and procedures.
- B. Disconnect, dismantle, and remove plumbing systems, equipment, and components indicated to be removed. Coordinate with all other trades
 - 1. Piping to be removed: Remove portion of piping indicated to be removed. Cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to be abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system to be evacuated per EPA requirements.
 - 3. Equipment to be removed: Drain down and cap remaining services and remove equipment.
 - 4. Equipment to be removed and re-installed: Disconnect and cap services and remove, clean, and store equipment. When appropriate, re-install, reconnect, and make equipment operational.
 - a. If existing equipment which is to be re-installed is damaged, contact architect prior to removal. Contractor to take pictures of any damaged equipment prior to its removal and submit pictures to Architect.
 - b. Equipment damaged during removal, storage, or re-installation shall be the Contractor's responsibility and is to be replaced with new at no additional cost to the owner.
 - 5. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, removed damaged or unserviceable portions and replace with new products of equal capacity and quality.
- D. Non-Destructive Testing Of Existing Concrete Slabs:
 - 1. When drilling or saw cutting existing reinforced concrete, use care and caution to avoid cutting or damaging the existing reinforcing bars, conduit, or tendons. Use a non-destructive method to locate metals poured into the slab prior to doing any work.

3.13 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 piping 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.

3.14 OPERATION TEST:

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.15 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 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. Miscellaneous Drains
 5. Cleanouts
 6. Floor Drains and Floor Sinks
 7. Interceptors

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. Exception: Main distribution gate valves above 1-1/2 inches located underground outside building are not required to conform lead-free requirements of California Health and Safety Code Section 11 68 75.

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. 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.

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
- D. Provide Valve list and half size floorplan(s) showing valve locations and function and valve ID cross-referenced on floorplan.

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. Hand-lever: For quarter-turn valves 6"Ø and smaller.
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

- d. Kitz
- 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 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: Silicon Bronze ASTM B 584 Alloy C87600.
 - e. Ends: Threaded or Solder.
 - f. Seats: PTFE or TFE.
 - g. Stem: Stainless.
 - h. Ball: Stainless steel, vented.
 - i. Port: Full.
- D. Gate Valves- $1-1/2''\varnothing$ and larger:
 - 1. Lead-Free Iron Body Gate Valve, Bolted Bonnet, Non-Rising Stem, Resilient Flanged Ends
 - 2. NIBCO F-619-RW-SON for below grade use.
 - a. CWP Rating: 300 psig
 - b. Stem Material: Stainless Steel 304
 - c. Bonnet Material: Ductile Iron ASTM A536
 - d. Body Material: Ductile Iron ASTM A536 65-45-12
 - e. Wedge Material: Ductile Iron ASTM A536 / EPDM ASTM D2000

- f. End Connections: Flanged
 - g. Provide with square operating nut for use below grade
 - h. Provide with 1 operating wrench per nut sizes.
- E. Check Valves -- $\leq 3''\text{Ø}$:
- 1. Horizontal Swing, Regrinding type, Y-patter, Renewable seat and disc bronze check valve
 - 2. NIBCO Model T-413-Y-LF or equal.
 - a. CWP Rating: 200 psig
 - b. Body Material: Silicon Bronze ASTM B584
 - c. Ends: Threaded
 - d. Seats: PTFE
 - e. Hinge pin: 316 Stainless Steel or 304 Stainless Steel
- F. Check Valves - $\leq 2''\text{Ø}$:
- 1. Inline lift type bronze ring check valve
 - 2. NIBCO Model T-480-Y-LF or equal.
 - a. WWP Rating: 250 psig
 - b. Body Material: Silicon Bronze ASTM B 584.
 - c. Stem: Stainless Steel
 - d. Spring: Stainless Steel
 - e. Disc Holder: Stainless Steel
 - f. Disc: PTFE
- G. Balance Valves:
- 1. Bell and Gosset lead free Circuit Setter Plus, or equal
 - a. CWP Rating: 400 psig
 - b. Body: Brass
 - 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 1/4" tapped drain/purge port.
- e. Valve to have memory stop feature.

H. 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"

I. 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 Z1700 Shoktrol

- b. J.R. Smith Hydrotrol 5005-5050
- c. Mifab, series WHB
- d. Josam Company, Series 75000

J. 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 setscrew.

K. 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

L. Sleeve Seals:

- 1. Provide sleeve seals for sleeves located in foundation walls below grade or in exterior walls as follows:
 - a. Foundations: Lead and oakum, caulked between sleeve opening and pipe.
 - b. Walls Below Grade: Modular-mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
- 2. Acceptable Manufacturers:
 - a. Link-Seal Corporation
 - b. Or equal

2.2 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.
3. Where located on Roof:
 - a. Freezeless Roof Hydrant, Model RHY2-1-MS roof hydrant. Item to be complete with backflow preventor, 3/4" hose connection, 1" NPT female inlet connection 1-1/4" galvanized pipe casing. Provide with mounting system.

B. Wall Hydrant:

1. Recessed wall hydrant, Zurn model number Z1350 or equal. Hydrant to have bronze body, all bronze interior parts, replaceable seat washer, screwdriver-operated stop valve in supply, key-operated control valve.
 - a. Provide With optional vacuum breaker: -VP
 - b. Provide with optional 3/4" solder inlet: - 34FS

C. Acceptable manufacturers:

1. Zurn
2. Acorn Engineering Co.
3. Mifab, Inc.
4. Woodford
5. or equal

2.3 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.

2.4 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 concealed, above ground, cast-iron soil or waste lines: Zurn Z-1440A or equal with ABS plastic plug.
 2. Cleanouts in walls: Zurn Z-1441 or Z-1443, or equal, with stainless steel cover. Provide long sweep elbow or combination wye at connection to riser and install with surface of cleanout within ½ inch of front face of finished wall.
 - a. Where space does not permit the above installation, provide Zurn Z-1446, or equal, with stainless steel access cover, and vandal resistant screw.
 - b. Install face of cleanout plug within 1/2 inch of front face of finished wall
 3. Zurn Z-1446-A-BP with stainless steel access cover.
 4. Cleanouts in floor and in concrete sidewalks: Zurn Z-1440-KC.
 - 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.
 5. Cleanouts in composition floors Zurn ZN-1400-X-DX 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

2.5 FLOOR DRAINS AND FLOOR SINKS

A. Provide floor drains and floor sinks 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 Sinks: 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.

E. Acceptable Manufacturers:

1. Zurn
2. J.R. Smith
3. Wade
4. MiFab

2.6 INTERCEPTORS

A. Concrete Grease Interceptor:

1. Furnish and install a concrete grease interceptor with minimum capacity as indicated on the drawings, complete as cataloged. Provide manholes to

grade for access to each section. Provide gastight cast-iron ring and cover at grade for each manhole.

2. Provide concrete with an approved coating inside and outside.
3. Acceptable Manufacturers:
 - a. Jensen Precast
 - b. MC Nottingham Company
 - c. Or Equal

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 chain-wheels on operators for butterfly and gate valves more than 10'-0" above finished floor. Extend chains to within 60" above finished floor.
10. 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.
11. 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.
12. Provide union at each connection to equipment and downstream of each valve. Provide unions at both ends of valves when valves can not 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 Y-TYPE STRAINERS

- A. Install Y-type strainers full size of pipeline in accordance with manufacturer's installation instructions.
- B. Locate Y-type strainers in supply line ahead of the following equipment and elsewhere as indicated if integral strainer is not included in equipment:
 1. Pumps
 2. Pressure-reducing valves
 3. Temperature- or pressure-regulating valves
- C. Contractor to clean all pipeline strainers after their respective system has been flushed.

3.5 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.

3.6 INSTALLATION OF INTERCEPTORS

- A. Install interceptors per manufacturers written instructions. Verify adequate clearance is provided for removal of strainers and for cleaning.
- B. Anchor interceptors securely to substrate. Locate interceptors so that adequate clearance is provided to remove covers and sediment baskets. Set recessed units so top of cover is flush with finished grade and/or floor.
- C. Connect inlet and outlet piping to interceptors.
- D. Contractor to remove and clean all strainers after flushing of system and prior to project completion.

3.7 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.

3.8 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
 - 5. Armstrong

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

C. Mineral-Fiber Board Insulation

1. Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB..
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - A. CertainTeed Corporation.
 - B. Johns Manville.
 - C. Knauf Insulation.
 - D. Owens Corning.

2.3 PIPING INSULATION

A. Domestic Hot Water Supply and Return/ Tempered 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 to be provided with ASJ-SSL jacket.
2. Insulate concealed piping with fiberglass piping insulation with thicknesses as follows:

- a. Pipes 3/4"Ø and smaller with 1" of fiberglass piping insulation.
 - b. Pipes 1"Ø -1 1/2"Ø and larger – insulate with 1 1/2" of fiberglass piping insulation.
 - c. Pipes 2" Ø and larger – Insulate with 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 domestic cold water piping located within building, outside of insulation envelope in outside walls, vented attic spaces, and unheated spaces, including equipment rooms and below raised floor with 1 inch thick molded fiberglass, minimum 3-1/2 pound per cubic foot density, with ASJ-SSL jacket.
 2. Insulate piping exposed to weather with flexible closed cell insulation.
 3. Wrap valves and fittings with mastic and z-tape.
 4. Insulation to be a minimum of 2" thick.
 5. Seal all joints with Armstrong 520 adhesive.
 6. 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. Condensate Drain Piping:
1. Insulated exposed and concealed condensate drain piping within building with 1" closed-cell pipe insulation.
 2. Seal with Armstrong 520 adhesive.
 3. Provided with ASJ-SSL jacket.
- D. Grease Waste:

1. Insulate electrically heat-traced grease waste piping under slab on grade with Owens Corning Foamglas, preformed pipe insulation, or equal. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Cover pipe and fittings with insulation manufacturer's recommended jacketing. Insulation thickness for all pipe sizes: 3 inches.

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 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.

3.4 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.

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. 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.
 - d. Note – pro-press type fittings will not be considered.
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.
 - c. Note – pro-press type fittings will not be considered.
5. Under Slab Water Piping:
- a. Pipe sizes 1 ½" and smaller with no branches: 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.
6. Capped or plugged outlets shall be schedule 40 screwed brass.
- 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.
 - 1. Test Hot, Cold, Tempered, and Hot Water Return system with water at 150 PSI after rough-in and at 100 PSI after equipment connection.
- 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 13 00 – FACILITY SANITARY SEWERAGE

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.

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 – PRODUCTS

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, asphaltic coated, no-hub soil pipe.\ confirming to ASTM A888 and Cast Iron Soil Pipe Institute Standard (CISPI) 301 and so marked.
 - 2. Cast Iron Hub and Spigot Soil Pipe and Fittings: CISPI Standard 301 (Latest Edition) and ASTM A 74.
 - 3. Acceptable manufacturer's
 - a. Tyler pipe
 - b. AB&I
 - c. Charlotte,
 - d. Or Equal
 - 4. Couplings:
 - a. No-Hub Joints below grade: ANACO-Husky SD4000, Orange Shield coupling as manufactured by Husky Technologies, or equal. Minimum Shield thickness to be 0.015".

- b. No-Hub Joints above grade: No-Hub pipe conforming to ASTM A888 and CISPI 301. Coupling conforming to ASTM 1277 and CISPI 310, with stainless steel bands. Provide products by ANACO-Husky, Tyler, Ideal, or Equal. Provide sway brace at 20'-0" maximum spacing for suspended pipe with no-hub joints. Provide a brace on each side of a change in direction of 90 degrees or more. Brace riser joints at each floor and at 15 foot maximum intervals.
 - c. ANACO-Husky SD4000, Orange Shield coupling as manufactured by Husky Technologies, or equal. Minimum Shield thickness to be 0.015".
 - d. Hub and Spigot joints below grade: Neoprene gaskets conforming to ASTM C564, as manufactured by Ty-Seal, Dual-Tite, or equal.
5. 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.
- B. Sanitary Vent Piping:
1. Cast iron soil pipe as specified for sanitary sewer piping.
 2. Couplings as specified for sanitary sewer piping.
 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.
- C. Grease Waste and grease vent (to 6" above ground):
1. Underground grease waste piping and vent (to 6 Inches Aboveground) to be Schedule 40 polypropylene pipe and fittings assembled with electrofusion joints.
 2. Piping shall comply with ASTM F1412
 3. Acceptable manufacturer's
 - a. George Fisher Sloane, Inc., "Fuseal PP"
 - b. Orion Fittings, Inc., "Rionfuse CF,"
 - c. IPEX, Inc., "Enfield,"
 - d. or equal,

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.
 - 1. Test all soil, Waste Drain and Vent Piping with water. Minimum height of standpipe shall be 10 feet above piping being tested. Fill with water to top of highest vent.
- 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 16 00 – CONDENSATE DRAIN

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes piping as required for the Facility Condensate Drainage 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.

1.3 ACTION SUBMITTALS

- A. Submit manufacturer's catalog cut sheets, specifications, installation instructions, and dimensioned drawings for each type of pipe and fittings 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 condensate drain 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.

2.2 PIPING AND FITTINGS

- A. Condensate Drain piping:
 - 1. Where Exposed on Roof:
 - a. Provide schedule 40 galvanized steel pipe with malleable-iron threaded fittings, provide with di-electric couplings or unions at connections to dissimilar metals.
 - 2. Within Building:
 - a. For sizes <1": 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 equipment; di-electric couplings or unions at connections to dissimilar materials.
 - 3. Connect condensate drains to mechanical equipment per equipment manufacturer's recommendations; provide P-trap where required. Slope piping to drain, with 1 inch in 10 foot minimum pitch. Provide di-electric couplings or unions at connections to dissimilar materials.
 - 4. Where Drawings indicate installation of mechanical equipment on spring isolation rails spring mounted curbs, or spring hangers, provide threaded metal connector at mechanical equipment, Metraflex Model SST, or equal by Unisource Mfg. Co., or Flexicraft Industries. Arrange flexible connection to ensure drainage of condensate, and support flexible connection at each end of connector, to ensure proper alignment.
 - 5. Where condensate drain P-traps are required, install trap using Wye fitting on inlet and outlet of trap. Provide cap on top of each Wye, made removable for cleaning and inspection. Drill 1/4 inch diameter hole in cap at outlet of the trap to allow venting of the system. The minimum depth of trap should be 4 inches, or as recommended by the manufacturer in printed literature.

6. Provide cleanout tees or “Y” at each change in direction.

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 CONDENSATE DRAINAGE SYSTEMS

- A. Make joints between PVC pipe and copper pipe or fittings using adapter fittings, installed as recommended by the manufacturer.
- B. Condensate Drain Piping: Run all horizontal condensate drain piping inside of building on a uniform grade of not less than 1/8-inch per foot, unless otherwise noted on the plans.
- 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. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees and where shown in drawings.

3.3 PIPING SYSTEM JOINTS

- A. General: Provide joints of type indicated in each piping system.
- B. 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.

3.4 TEST OF PIPING

- A. Test piping at completion of roughing in, in accordance with the following schedule. Show no loss water or visible leaks after a minimum duration of 2 hours. Tests to be verified by Inspector of Record.
 - 1. Test all condensate drain piping by filling with water from outlet to trap.
- 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.

3.5 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

SECTION 22 40 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 the 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. Make connection between fixtures and flanges on soil pipe absolutely gastight and watertight with neoprene type gaskets (wall hung fixtures) or bowl wax (floor outlet fixtures). Rubber gaskets or putty will not be permitted.

2.2 WATER SUPPLIES AND STOPS

- A. Provide 85 percent IPS threaded red brass nipple, conforming to the lead-free requirements of California Health and Safety Code Section 11 68 75, securely anchored to building construction, for each connection to stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have stop valves installed on water supply lines
- B. Provide water supplies to fixtures with compression shut-off stops with threaded inlets and lock shield-loose key handles. Provide combination fixtures with compression stop and threaded inlet on each water supply fitting. Provide lock shield-loose key handle for each stop.
- C. Provide 1/2 inch riser tubes with reducing coupling for fixtures, unless otherwise noted.
- D. Provide cast brass escutcheon at each angle stop.
- E. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - 1. McGuire Manufacturing Company, Inc., model LFH2167LK.
 - 2. T & S Brass and Bronze Works, Inc., model B-1305.

- F. Provide all water supplies to fixtures with compression shut-off stops. Stops to be as follows:
1. Compression stop
 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.
- G. Riser to have brass barbs, stainless steel Ferrules, Brass nut, and rubber washer.
- H. 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.
- I. 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.
- J. 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. IAPMO Approved
 - b. Cast Brass body
 - c. 17-gauge seamless brass
 - d. Less screw tap cleanout
 2. Provide ADA fixtures waste offsets.
 3. Acceptable Manufacturers:
 - a. McGuire Manufacturing
 - b. Dearborn Brass
 - c. Delta Commercial

- K. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets.

2.3 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 E84 smoke test rating of 0.
- D. Similar fixtures to be by same manufacturer.
- E. Acceptable Manufacturers to be as follows:
 - 1. Mop Sinks:
 - a. American Standard
 - b. Kohler
 - c. Or Equal
 - 2. Manual Faucets:
 - a. Chicago
 - b. Symmons Scott
 - c. T&S Brass and Bronze Works, Inc.
 - d. Delta Commercial
 - 3. Drinking Fountains / Electric Water Coolers
 - a. Murdock
 - b. Haws
 - c. Or Equal
 - 4. Washing Machine Hose/Supply Boxes:
 - a. Accorn Engineering Co.

- b. Or Equal

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.
- E. Install CMC Accessible fixtures in accordance with Chapter 4 California Plumbing Code, and Chapters 11A and 11B California Building Code.

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 10-15 seconds.

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. Grout voids between all fixtures and adjacent surfaces with white Dow Silicone Sealant, arrange to shed water.
- D. 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.
- E. 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 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.

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DIVISION 23 – HVAC

- 23 00 00 – Mechanical General Conditions
- 23 05 00 – Common Work Results for HVAC
- 23 05 93 – Testing, Adjusting, and Balancing for HVAC
- 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 74 33 – Make Up Air Unit

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SECTION 23 00 00 – MECHANICAL 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 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
 4. California Mechanical Code
 5. California Plumbing Code
 6. California Electric Code
 7. California Fire Code
 8. California Building Energy Efficiency Standards
 9. California Green Building Standards
 10. California Energy Code
 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
 - a. Code edition for the above shall be as noted on the drawings and as adopted by the California Division of the State Architect.
- 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. Obtain the first permits to operate any compressed air tanks that are required to be furnished under this work, pay all costs, and perform all tests required to obtain permits. Post permits under glass in a conspicuous place on or near the tanks, as required by these authorities.

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 AC Units, Exhaust Fans, Make Up Air Units, etc.)
 - 3. Mechanical – Building Automation System
 - 4. Mechanical – Duct coordination shop drawing package.
 - 5. Incomplete submittals or submittals broken down by spec section shall be returned un-reviewed.

- E. 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.

1.8 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. Drawings to be coordinated with 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.
5. Show size and location of all duct access doors required for air distribution system cleaning. Clearly mark locations on shop drawings. Reference Specification Section 23 05 15 for additional information / requirements.

- 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 (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. 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 EXISTING SERVICES

- A. Provide and install all required connections to existing systems as required by the Drawings and specifications.
- B. Integrate existing systems with all new work to provide a complete working system.
- C. Provide minimum 72 hour notice to Owner of service interruptions. All service interruptions shall be kept to the minimum possible time. When requested by Owner service interruptions shall occur outside of normal working hours at no additional cost to owner.

3.9 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.

3.10 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 California Building Code, Section 1616A.1.18 through 1616A.1.26 and ASCE 7-16. Chapters 13, 26, and 30.
- B. Provide seismic sway bracing for all suspended piping 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".

3.11 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 1 year from the date of substantial completion unless more stringently specified within individual Sections of this Division.

3.12 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 pleated filters at all return, exhaust, and transfer grilles. Filters shall also be provided at all return air ducts open to the plenum. The 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.

3.13 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 AC Units (under 30 tons), 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.

3.14 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.

3.15 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.

3.16 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. Ductwork mains and branches, size and location with duct elevation information.
 - 5. 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.
 - 6. Locations of all manual and automatic valves, pipe strainers, expansion joints and compensators, pipe guides and anchor points, steam traps and air vents.
 - 7. Equipment locations with dimensions from prominent building lines and required service access.

8. Seismic bracing information for ductwork, piping and equipment.
9. Locations of control system panels, control power transformer panels miscellaneous relay panels, control workstations, routing of control system communication loops.
10. 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.

3.17 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 RESULTS 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 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 counter-flashings 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.
- 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. 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.
 - 3. Seal all pipes, flues, or ducts passing through exterior walls in an approved, watertight manner.

2.2 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.

2.3 EQUIPMENT IDENTIFICATION

A. This section includes requirements for:

1. Nameplates
2. Tags
3. Stencils
4. Pipe Markers

B. General:

1. Each piece of equipment and piping system furnished and installed under this work shall be identified and the direction of flow indicated by a prefabricated coiled plastic colored label.

C. NAMEPLATES

1. Description: Laminated three-layer plastic with engraved letters.
 - a. Letter Color: White.
 - b. Letter Height: Equipment, control panels 1 inch.
 - c. Letter Height: Thermostats and small control components, 1/4 inch.
 - d. Background Color: Black.

2. TAGS

- a. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- b. Chart: Typewritten letter size list in anodized aluminum frame.

3. STENCILS

- a. Stencils: With clean cut symbols and letters of following size:
- b. Access Doors and Similar Operational Instructions: Minimum 3/4" high letters.
- c. Stencil Paint: As specified in Section 09 90 00, semi-gloss enamel, colors conforming to ASME A13.1.

4. Acceptable Manufacturers:

- a. Seton Identification Products
- b. Bradly Corporation

c. Or equal

2.4 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 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.

3.2 DIELECTRIC UNIONS

- A. Install dielectric unions in the following locations:
 - 1. In all metallic water 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 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.

3.3 EQUIPMENT IDENTIFICATION

A. Preparation

1. Degrease and clean surfaces to receive adhesive for identification materials.
2. Prepare surfaces in accordance with Section 09 90 00 for stencil painting.

B. Installation:

1. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
2. Install tags with corrosion resistant chain.
3. Apply stencil painting in accordance with Section 09 90 00.
4. Identify air conditioning units, exhaust fans, split systems, DOAS units, etc. with plastic nameplates.
5. Identify control panels and major control components outside panels with plastic nameplates.

C. Lettering size and label colors are to be per ASME/ANSI A13.1 Pipe Marking Standards.

3.4 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.

3.5 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.

3.6 CONCRETE

- A. Concrete and reinforcing steel shall be equal to that specified for General Construction.
- B. Except as noted above, concrete work will be furnished and installed under General Work. This Contractor shall coordinate requirements accordingly.

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 DEMOLITION

- A. Refer to Division 1 sections for general demolition requirements and procedures.
- B. Disconnect, dismantle, and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades
 1. Piping to be removed: Remove portion of piping indicated to be removed. Cap or plug remaining piping with same or compatible piping material.
 2. Piping to be abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system to be evacuated per EPA requirements.

3. Ducts to be removed: Remove portion of duct indicated to be removed. Cap remaining ducts with same or compatible ductwork material and seal cap airtight.
 4. Ducts to be abandoned in Place: Cap ducts with same or compatible ductwork material.
 5. Equipment to be removed: Drain down and cap remaining services and remove equipment.
 6. Equipment to be removed and re-installed: Disconnect and cap services and remove, clean, and store equipment. When appropriate, re-install, reconnect, and make equipment operational.
 - a. If existing equipment which is to be re-installed is damaged, contact architect prior to removal. Contractor to take pictures of any damaged equipment prior to its removal and submit pictures to Architect.
 - b. Equipment damaged during removal, storage, or re-installation shall be the Contractor's responsibility and is to be replaced with new at no additional cost to the owner.
 7. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, removed damaged or unserviceable portions and replace with new products of equal capacity and quality.
- D. Non-Destructive Testing Of Existing Concrete Slabs:
1. When drilling or saw cutting existing reinforced concrete, use care and caution to avoid cutting or damaging the existing reinforcing bars, conduit, or tendons. Use a non-destructive method to locate metals poured into the slab prior to doing any work.

3.9 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.

3.10 OPERATION TEST

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.11 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 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 existing and new air distribution system, hydronic systems, 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. Coils and heat exchangers
5. Piping systems
6. Terminal units
7. 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:
1. Provide TAB Contractor company information.

1.5 CLOSEOUT SUBMITTALS

- A. Duct Leakage Reports:
1. TAB Contractor to provide TAB report for duct leakage tests.
- B. Field Inspection Report:
1. TAB Contractor to provide written verification of field inspections.

- a. Include date of inspection and list of all items to be corrected prior to balance.
- C. 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 three copies of complete test report prior to final acceptance of project.
- D. 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
 4. National Air Balance
- 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 Guaranty. Guaranty 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. Guaranty to be valid for one year from the date of submission of a test and balance report.

1.8 COORDINATION:

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed
- C. Coordinate TAB work with work of other trades.

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 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures. TAB plan shall be specific to Project and include the following:
 - 1. General description of each air system and sequence(s) of operation.
 - 2. Complete list of measurements to be performed.
 - 3. Complete list of measurement procedures. Specify types of instruments to be utilized and method of instrument application.
 - 4. Qualifications of personnel assigned to Project.
 - 5. Single-line CAD drawings reflecting all test locations (terminal units, grilles, diffusers, traverse locations, etc).
 - 6. Table indicating pressure relationships (positive, negative, or neutral) between building spaces.
 - 7. Air terminal correction factors for the following:
 - a. Air terminal configuration.
 - b. Flow direction (supply or return/exhaust).
 - c. Effective area of each size and type of air terminal.
 - d. Air density.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Automatic temperature-control systems are operational.
 - 3. Equipment and duct access doors are securely closed.
 - 4. Balance, smoke, and fire dampers are open.
 - 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or

NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 07 13 "Duct Insulation," Section 23 07 16 "HVAC Equipment Insulation," and Section 23 07 19 "HVAC Piping Insulation." Section 23 80 00 Heating, Ventilating, and Air Conditioning."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Test each system to verify building or space operating pressure, including all stages of economizer cycle. Maximum building pressure shall not exceed 0.03 inches of pressure.
- C. Except as specifically indicated in this Specification, Pitot tube traverses shall be made of each duct to measure airflow. Pitot tubes, associated instruments, traverses, and techniques shall conform to ASHRAE Handbook, HVAC Applications, and ASHRAE Handbook, HVAC Systems and Equipment.
 1. Use state-of-the-art instrumentation approved by TAB specialists governing agency..
 2. Where ducts' design velocity and air quantity are both less than 1000 fpm/CFM, air quantity may be determined by measurements at terminals served.
- D. Test holes shall be placed in straight duct, as far as possible downstream from elbow, bends, take-offs, and other turbulence-generating devices.
- E. For variable-air-volume systems, develop a plan to simulate diversity.
- F. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

- G. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- H. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- I. Verify that motor starters are equipped with properly sized thermal protection.
- J. Check dampers for proper position to achieve desired airflow path.
- K. Check for airflow blockages.
- L. Check condensate drains for proper connections and functioning.
- M. Check for proper sealing of air-handling-unit components.
- N. Verify that air duct system is sealed as specified in Section 23 31 13 "Metal Ducts." Section 23 80 00 "Heating, Ventilating, and Air Conditioning."
- O. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.
- P. Automatically operated dampers shall be adjusted to operate as indicated in Contract Documents. Controls shall be checked for proper calibration.

3.4 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow. Alternative methods shall be examined for determining total CFM, i.e., Pitot-tube traversing of branch ducts, coil or filter velocity profiles, prior to utilizing airflow values at terminal outlets and inlets.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Check operation of relief air dampers. Measure total relief air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust relief air dampers to provide 100 percent relief in economizer mode. Ensure that relief dampers close completely upon unit shutdown.
- C. Check operation of outside air dampers. Measure total outside air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust outside air dampers to provide 100 percent outside air in economizer mode. Ensure that outside air dampers close completely upon unit shutdown.
- D. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow of submain and branch ducts.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

- E. Measure air outlets and inlets without making adjustments.
 - 1. Measure terminal outlets using a direct-reading digital backflow compensating hood. Use outlet manufacturer's written instructions and calculating factors only when direct-reading hood cannot be used due to physical obstruction or other limiting factors. Final report shall indicate where values listed have not been obtained by direct measurement.
- F. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
 - 1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents, if included.
 - 2. Adjust patterns of adjustable outlets for proper distribution without drafts. Terminal air velocity at five feet above finished floor shall not exceed 50 feet per minute in occupied air conditioned spaces.
- G. Do not overpressurize ducts.

3.5 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
2. Rated and Actual Motor Data:
- a. Horsepower / Break-horsepower
 - b. Phase
 - c. Voltage.
 - d. Amperage.
3. Duct Velocity Traverse Data:
- a. Fan or unit number
 - b. Design and actual CFM
 - c. Duct division signs and area.
 - d. Design and actual average velocity
 - e. Duct static pressure average velocity
 - f. Traverse location
 - g. Traverse measurements in fpm (show grid pattern)
4. 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
5. Flow Indicator Data:
- a. Identification and location
 - b. Service
 - c. Manufacturer

- d. Model number and serial number
 - e. Pipe size
 - f. Design GPM and meter indication
 - g. Actual GPM and meter indication
 - h. Type of meter used
6. Other information required to establish completely balanced systems.

3.6 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.
 - 3. Coils: balance within -5% / +10% of design GPM.
- 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 Alnor 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 09 00 – BUILDING MANAGEMENT SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. This section provides requirements for the Building Automation System.

1.2 ACTION SUBMITTALS

- A. Product data: submit complete data of materials proposed including:
1. Shop drawings prepared in Visio Professional or AutoCAD software.
 2. Shop drawings showing riser diagram depicting locations of all controllers and schematics of each mechanical system showing all connected points with reference to their associated controllers.
 3. Submittal data for all hardware and software products required as by the specification.
- B. Equipment sequences of operation.
1. Manufacturer, model number, and chiller specifications
 2. Clearly indicate all options and accessories.
 3. Provide installation manual.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: submit complete O&M data including:
1. Shop drawings prepared in Visio Professional or AutoCAD software.
 2. Provide "trouble- shooting" maintenance guide
 3. Include this data, product data and Shop Drawings in maintenance manual

1.4 COORDINATION

- A. Automatic temperature control systems work shall be accomplished as outlined below:
1. Control Valves furnished under this section shall be installed as specified in Mechanical Division.
 2. Control Dampers are provided under the applicable Mechanical Division air distribution or air handling equipment section.
 3. Water Pressure Taps, Thermal Wells, Flow Switches, Flow Meters, that will have wet surfaces furnished under this Section, shall be installed as specified in Mechanical Division.
 4. Controlled Equipment Power Wiring shall be furnished and installed under Electrical Division. Where control involves 120V control devices controlling

120V equipment, the Division 16 Electrical Contractor shall extend power wiring to the equipment and shall extend it from the equipment to the control device.

1.5 INSTALLING CONTRACTOR QUALIFICATIONS

- A. The Building Automation System Control System contractor must have been in business, and licensed as a contractor by the State of California, installing HVAC and building automation controls, and fire/life safety systems, for a minimum of ten (10) years preceding the bid opening.
- B. The Building Automation Control System contractor must have completed no less than one (1) control system installation, within twenty-four (24) months preceding the bid opening, pursuant to a single written contract, valued at no less than three hundred thousand (\$300,000) dollars.
- C. The Building Automation Control System contractor must demonstrate that, from the local office that will service the Owner with a four (4) hour emergency response requirement can logistically be provided.
- D. Controls contractor must have direct access to factory certified instructors to provide training upon request of the district.
- E. Controls contractor must have explicit district approval to interface with district wide server for integration of new controls system.
- F. The Building Automation Control System contractor must have been, for five (5) years preceding the bid opening, a factory branch office, or a factory authorized dealer for the product manufacturer type identified in subsection 2.01, A., under PART 2 – PRODUCTS, of this section. Factory authorized dealer means:
 - 1. Installing Contractor has a contract directly with the factory. Approved installing contractors shall be Johnson Controls (JCI), Emcor, or Intech Mechanical. No others are approved.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturer: The Building Automation Control System shall be provided by the following:
 - 1. Controls are to be provided by Johnson Controls, Inc., branch office in Folsom, CA to match campus standard.
 - 2. No other contractors are acceptable or will be considered per Part 1.4, Item F above.
 - 3. The Building Automation Controls contractor must have been, for ten (10) years preceding the bid opening, a factory branch office. A contract with a distributor is not acceptable.
- B. All new controls material must be fully integrated and graphically represented on existing district building automation controls system on the districts servers. Only district authorized personnel may access this server for controls integration.

- C. All components used shall be serviceable, repairable, and replaceable by qualified temperature control technicians using non-proprietary parts, tools, and instruments.

2.2 SUPERVISORY CONTROLLER

A. NETWORK AUTOMATION ENGINE (NAE) – EXISTING ON SITE

1. The NAE shall perform the function of monitoring all system variables, both from real hardware points, software variables, and controller parameters such as set points.
2. NAE's shall be entirely solid state devices. No rigid disk drives will be permitted in the equipment rooms.
3. The NAE's shall manage and direct all information traffic on the Tier 1 network, between the Tier 1 and Tier2 networks, and to servers.
4. Any NAE on the Tier 1 network shall be equipped with all software necessary to drive the complete user interface including graphics on a browser connected to the NAE via the network or directly via a local port on the node.
5. The operating system of the NAE shall support multi-user access. At minimum four users shall be able to access the same NAE simultaneously.
6. Communication between NAE's shall be per-to-peer via 10/100 Ethernet using the BACnet protocol.
7. The NAE shall be capable of direct connection to multiple field busses using different protocols simultaneously as indicated below. Should the controller not support multiple field busses, install two supervisory controllers side by side.
 - a. An RS-485 serial field bus such as BACnet MSTP or the manufacturer's proprietary field bus – JCI N2.
 - b. A LON field bus for supervision and control of LON based controllers that conform to the Lon Talk standard.
8. The NAE will integrate data from both field busses into a common object structure. Data from both field busses will appear in common displays throughout the user interface in exactly the same format. It shall not be possible to determine which field buss the data originated on without reviewing the system configuration data.
9. The NAE shall be programmable and governed by the requirements of their applicable codes, approvals and regulations.
10. The NAE shall be designed, packaged, installed, programmed and commissioned in consideration of their specific service and prevailing operating conditions. They shall be proven standard product of their original manufacturer and not a custom product for this Project.
11. A failure at an NAE shall not cause failures or non-normal operation at any other system NAE other than the possible loss of active real-time information from the failed NAE.

12. Ancillary NAE equipment, including interfaces and power supplies, shall not be operated at more than 80% of their rated service capacity.
13. The NAE shall comply with FCC Part 15 subpart J class A emission requirements.
14. Each NAE shall be equipped with the necessary un-interruptible power such that it will not cease operation during minor power outages, including those that occur upon transfer to emergency generator or other local power source not provided by the utility.

2.3 NETWORKING/COMMUNICATIONS

- A. The design of the Building Automation Control System shall network operator workstations and Standalone DDC Panels as shown on the attached system configuration drawing. Inherent in the system's design shall be the ability to expand or modify the network(s) either via the local area network, or auto-dial telephone line modem connections, or via a combination of the two networking schemes.
 1. Local Area Network
 - a. Workstation/DDC Panel Support: Operator workstations and DDC panels shall directly reside on a local area network such that communications may be executed directly between controllers, directly between workstations, and between controllers and workstations on a peer-to-peer basis.
 - b. Dynamic Data Access: All operator devices, either network resident or connected via dial-up modems, shall have the ability to access all point status and application report data, or execute control functions for any and all other devices via the local area network. Access to data shall be based upon logical identification of building equipment. Access to system data shall not be restricted by the hardware configuration of the Building Automation Control System. The hardware configuration of the Building Automation Control System network shall be totally transparent to the user when accessing data or developing control programs.
 - c. General Network Design: Network design shall include the following provisions:
 - i. High-speed data transfer rates for alarm reporting, quick report generation from multiple controllers and upload/download efficiency between network devices. The minimum baud rate shall be one (1) Megabaud.
 - ii. Support of any combination of controllers and operator workstations directly connected to the local area network. A minimum of fifty (50) devices shall be supported on a single local area network.
 - iii. Detection and accommodation of single or multiple failures of either workstations, DDC panels or the network media. The network shall include provisions for automatically reconfiguring itself to allow all operational equipment to

perform their designated functions as effectively as possible in the event of single or multiple failures.

- iv. Message and alarm buffering to prevent information from being lost.
- v. Error detection, correction, and retransmission to guarantee data integrity.
- vi. Default device definition to prevent loss of alarms or data, and ensure alarms are reported as quickly as possible in the event an operator device does not respond.
- vii. Commonly available, multiple sourced, networking components and protocols shall be used to allow the Building Automation Control System to coexist with other networking applications such as office automation. MAP, ETHERNET, IBM Token Ring and ARCNET are acceptable technologies.
- viii. Use of an industry standard IEEE 802.x protocol. Communications must be of a deterministic nature to assure calculable performance under worst-case network loading.
- ix. Synchronization of the real-time clocks in all DDC panels shall be provided.

2.4 APPLICATION SPECIFIC CONTROLLERS – HVAC APPLICATIONS

- A. Each Standalone DDC Controller shall be able to extend its performance and capacity through the use of remote Application Specific Controllers (ASCs).
- B. Each ASC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.
- C. Each ASC shall have sufficient memory to support its own operating system and data base including:
 - 1. Control Processes
 - 2. Energy Management Applications
 - 3. Operator I/O (Portable Service Terminal)
- D. The operator interface to any ASC point data or programs shall be through any network-resident PC workstation, or any PC or portable operator's terminal connected to any DDC panel in the network.
- E. Application Specific Controllers shall directly support the temporary use of a portable service terminal. The capabilities of the portable service terminal shall include but not be limited to the following:
 - 1. Display temperatures

2. Display status
 3. Display setpoints
 4. Display control parameters
 5. Override binary output control
 6. Override analog setpoints
 7. Modification of gain and offset constants
- F. Powerfail Protection: All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.
- G. Application Description:
1. Field Equipment Controller (FEC) – BY JCI
 - a. When indoors - the FEC shall operate as a standard from 32 to 122 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity.
 - b. When outdoors mounted either in unit cabinet or mounted in a steel enclosure – the FEC shall operate from -40 to 158 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity.
 - c. The Field Equipment Controller (FEC) shall be a fully user-programmable, digital controller that communicates via BACnet MS/TP protocol.
 - d. The FEC shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
 - e. Controllers shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable.
 - f. The FEC shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
 - g. The FEC shall include a removable base to allow pre-wiring without the controller.
 - h. The FEC shall include troubleshooting LED indicators to identify the following conditions:
 - i. Power On
 - ii. Power Off

- iii. Download or Startup in progress, not ready for normal operation
- iv. No Faults
- v. Device Fault
- vi. Field Controller Bus - Normal Data Transmission
- vii. Field Controller Bus - No Data Transmission
- viii. Field Controller Bus - No Communication
- ix. Sensor-Actuator Bus - Normal Data Transmission
- x. Sensor-Actuator Bus - No Data Transmission
- xi. Sensor-Actuator Bus - No Communication
- i. The FEC shall accommodate the direct wiring of analog and binary I/O field points.
- j. The FEC shall support the following types of inputs and outputs:
 - i. Universal Inputs - shall be configured to monitor any of the following:
 - 1) Analog Input, Voltage Mode
 - 2) Analog Input, Current Mode
 - 3) Analog Input, Resistive Mode
 - 4) Binary Input, Dry Contact Maintained Mode
 - 5) Binary Input, Pulse Counter Mode
 - ii. Binary Inputs - shall be configured to monitor either of the following:
 - 1) Dry Contact Maintained Mode
 - 2) Pulse Counter Mode
 - iii. Analog Outputs - shall be configured to output either of the following
 - 1) Analog Output, Voltage Mode
 - 2) Analog Output, current Mode
 - iv. Binary Outputs - shall output the following:
 - 1) 24 VAC Triac
 - v. Configurable Outputs - shall be capable of the following:

- 1) Analog Output, Voltage Mode
 - 2) Binary Output Mode
- k. The FEC shall have the ability to reside on a Field Controller Bus (FC Bus).
- i. The FC Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - ii. The FC Bus shall support communications between the FECs and the NAE.
 - iii. The FC Bus shall also support Input/Output Module (IOM) communications with the FEC and with the NAE.
 - iv. The FC Bus shall support a minimum of 100 IOMs and FEC in any combination.
 - v. The FC Bus shall operate at a maximum distance of 15,000 ft. between the FEC and the furthest connected device.
- l. The FEC shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
- i. The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - ii. The SA Bus shall support a minimum of 10 devices per trunk.
 - iii. The SA Bus shall operate at a maximum distance of 1,200 ft. between the FEC and the furthest connected device.
 - iv. The FEC shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the FC Bus or the SA Bus.
 - v. The FEC shall support, but not be limited to, the following:
 - 1) Hot water, chilled water/central plant applications
 - 2) Built-up air handling units for special applications
 - 3) Terminal units
 - 4) Special programs as required for systems control
- H. Field Devices
1. Input/Output Module (IOM) – BY JCI
 - a. The IOM shall operate as a standard from 32 to 122 degrees Fahrenheit ambient air temperature and 10 to 90% relative humidity

- b. The Input/Output Module (IOM) provides additional inputs and outputs for use in the FEC.
- c. The IOM shall communicate with the FEC over either the FC Bus or the SA Bus using BACnet Standard protocol SSPC-135, Clause 9.
- d. The IOM shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
- e. The IOM shall have a minimum of 4 points to a maximum of 17 points.
- f. The IOM shall support the following types of inputs and outputs:
 - i. Universal Inputs - shall be configured to monitor any of the following:
 - 1) Analog Input, Voltage Mode
 - 2) Analog Input, Current Mode
 - 3) Analog Input, Resistive Mode
 - 4) Binary Input, Dry Contact Maintained Mode
 - 5) Binary Input, Pulse Counter Mode
 - ii. Binary Inputs - shall be configured to monitor either of the following:
 - 1) Dry Contact Maintained Mode
 - 2) Pulse Counter Mode
 - iii. Analog Outputs - shall be configured to output either of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Analog Output, current Mode
 - iv. Binary Outputs - shall output the following:
 - 1) 24 VAC Triac
 - v. Configurable Outputs - shall be capable of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Binary Output Mode
- g. The IOM shall include troubleshooting LED indicators to identify the following conditions:
 - i. Power On

- ii. Power Off
- iii. Download or Startup in progress, not ready for normal operation
- iv. No Faults
- v. Device Fault
- vi. Normal Data Transmission
- vii. No Data Transmission
- viii. No Communication

2. Network Sensors (NS)

- a. The Network Sensors (NS) shall have the ability to monitor the following variables as required by the systems sequence of operations:
 - i. Zone Temperature
 - ii. Zone humidity
 - iii. Zone setpoint
- b. The NS shall transmit the zone information back to the controller on the Sensor-Actuator Bus (SA Bus) using BACnet Standard protocol SSPC-135, Clause 9.
- c. The Network Sensors shall include the following items:
 - i. A backlit Liquid Crystal Display (LCD) to indicate the Temperature, Humidity and Setpoint.
 - ii. An LED to indicate the status of the Override feature.
 - iii. A button to toggle the temperature display between Fahrenheit and Celsius.
 - iv. A button to initiate a timed override command.
- d. The NS shall be available with either screw terminals or phone jack.
- e. The NS shall be available in either surface mount or wall mount styles.

2.5 TEMPERATURE CONTROL MATERIAL

A. Panel Devices:

| <u>Part #</u> | <u>Description</u> | <u>Manufacturer</u> |
|---------------|--------------------|---------------------|
|---------------|--------------------|---------------------|

| | | |
|--------------|-----------------------------|-------|
| DCP-1.5-W | 1.5 AMP POWER SUPPLY | KELE |
| DPT2640-005D | PRESSURE SENS, DP, 0-5"WC | SETRA |
| RH2B-UAC24-L | DPDT, 10A, HC=24 VAC, W/LED | IDEC |
| SH2B-05 | DPDT RELAY BASE FOR RH2B | IDEC |
| RH4B-UAC24V | 4PDT, 10A, HC=24 VAC | IDEC |
| SH4B-05 | 4PDT RELAY BASE FOR RH4B | IDEC |
| PXPLX01S | DP TRANSDUCER, AIR, 0-1" | VERIS |
| 1900-5MR | HIGH STATIC PRESS. SWITCH | DWYER |
| BAM2 | TB END STOP | KELE |
| FEM6 | TB END STOP SECTION | KELE |
| M4/6 | TERMINAL BLOCK | KELE |
| RC610B | TB BLANK MARKING STRIPS | KELE |
| Y65A13-0 | 120VAC/24VAC, FOOT, 40VA | JCI |
| Y65A21-0 | 120VAC/24VAC, PLATE, 40VA | JCI |

B. Transducers:

| <u>Part #</u> | <u>Description</u> | <u>Manufacturer</u> |
|---------------|-----------------------------------|---------------------|
| A-306 | OUTDOOR AIR STATIC | KELE |
| DPT-2015-1 | DIFF PRESS TRANSMITTER | JCI |
| DPT2090-250 | GPRESS SENS, GAGE, 250 PSI, VDC | SETRA |
| DPT2640-0R1 | BPRESS SENS, DP, -0.1-0.1"WC, VDC | SETRA |
| DPT2640-2R5D | PRESS SENS, DP, 0-2.5"WC, VDC | SETRA |
| FTG18A-600R | REMOTE MTD PROBE | JCI |
| PWLX03S | DIFF PRESS, WATER, 0-25PSI | VERIS |

C. Sensors:

| <u>Part #</u> | <u>Description</u> | <u>Manufacturer</u> |
|---------------|--------------------------------|---------------------|
| TE-6000-1 | SENSOR, T-NI, 1.0%, STRAP-ON | JCI |
| TE-6001-3 | KIT, MTG BOX FOR WZ-1000 WELL | JCI |
| TE-6313P-1 | SENSOR, T-NI 0.1%, 3IN OAT | JCI |
| TE-6316P-1 | SENSOR, T-NI, 0.1%, 17FT AVG | JCI |
| TE-6311V-2 | DUCT PROBE TEMP. SEN. 1K | JCI |
| TE-67NP-0N00 | SENSOR, RM, 1K, NI, PHONE JACK | JCI |
| TE-67NT-0N00 | TEMP SENSOR 1K NICKEL | JCI |
| NS-BTP7002-0 | ZONE TEMP SENSOR/SETPT | JCI |
| NS-BTP7003-0 | ADDRESSABLE ZONE TEMP | JCI |
| NS-BCN7004-0 | CO2 SENSOR | JCI |
| A/1KHT-2W-RP | REMOTE PROBE,-40-842, PT, 1K | ACI |
| A11A-1C | PLN, MLT, SP=35-45 F, STG=1 | JCI |
| TEC-2601-4 | 1 HEAT/1 COOL BACnet STAT | JCI |
| LX-24 | CEILING MOUNT OCC SENSOR | KELE |
| ST-S63-XH | S.S ZONE TEMP WITH OCC OVR | KELE |

D. Field Devices:

| <u>Part #</u> | <u>Description</u> | <u>Manufacturer</u> |
|----------------|-----------------------------------|---------------------|
| H922 | CURRENT SENSOR, SPLIT | VERIS |
| ST-S63-XM | STAINLESS STEEL ZONE TEMP | KELE |
| TS-470 | END SWITCH, NO | KELE |
| WZ-1000-5 | WELL, BRASS, 2-3/8 IN, 1/2 IN NPT | JCI |
| M9104-AGS-2N | ELEC, INCR, NSR, TQ=35 | JCI |
| M9220-BGA-3 | DAMPER ACTUATOR 20 NM SR | JCI |
| MS-FEC2611-0ET | OUTDOOR FEC | JCI |
| MS-FEC2611 | INDOOR FEC | JCI |
| MS-NAE4510-2 | MEDIUM CAPACITY NAE | JCI |
| MS-NAE5510-2 | HIGH CAPACITY NAE | JCI |

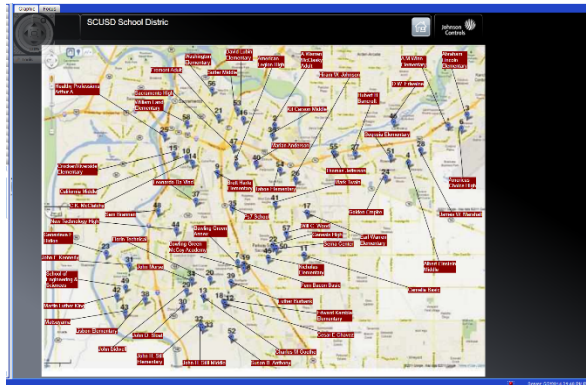
1. TEMPERATURE CONTROL MATERIAL:

- a. Motorized Control Dampers: Shall be parallel blade for two-position control and opposed blade for proportional control applications. Dampers shall have an enamel finish or be galvanized, with nylon bearings. Blade edge and tip seals shall be included for all dampers. Blade shall be double piece 22 gauge minimum and 8" wide maximum and frame shall be welded channel iron.
- b. Temperature control panels (TCP): Shall be of NEMA code gauge steel with locking doors for mounting all devices as shown. They shall meet all applicable requirements of Title 24, California Code of Regulations. All controllers, relays, switches, etc. for equipment located in mechanical equipment rooms shall be mounted in a TCP as shown on the drawings. Temperature settings, adjustments and calibration shall be done at the TCP. Any required UCMC Campus Data networks connection for this panel shall be installed inside the panel. All electric devices within a control panel shall be factory pre-piped and wired. Provide engraved laminated plastic nameplates identifying all devices mounted on the face of the control panels. A complete set of related "as-builts" control drawings shall be furnished in each control panel.

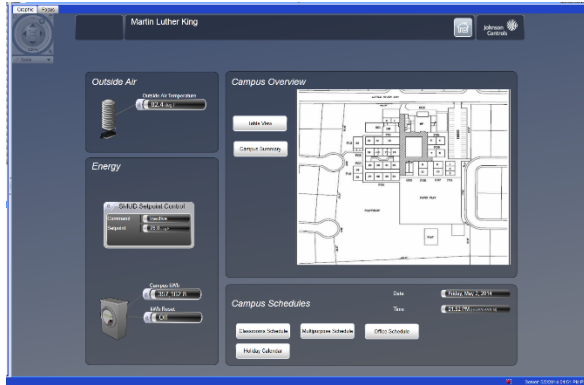
2. GRAPHIC INTERFACE

- a. The following are examples of the district wide standard for the graphical interface of the controls system. The new controls system must be graphically represented according to the following templates

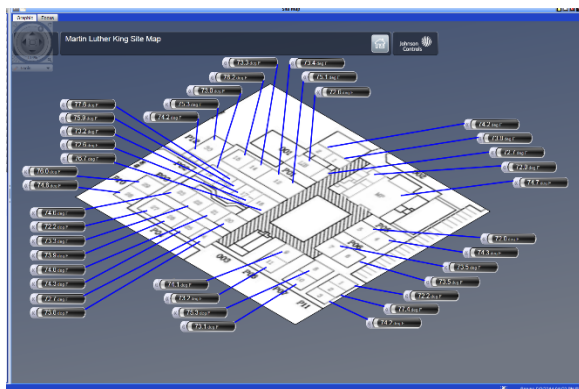
District Map View



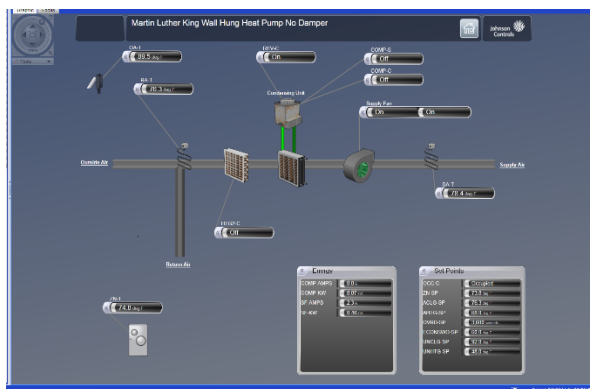
i. School Overview



ii. Zone Overview



iii. Equipment Overview



3. CONSULTATIVE SUPPORT

- a. For this project, the manufacturer shall provide at a minimum 8 hours of consultative support services to review and provide recommendations and enhancements to the system, which may include:
 - i. Review of critical programming loops and adjustments as necessary

- ii. Adjustments to improve building system operation, reduce energy consumption and/or improve environmental control
- iii. Implementation or enhancement of functionality in the system

4. MISCELLANEOUS DEVICES

- a. Moisture Sensors:
 - i. Moisture sensors shall be used to detect water in elevator sumps and chilled water fan coil unit overflow drain pans and where otherwise indicated on the Drawings using George Risk Industries Model GRI 2650, Veris MX Series, or equal.
 - ii. The sensor shall be floor mounted operating at 24 VAC with SPDT relay for the output signal with automatic reset.

PART 3 – EXECUTION

3.1 GENERAL

- A. Furnish all labor, materials, equipment, and service necessary for a complete and operating Direct Digital Control Building Automation Control System, as shown on the drawings and described herein.
- B. All labor, material, equipment, and software necessary to meet the functional intent of the Building Automation Control System as specified herein and as shown on the drawings shall be included.
- C. Drawings are diagrammatic only. Equipment and labor not specifically referred to herein, or on the plans, that are required to meet the functional intent of the Building Automation Control System, shall be provided without additional cost to Sac City Unified School District.
- D. Equipment furnished by Electrical and/or Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Wiring normally performed in field shall be furnished and installed by the Building Automation Control System contractor.
- E. Control equipment having electrical connections only, which are furnished under this work, shall be installed and connected by the Building Automation Control System contractor. Electrical devices requiring wet side piping connections shall be installed by the Mechanical Contractor.
- F. Clearly identify and label equipment and controls, such as starters, switches, relays, as to function and position with permanently engraved plastic nameplates.
- G. Wiring of control equipment in accordance with wiring diagrams and functional operation of the control system shall be the responsibility of the Building Automation Control System contractor.
- H. Final Adjustment of Equipment: After completion of installation, adjust temperature sensors, control valves, actuators, motors, and similar equipment provided under the scope of work of this section. Cooperate with the air balance contractor as required.

- I. Perform final adjustment by specially trained personnel in direct employ by the manufacturer of the primary Building Automation Control System.
- J. Connect control valves with threaded connections with sufficient unions to permit valves to be readily removed from their installed locations for servicing, without disturbing adjacent piping. In no case shall this be less than three unions for three-way valves and one union for two-way valves.
- K. Wiring and raceways included with the BACS scope of works includes but is not limited to the following:
 - 1. Power wiring for all controllers, sensors, relays and other equipment shall be taken from the local HVAC controls panels except equipment provided with dedicated supplies provided by Division 16.
 - 2. Controls wiring shall be routed from the local HVAC controls panels.
 - 3. Conduit shall be used for the following:
 - a. All exposed and concealed low voltage wiring in all areas below 8 feet above floor level.
 - b. All mechanical and equipment rooms, exterior locations and any other areas where physical protection and/or access is required as defined elsewhere in the contract documents.
 - c. All in-wall drops to equipment monitoring and/or control points including but not limited to medical equipment, kitchen service equipment, elevator sump and other moisture sensors, water flow meters, equipment mounted alarms, etc.
 - d. All areas where specifically indicated on the Drawings.
 - 4. J-Hooks and or designated LV raceway shall be used for the following:
 - a. All low voltage wiring above 8 feet above floor level in open and accessible areas where conduit is not required, to cable trays or other conduits.
 - b. All areas where specifically indicated on the Drawings.
 - 5. Conduit and J-Hook materials and installation requirements shall comply with the applicable sections of Division 16 unless specifically indicated otherwise on the Drawings.

3.2 WARRANTY

- A. The Building Automation Control System contractor shall provide a one-year warranty covering the Building Automation Control System, and all associated components installed by the Building Automation Control System contractor. Any manufacturing or installation defects arising during this warranty period shall be corrected without cost to the Owner. The Building Automation Control System contractor shall respond to the job site within a four (4) hour period for any emergency relating to the control system and associated components installed by the Building Automation Control System contractor. Warranty period shall commence

after all operator instruction is completed and the entire system has been accepted by the Owner.

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 Owner's Representative. 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 OPERATION TEST/SYSTEM COMMISSIONING

- A. Each piece of equipment shall be tested by the Building Automation Control System contractor to show that it will operate in accordance with designed requirements, and provide written documentation of this test. Control system commissioning shall consist of a point per point conformation and system operational demonstration conducted jointly by the Building Automation Control System contractor and the University's Representative.
- B. The mechanical contractor and BACS contractor/vendor will conduct two levels of Quality Assurance to verify that the required installation and performance of the Building Automation Control System as been met.
 - 1. Static Commissioning:
 - a. A point to point examination and documentation of the successful installation of the BACS system and its components in its entirety.
 - b. The start up of all HVAC equipment and associated systems will not commence until this work has been completed and the documentation received by the Owner.
 - 2. Dynamic Commissioning:
 - a. A point by point demonstration and documentation of the successful performance of the BACS system and its components in its entirety.
 - b. The verification demonstrations of all HVAC equipment and associated systems will not commence until this work has been completed and the documentation received by the Owner.
- C. All new controller programming shall be backed up into the districts existing database.
- D. As part of the operational test's the controls contractor shall demonstrate integration of new controls system into the existing server and BACS.
- E. In General the Commissioning process will comprise the following:
 - 1. Review of points list and documentation.
 - 2. Installation compliance with project plans and specifications.
 - 3. Point-to-point check.
 - 4. Control devices calibration and operation.

5. System programming and documentation.
 6. System endurance test.
 7. Control loop trends.
 8. Reports and alarms.
 9. Analog input calibration.
 10. Analog output check and spring ranges.
 11. Digital input range set points.
 12. Digital output in autolog.
 13. Point by point performance verification.
 14. O & M training and documentation.
 15. Opposite season verification and documentation.
 16. Review and document system architecture.
- F. Prior to job closing, the controls contractor must provide and present drawings showing the physical location of the new Field Control bus routing around the campus. This will be reviewed by district HVAC personnel.

3.5 OPERATOR INSTRUCTION

- A. During system commissioning and at such time acceptable performance of the Building Automation Control System hardware and software has been established, the Control Contractor shall schedule with the Owner's Representative and provide eight (8) hours of on site, or off site, operator instruction to the Owner's operating personnel. Operator instruction during normal working hours shall be performed by a competent representative familiar with the systems hardware, software, and accessories

END OF SECTION

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.
 - 2. Kitchen grease hood 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, air, etc.)
- B. Shop Drawings: Submit shop drawings for ductwork including elevations and showing all terminal units and air devices connections. Drawings shall be a minimum scale of 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. United McGill Sheet Metal
 2. Omni Duct
 3. Or equal
- B. Duct Connection Systems:
1. Ductmate Industries, Inc.
 2. Travers Duct Connection (TDC)
 3. Or equal
- C. Duct Sealants:
1. United McGill Corp.
 2. Ductmate Proseal
 3. Or Equal
- D. Duct Liner:
1. Johns Manville - Linacoustic
 2. Owens Corning Fiberglas Corporation – Aeroflex Plus
 3. Certainteed Corporation - Toughgard
- E. 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 or Round 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

2.3 GENERAL

- A. All duct sizes listed on drawings are external sizes.
- B. Galvanized Sheet Steel to be lock-forming quality, ASTM A924 and ASTM. 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 air tight. 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.
 - 6. Sealant shall have a VOC content of 250 g/L or less
 - 7. Sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.

8. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
 - a. Design Polymerics, model DP1010
 - b. Polymer Adhesive Sealant Systems Inc, model Airseal #11
 - c. McGill Airseal, LLC

- 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.
 - 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".
 - e. Elsewhere as indicated on the drawings.

 2. 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 – $0.14 \text{ BTU} / (\text{h} * \text{FT}^2 * ^\circ\text{F})$ – minimum
 - c. Thermal Performance - R Value – $8.3 (\text{h} * \text{FT}^2 * ^\circ\text{F}) / \text{BTU}$ – minimum
 - d. Minimum Acoustical Performance shall be as follows:
 - i. At 125 Hz Octave Band Frequencies, sound absorption of 0.24.
 - ii. At 250 Hz Octave Band Frequencies, sound absorption of 0.79.
 - iii. At 500 Hz Octave Band Frequencies, sound absorption of .09.
 - iv. At 1,000 Hz Octave Band Frequencies, sound absorption of 1.05.

- v. At 2,000Hz Octave Band Frequencies, sound absorption of 1.02.
 - vi. At 4,000 Hz Octave Band Frequencies, sound absorption of 1.01.
 - vii. NRC sound absorption to be 1.00.
- 3. Liner to be CertainTeed, ToughGard R Duct Liner, Type 150, or equal.
 - 4. Cement duct liner in place with nonflammable, non-hardening duct adhesive. Seal up all raw edges of insulation inside ductwork with adhesive.
 - 5. 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.
 - 6. Duct liner and adhesive shall not exceed flame-spread rating of 25 and smoke-developed rating of 50, all in conformance with NFPA 90A.
 - 7. 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:
 - 1. Ducts up through 12" to be 26 gauge minimum / no joint reinforcement required.
 - 2. Ducts 13" - 18" to be 24 gauge minimum / no joint reinforcement required.
 - 3. Ducts 19" – 30" to be 24 gauge minimum with C/4 joint reinforcement per CMC.
 - 4. Ducts 31" – 42" to be 22 gauge minimum with E/4 joint reinforcement per CMC.

5. Ducts 43" - 54" to be 22 gauge minimum with F/4 joint reinforcement per CMC.
 6. Ducts 55" – 60" to be 20 gauge minimum with G/4 joint reinforcement per CMC.
- 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.
1. Ducts 4" - 14" diameter to be 26-gauge minimum spiral lock-seam.
 2. Ducts 15" - 23" diameter to be 24-gauge minimum spiral lock-seam.
 3. Ducts 24" - 36" diameter to be 22-gauge minimum spiral lock-seam.
 4. Ducts 37" - 50" diameter to be 20-gauge minimum spiral lock-seam.
 5. Ducts 51" - 60" diameter to be 18-gauge minimum spiral lock-seam.

6. Ducts over 60" diameter to be 14-gauge minimum spiral lock-seam.
- D. Fittings and Couplings:
1. Construct of same minimum gauges listed for ductwork.
 2. Provide continuous welds along seams.

2.6 KITCHEN HOOD EXHAUST DUCTWORK

- A. Fabricate kitchen exhaust ducts and supports used for removal of smoke and grease-laden air from cooking equipment of 16 gauge minimum black steel where concealed and of 18 gauge minimum Type 304 stainless steel where exposed. At Contractor's option, 18 gauge minimum Type 304 stainless steel may be used where concealed. Finish exposed stainless steel with Number 4 finish. All ductwork shall be of welded construction in accordance with Section 510 of California Mechanical Code. For duct construction, comply with SMACNA "HVAC Duct Construction Standards" and ANSI/NFPA 96 "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations."
- B. Provide cleanouts in ductwork at all changes in direction as required by code.
- C. Kitchen Exhaust Duct Access Panels:
1. Provide listed duct access panel assembly of the same material and gauge used for the duct. Duct access panels shall conform to the following:
 - a. Fasteners: Black steel or stainless steel to match material used for the duct. Panel fasteners shall not penetrate duct wall.
 - b. Gasket: Comply with NFPA 96, grease-tight, high temperature ceramic fiber, rated for minimum 1500 °F.
 - c. Minimum Pressure rating: 10 inches wg., positive or negative.
- D. Available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Ductmate Industries, Inc.
 2. 3M
 3. FlameGard, Inc.
- E. Field-Applied Grease Duct Enclosure:
1. Thermal Ceramics Firemaster FastWrap XL, or equal, field-applied grease duct enclosure listed in accordance with ASTM E 2336.

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.
 - 2. Upper Connection of support to wood structure shall be with wood screws or lag screws in shear fastened in the upper one half of the wood structural member. Fasteners shall conform to the following schedule:
 - a. For duct sizes with $P/2 < 30"$, use #10 x 1/2" wood screw for fastener.
 - b. For duct sizes $31" \leq P/2 \leq 72"$, use 1/4"x 1-1/2" lag screw for fastener.
 - c. For duct sizes $P/2 \geq 73"$, use 3/8"x 1-1/2" lag screw for fastener.
 - 3. Upper connection in tension shall not be used unless absolutely necessary. Where deemed necessary, the Contractor shall submit calculations to show the size fastener and penetration required to support loads in tension from wood in accordance with the following schedule:
 - a. For duct sizes with $P/2 < 30"$, 260 pounds maximum load per hanger.
 - b. For duct sizes $31" \leq P/2 \leq 72"$, 320 pounds maximum per hanger.
 - c. For duct sizes $73" \leq P/2 \leq 96"$, 460 pounds maximum per hanger.
 - d. For duct sizes $P/2 > 96"$, not allowed

- 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 KITCHEN EXHAUST DUCTS

- A. Fabricate joints and seams with continuous welds for water-tight construction. Provide for thermal expansion of ductwork through 2,000 degrees F temperature range. Install without dips or traps which may collect residues. Provide access openings at each change in direction located on sides of duct 1-1/2 inches minimum from bottom and fitted with grease- tight covers of same material as duct.

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. Strip protective paper from stainless ductwork surfaces, and repair finish wherever it has been damaged.
- E. 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.
- F. 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. Fire/Smoke Dampers
 - 3. Fire Dampers
 - 4. Turning Vanes
 - 5. Duct Access Doors
 - 6. Flexible Connections

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."
- E. 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.
- F. Combination Fire smoke Dampers:
 - 1. Manufacturer: Test and qualify with UL a complete range of damper sizes covering dampers specified. Testing 1 size only is not acceptable.
 - 2. Damper Capacity: Demonstrate damper capacity to open and close under HVAC system operating conditions in accordance with UL 555S.
 - a. Closed Position: Maximum pressure of 4" w.g.
 - b. Open Position: Maximum air velocity of 3,000 feet per minute.

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 the 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 applications 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. 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
- C. 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
- D. Round Dampers:
1. Frame shall be 20 gauge galvanized steel or duct casing reinforced.
 2. Provide single thickness 20 gauge galvanized steel blade for ducts up to 12" diameter and 15 gauge steel for dampers larger than 12" diameter. Damper blade shall be 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.
- E. 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
- 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 into ductwork greater than 2" w.g. pressure class shall be side-mounted equal to Nailor Series 0800 for rectangular ducts and Nailor Series 0895 for round ducts. Access doors shall be tested at 8-inch static pressure. Access door height shall not be less than 75% of duct height.
 - 4. 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.
 - 5. Access doors into ductwork greater than 2" w.g. pressure class shall be side-mounted equal to Nailor Series 0800 for rectangular ducts and Nailor Series 0895 for round ducts. Access doors shall be tested at 8-inch static pressure. Access door height shall not be less than 75% of duct height.
 - 6. 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.
- D. Ductwork with pressure class greater than 2" w.g.:
 - 1. Rectangular Ductwork: Nailor model 0895, or equal.
 - 2. Round Ductwork: Nailor model 0800, or equal.
 - 3. Access doors shall be tested at 8-inch static pressure.
 - 4. Access door height shall not be less than 75% of duct height.

2.4 FLEXIBLE CONNECTIONS

- A. Furnish and install flexible connections at following locations:
 - 1. Duct connection of supply fan
 - 2. 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. 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.
- C. Where concealed volume control dampers are used, Contractor to show remote actuator locations on shop drawings for review. Remote Actuators shall be located symmetrically around lights and diffusers/grilles. Locations to be removed with shop drawings.

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. 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.

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SECTION 23 34 00 – EXHAUST FANS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes exhaust systems including:
 - 1. Kitchen exhaust fans
 - 2. Roof Curbs

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%
- 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.

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, Kitchen Exhaust Fans, Roof Exhaust fans:
1. Greenheck
 2. Loren Cook
 3. Twin Cities Fan and Blower

- 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 KITCHEN ROOFTOP CENTRIFUGAL EXHAUST FAN – UPBLAST – DIRECT DRIVE.

- A. Roof exhaust fans shall be upblast centrifugal belt driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure. Windbands shall have a rolled bead for added strength. Windband shall be welded to curbcaps with a leak proof continuous seam.
- B. Motor less than 2 HP to be an electronic commutation motor (ECM) specifically designed for fan applications.
 - 1. AC induction type motors (examples: Shaded pole, permanent split capacitor, split phase, capacitor start and 3 phase induction type motors) are not acceptable.
 - 2. Motors shall be permanently lubricated with heavy-duty ball bearings to match the fan load and pre-wired to the specific voltage and phase.
 - 3. Internal motor circuitry shall convert AC power supplied to the fan to DC power to operate the motor.
 - 4. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted on the motor or by a 0-10 VCD signal.
 - 5. Motor shall be a minimum of 85% efficient at all speeds.
- C. Motors shall be mounted out of the air-stream on vibration isolators. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance.

- D. A disconnect switch shall be factory installed and wired from the fan motor to a junction box within the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring.
- E. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.
- F. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.
- G. Provide with the following Options and Accessories:
 - 1. Aluminum Birdscreen
 - 2. Gravity backdraft Dampers
 - 3. UL/cUL 705 Electrical
 - 4. Drain connection
 - 5. Speed Controls
 - 6. NEMA 3R and EXP Disconnect Switches
 - 7. Vented Curb Extensions
 - 8. Heat Baffles
 - 9. UL/cUL 762 Grease
 - 10. Non-Stick Wheel
 - 11. Clean Out Port
 - 12. Grease Trap w/Drain Connection
 - 13. Hinged Curb Cap Kit w/Cable

2.4 ROOF CURBS

- A. Provide manufacturer's standard shop-fabricated units, modified if necessary to comply with project requirements.
- B. Fabricate structural framing for units of structural quality sheet steel formed to manufacturer's standard profiles for coordination with roofing, insulation and deck construction. Include 45 degree cant strips and deck flanges with offsets to accommodate roof insulation. Weld corners and seams to form watertight units.
- C. Sloping Roof Decks: For deck slopes of 1" per foot and more slope, fabricate support units to form level top edge.
- D. Unless scheduled otherwise, curbs height to be 14".
- E. Unless scheduled otherwise, curbs to be fabricated of 14 gauge metal.

- F. Provide pressure treated wood nailer, not less than 1-5/8" thick and of not less than width of support wall assembly. Anchor nailer securely to top of metal frame unit.
- G. Insulate units inside structural support wall with rigid glass fiber insulation board of approximately 3 lb. density and 1-1/2" minimum thickness, except as otherwise indicated.

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 discharge ductwork. Metal bands of connectors are to be parallel with 1" (minimum) flex between ductwork and fan while running.
- C. Flexible connections located outdoors shall be provided with a sheet metal sun shield.
- D. Install fan with vibration isolation as indicated. Adjust isolators to prevent tension n flexible connectors when fan is operating.
- E. Supply and install sheaves as necessary for final air balancing.
- F. Ensure air distribution equipment is wired properly, with rotation in direction indicated and intended for proper performance.

3.2 ROOF CURBS

- A. Furnish roof curbs to roofing installer for installation.

3.3 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.

3.4 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 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. 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."
- E. 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. All supply diffusers, registers, and grilles located at ceiling shall have factory-applied, bone-white finish unless noted otherwise.
 - 3. 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 74 33 – MAKE UP AIR UNIT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section provides requirements for packaged outdoor air unit.

1.2 REFERENCES AND STANDARDS

- A. AMCA Standards: Comply with Air Movement and Control Association (AMCA) Standards as applicable to testing and rating fans.
- B. SMACNA Compliance: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) ductwork construction standards as applicable to air conditioning units.
- C. ARI Certification: Coils shall comply with ARI Standard 410.
- D. UL Compliance: Provide electric components for air conditioning units which have been listed and labeled by Underwriters Laboratories or by a testing organization of equal standing.
- E. NFPA 90 A & B – Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems (all) ETL Listed and Labeled ANSI/ASHRAE 15 – Safety Code for Mechanical Refrigeration.
- F. Standard for Safety, Heating and Cooling Equipment – Third Edition, UL 1995 CSA C22.2 236-05, dated February 18, 2005, with revisions through July 30, 2009 (all for cooling and for electric heat)
- G. ANSI/ASHRAE/IESNA 90.1-2010 – Energy Standard for New Buildings except Low Rise Residential Buildings.
- H. ANSI Z21.47/UL 1995 – Unitary Air Conditioning Standard for Safety Requirements.
- I. California Energy Commission Administrative Code – Title 20/24 – Establishes the Minimum Efficiency Requirements for HVAC Equipment Installed in New Buildings in the State of California. (all)
- J. ANSI/NFPA 70-1995 – National Electric Code. (all)

1.3 ACTION SUBMITTALS

- A. Submit the following information for each packaged unit:
 - 1. Manufacturer's product data and cut sheet for each unit.
 - 2. Submit unit performance data including: capacity, nominal and operating performance.
 - 3. Submit Mechanical Specifications for unit and accessories describing construction, components and options.

4. Submit shop drawings including overall dimensions as well as installation, operation and service clearances. Indicate lift points and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
 5. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.
- B. Submit factory authorized start-up for review/approval.
- 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.

1.4 CLOSEOUT SUBMITTALS

- A. Startup Reports:
1. Submit unit start-up reports (by manufacturer's authorized start-up company).
- B. 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.

1.5 QUALITY ASSURANCE

- A. Flame-Smoke Ratings: Except as otherwise indicated, provide air conditioning unit 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.
- B. Packaged units shall be certified in accordance with ANSI/AHRI Standard 340/360 performance rating of commercial and industrial unitary air-conditioning and heat pump equipment.
- C. Unit shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.
- D. Unit and refrigeration system shall comply with ASHRAE 15, Safety Standard for Mechanical Refrigeration.
- E. Unit Energy Efficiency Ratio (EER) shall be equal to or greater that prescribed by ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.
- F. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117.
- G. Unit shall be rated in accordance with ARI sound standards 270.

- H. Unit shall be ETL or UL tested and certified in accordance with ANSI Z21.47 Standards as a total package.
- I. Roof curb shall be designed to conform to NRCA Standards.
- J. Unit shall be manufactured in a facility registered to ISO 9001:2000.
- K. Unit shall be Energy Star qualified.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver units with factory-installed shipping skids and lifting lugs; pack components in factory-fabricated protective containers.
- B. Handle units carefully to avoid damage to components, enclosures, and finish. Do not install damaged components; replace and return damaged components to unit manufacturer.
- C. Unit shall be shipped with doors screwed shut and outside air hood closed to prevent damage during transport and thereafter while in storage awaiting installation.
- D. Follow Installation, Operation, and Maintenance manual instructions for rigging, moving, and unloading the unit at its final location.
- E. Unit shall be stored in a clean, dry place protected from construction traffic in accordance with the Installation, Operation, and Maintenance manual.

1.7 WARRANTY

- A. In addition to the contractor's standard guarantee, furnish owner with manufacturer's warranty as follows:
 - 1. Installing contractor to provide 2 year labor warranty on entire unit.
 - 2. Unit manufacturer shall provide 5 year compressor parts warranty.
- B. This warranty period shall begin at upon signoff of substantial completion of the project.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Unit(s) furnished and installed shall be packaged. Unit shall consist of an insulated, weather- tight metal cabinet, downturn outdoor air intake with metal mesh filter assembly, evaporator coil, condensate drain pan, hot gas reheat coil, electric post-heater or indirect gas heater, supply air blower assembly and an electrical control center. All specified components and internal accessories shall be factory installed.
- B. The single- packaged units shall be a standard product of a firm regularly engaged in the manufacture of heating/cooling equipment.

- C. The equipment shall be shipped completely factory assembled, pre-charged, piped, and wired internally ready for field connections.
- D. Provide thermal overload protected motors.
- E. Manufacturer shall test operate system at the factory before shipment.
- F. Unit shall be U.L. listed.
- G. Unit shall have decals and tags to indicate lifting and rigging, service areas and caution areas for safety and to assist service personnel.
- H. Unit components shall be labeled, including refrigeration system components and electrical and controls components.
- I. Estimated sound power levels (dB) shall be shown on the unit ratings sheet.
- J. Installation, Operation, and Maintenance manual shall be supplied within the unit.
- K. Laminated color-coded wiring diagram shall match factory installed wiring and shall be affixed to the interior of the control compartment's hinged access door.
- L. Unit nameplate shall be provided in two locations on the unit, affixed to the exterior of the unit and affixed to the interior of the control compartment's hinged access door.
- M. Unit shall be capable of starting and running at 115° F ambient outdoor temperature per maximum load criteria of ARI Standards 210/240 or 340/360.
- N. Unit with microprocessor or electro-mechanical controls shall operate in cooling down to an outdoor ambient temperature of 25° F.
- O. Unit shall be provided with fan time delay to prevent cold air delivery in heating mode.
- P. All wiring shall be in compliance with Current NEC Codes.
- Q. Acceptable manufacturers:
 - 1. iAIRE
 - 2. Desert-Aire
 - 3. AAON
 - 4. Modine Co.
 - 5. Reznor
- R. Substitute equipment may be considered for approved equal if:
 - 1. Direct drive supply fans

2. Stainless Steel drain pans.
3. Efficiency equal or greater than specified.
4. Direct integration with BMS System.

2.2 UNIT CONSTRUCTION

- A. Materials: Formed, single wall or double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
 1. Outside casing: galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Pre-painted components as supplied by the factory shall have a baked enamel finish.
 2. Internal assemblies: galvanized (G90) steel except for motor supports which shall be minimum 14 gauge galvanized (G90) steel.
- B. Cabinet Insulation: Comply with NFPA 90A and NFPA 90B and erosion requirements of UL 181.
 1. Materials: Fiberglass insulation. If insulation other than fiberglass is used, it must also meet the Fire Hazard Classification shown below.
 - a. Thickness: 1/2 inch (50 mm)
 - b. Fire Hazard Classification: Maximum flame spread of 25 and smoke developed of 50, when tested in accordance with ASTM C 411.
- C. Access Panels / Doors: Unit shall be equipped with insulated, hinged doors or removable access panels to provide easy access to all major components. Doors and access panels shall be fabricated of galvanized G90 steel or painted galvanized steel.
- D. Supply Air blower assemblies: Blower assembly shall consist of an electric motor and a belt or direct-drive fan. Assembly shall be mounted on heavy gauge galvanized steel rails and further mounted on 1.125 inch thick neoprene vibration isolators. Blower motor shall be capable of continuous speed modulation and controlled by a VFD.
 1. Evaporator Coil: Evaporator coil shall be AHRI Certified and shall be (silver) soldered or brazed into the compressed refrigerant system. Coil shall be constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a galvanized steel frame. If two compressors are used as components of the unit, then the evaporator coil shall be of circuited configuration, permitting independent operation of either compressor without conflict with the other compressor.
- E. Control panel / connections: Units shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections.
- F. Condensate drain pan: Drain Pan shall be an integral part of the unit whenever a

cooling option is included. Pan shall be non-corrosive composite or welded austenitic stainless steel sheet material and provided with a welded stainless steel drain connection at the front for connection to a P trap. Drain pan shall be sloped in two directions to provide positive draining and drain connector shall be sealed at penetration through cabinet wall.

- G. Electric heater shall be provided for heating cycle and / or temperature control. Heater shall comply with UL 1995 and be constructed on a galvanized steel frame. heater shall be staged or SCR control and shall include a temperature sensor with field adjustable set point, located in the air stream.
- H. Reheat Coil with factory installed modulating hot gas reheat valve, shall be of the copper tube / aluminum fin design and shall be located downstream of the evaporator coil.
- I. Packaged DX System: unit shall have an integral compressor(s) and evaporator coil located within the weather-tight unit housing. Condenser coils and appurtenant condenser fan assemblies shall be factory installed as integral subassemblies of the unit. Condenser fan motors shall be three phase type 56 frame, Open Air Over and Shaft Up. Each condenser fan motor shall have a vented frame, rated for continuous duty and be equipped with an automatic reset thermal protector. Motors shall be UL Recognized and CSA Certified. The refrigerant compressor(s) shall be hermetic scroll-type modulating using a capacity control valve A.P.R. device for modulation of compressor capacity and to help prevent icing of the evaporator coil under low load conditions. The refrigeration circuit shall be equipped with liquid line filter drier, metering device, manual reset high pressure and low pressure cutouts and all appurtenant sensors, service ports and safety devices. Compressed refrigerant system shall be fully charged with R-410A refrigerant. Each compressor shall be factory-equipped with an electric crankcase heater to boil off liquid refrigerant from the oil.
- J. Capacity Modulation: a VFD driven compressor shall be used to modulate capacity of the first stage only.
- K. Packaged DX Control and Diagnostics: The Packaged DX system shall be controlled by an onboard microprocessor based digital controller (DDC) that indicates both owner-supplied settings, unit status and fault conditions that may occur. The DDC shall be programmed for discharge air control or space control.
- L. Motorized dampers: Motorized damper of low leakage type shall be shipped loose to prevent shipping damage.
- M. Sensors are considered to be part of various optional operational modes or device controllers and are to be factory supplied and installed as specified by the A/E.
- N. Blower section construction: Supply air blower shall be forward curved, direct drive (smaller units) or belt drive type (larger units). Blowers shall include neoprene pad isolation.
- O. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating."

2.3 UNIT CONTROLS

- A. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and sensors or it can be operated as a heating and cooling system controlled by a Building Management System (BMS) with optional BACnet or LON gateway. This unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors.
 - 1. Unit shall incorporate a DDC controller with integral LCD screen that provides text readouts of status. DDC controller shall have a built-in keypad to permit operator to access read-out screens without the use of ancillary equipment, devices or software. DDC controllers that require the use of equipment or software that is not factory-installed in the unit are not acceptable. Alarm readouts consisting of flashing light codes are not acceptable.
- B. Economizer control shall be temperature / dew point.
- C. Operating protocol: The DDC shall be factory-programmed for BACnet MSTP – coordinate with Controls Contractor.
- D. Variable Frequency Drive (VFD): Unit shall have factory installed variable frequency drive for modulation of the supply air blower assembly. The VFD shall be factory-programmed for unit-specific requirements and shall not require additional field programming to operate.

2.4 FANS AND MOTORS

- A. Indoor Fan shall direct or belt drive, factory installed and wired to on-board Variable Frequency Drive and shall be equipped with slide out service access.
- B. All fan motors shall meet the U.S. Energy Policy of 2005/10 (EPACT).
- C. All fan motors shall be permanently lubricated and / or have thermal overload protection.
- D. Outdoor fans shall be direct drive, statically and dynamically balanced, draw through in the vertical discharge position.
- E. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.

2.5 EVAPORATOR CONDENSER AND REHEAT COILS

- A. Evaporator and Hot Gas Reheat Coils shall be constructed of copper tubes mechanically bonded to aluminum fins. Micro-Channel Coils shall NOT be acceptable in these positions.
- B. Coils shall be leak tested at the factory to ensure pressure integrity. The Evaporator, Condenser, and Reheat Coils shall be pressure and leak tested.
- C. The Condenser coil shall be copper tubes mechanically bonded to aluminum fins, or micro channel design.

- D. To prevent re-hydration of condensate from the evaporator coil, the hot gas reheat coil face, and the evaporator coil face shall be separated.

2.6 REFRIGERANT CAPACITY CONTROL

- A. Units with scroll compressors shall be equipped with a VFD driven compressor on the lead circuit to modulate compressor capacity, and prevent evaporator frosting or freezing
- B. The Condenser coil shall be copper tubes mechanically bonded to aluminum fins, or micro channel design.
- C. To prevent re-hydration of condensate from the evaporator coil, the hot gas reheat coil face, and the evaporator coil face shall be separated.
- D. Compressors that pulse refrigerant as a means of capacity control will not be acceptable.

2.7 REFRIGERATION SYSTEM

- A. Compressor(s): All units shall have direct drive hermetic or semi-hermetically sealed compressors with centrifugal oil pumps
- B. Motor shall be suction gas cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate rated voltage.
- C. Internal overloads shall be provided in each compressor.
- D. Each compressor shall have a crankcase heater to minimize the amount of liquid refrigerant present in the oil sump during off cycles.
- E. Provide each circuit with hermetically sealed refrigerant circuit(s) factory supplied completely piped with liquid line filter drier, liquid line charging port suction and liquid line charging ports, accumulator, and/or liquid receiver.
- F. Units shall come with a hot gas, reheat coil, hot gas modulating valve, accumulator and receiver.

2.8 SEQUENCE OF OPERATION.

- A. The unit shall be constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers, thermostats and / or sensors. The unit can also be operated as a heating and cooling system controlled by a Building Management System (BMS). The unit shall be controlled by a factory-installed microprocessor programmable controller (DDC) that is connected to various optional sensors to control its operation by one of the following two sequences.

2.9 DISCHARGE AIR CONTROLLED (DAT)

- A. In the UNOCCUPIED mode, the outside air unit will be open and the outside air damper, if supplied, will be closed. Occupied or Unoccupied is signaled to the IAIRE controller via a normally open or normally closed contact on the OCCUPIED input with a clock or switch. An open contact on the input indicates OCCUPIED, a closed contact

indicates UNOCCUPIED.

- B. In the OCCUPIED mode, the outside air damper will open and the supply fan will ramp up to the configured fan speed (dependent on whether the unit is heating or cooling). The Fan input is monitored to determine if fan is operating or not. If not operating, the IAIRE controller will enter into an alarm state, start staging off compressors, and attempt to cycle the fan until it starts.
- C. There is a configurable EAT Heat Lockout (default 58F). If the entering air temperature (EAT) is $<$ or $=$ to the lockout, then the heat stages will cycle to maintain the discharge air temperature DAT setpoint.
- D. There is a configurable EAT Cool Lockout (default 61F). If the EAT is $>$ or $=$ to this lockout then Y1 is always on and Y2-Y4 is staged on depending on demand (if enabled), along with the modulated hot gas valve will be used to maintain the DAT.
- E. If the EAT is $>$ the EAT Heat Lockout (default 58F) and $<$ the EAT Cool Lockout (default 61F), the unit has 3 possible modes of operation. If DAT needs cooling, the unit will free cool. If DAT requires heat, the unit will turn on heat to try to maintain DAT. If there is a call for humidity control (Humidity above the Humidity Stage 1 Set point), (defaulted to 50% RH and user configurable), Y1 will stage on and the modulated Hot Gas will try to maintain DAT.

2.10 PROCESS CONTROLLED

- A. In the unoccupied mode, the outside air unit will be off and the outside air damper, if supplied, will be closed. Occupied or Unoccupied is signaled to the IAIRE controller via a normally open or normally closed contact on the OCCUPIED input with a clock or switch. An open contact on the input indicates OCCUPIED, a closed contact indicates UNOCCUPIED.
- B. In the OCCUPIED mode, the outside air damper will open and the supply fan will ramp up to the configured fan speed (dependent on whether the unit is heating or cooling). The Fan input is monitored to determine if the fan is operating or not. If not operating, the IAIRE controller will enter into an alarm state, stage OFF cooling or heating and attempt to cycle the fan until it starts.
- C. There is a configurable EAT Heat Lockout (default 58F). If the entering air temperature (EAT) is less than or equal to the lockout, then the heat stages will cycle to maintain the discharge air temperature and space temperature set-point.
- D. There is a configurable EAT Cool Lockout (default 61F). If the EAT is more than or equal to this lockout then Y1 is always on and Y2-Y4 is staged on depending on demand (if enabled). The modulating hot gas reheat cycle will be used to maintain the space temperature.
- E. If the EAT is greater than the EAT Heat Lockout (default 58F) and less than the EAT Cool Lockout (default 61F), Y1 will turn on and the modulating hot gas reheat cycle will be used to maintain space temperature. If EAT less than Space Temperature and Space Temperature is greater than the set-point, free-cooling will engage and Y1 will be off. While in this mode, if space humidity is $>$ 50% then Y1 will stage on and if its $>$ 70% then Y2 will stage on as well. The modulating hot gas reheat cycle will be used to maintain space temperature.

- F. Air filters:
1. Unit shall be equipped with 2-inch-thick, pleated panel filters with an ASHRAE efficiency of 80% and MERV rating of 13, upstream of the cooling coil.
 2. Provide sufficient spare filters for two complete change-outs of MERV 13 filters.

2.11 EQUIPMENT MOUNTING

- A. Roof Curb Data: For roof mounted equipment where combined weight of equipment unit and roof curb or rail exceeds 400 pounds, submit calculations from manufacturer for roof curbs proving compliance with the seismic requirements of the California Building Code, and ASCE 7-10. Manufacturer shall certify that roof curbs are suitable for use indicated on Drawings and in Specifications for the seismic design category indicated in structural Contract Documents. Calculations shall be stamped and signed by a State of California registered structural engineer
- B. Standard Roof Curbs:
1. Furnish and install a steel roof-mounting frame for bottom discharge air duct connection, where noted on Drawings. It shall mate to the bottom perimeter of the equipment. When flashed into the roof, it shall make a unit-mounting curb and provide weatherproof duct connection and entry into the conditioned area. Flashing shall be the responsibility of Roofing Contractor. Fourteen inch high frame above roofing unless noted otherwise.
 2. Sloping Roof Decks: For deck slopes of one inch per foot and more, fabricate support units to form level top edge. Where slope is less than one inch per foot, provide tapered wood nailers (treated wood) at top of support units to form level top edge. Where gauge or height is not indicated, fabricated units of 14-ga. metal and height of 14 inches (minimum).
 3. Curb shall be constructed to meet CBC 2019.
- C. The unit must be solidly fastened to the top steel frame and the lower sheet metal curb must be attached to the roof structure
- D. Curb Heights:
1. Contractor to coordinate required height of curbs with sloped roof insulation. Curb heights to vary as required.
 2. Lower curb height shall be sized as required by adjacent sloped roof insulation.
 - a. Curb shall be provided with a minimum of 8" between adjacent rigid insulation and top of lower curb.
 3. Reference mounting details for additional requirements.

- E. Acceptable manufacturers:
 - 1. Standard Curbs: By MicroMetl or equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. Examine areas and conditions under which units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Maintenance:
 - 1. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels

3.2 INSTALLATION OF UNITS

- A. Install 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.

3.3 OWNER TRAINING

- A. Owner Training: Manufacturer shall provide two initial on-site 4-hour training sessions for Owners' maintenance personnel. Manufacturer shall provide one 4-hour follow-up training session to be scheduled by Owner within one year of the date of the final initial training session. Training session agenda shall be as follows:
 - 1. First Session: Equipment
 - 2. Second Session: Controls
 - 3. Follow-up session: Agenda by Owner.

3.4 TESTING AND STARTUP

- A. Equipment manufacturer's commercial and industrial local service company shall conduct check, test, and start-up of units and shall complete one factory authorized startup form for each unit listing the refrigerant suction line pressure and temperature, liquid line pressure and temperature, charge in pounds of refrigerant, charge in pounds of refrigerant as required by the unit nameplate, supply blower rpm and supply blower amps drawn. Completed startup forms shall be submitted to the Architect and Mechanical Engineer for approval upon completion. If necessary, units shall be field charged with refrigerant for proper operation. Startup by installing contractor or others shall not be acceptable.

END OF SECTION.

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DIVISION 26 – ELECTRICAL

- 26 00 10 – Basic Electrical Requirements
- 26 00 60 – Power System Study
- 26 00 90 – Electrical Demolition
- 26 05 19 – Building Wire and Cable
- 26 05 26 – Grounding and Bonding
- 26 05 29 – Electrical Hangers and Supports
- 26 05 31 – Conduit
- 26 05 33 – Boxes
- 26 05 43 – Underground Ducts and Structures
- 26 05 53 – Electrical Identification
- 26 24 16 – Panelboards
- 26 27 19 – Surface Raceways
- 26 27 26 – Wiring Devices
- 26 28 16 – Overcurrent Protective Devices
- 26 28 19 – Disconnect Switches
- 26 50 00 – Lighting

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SECTION 26 00 10 – BASIC ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Table of Contents, Division 26 - Electrical:
- B. Work included: This Section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 01.
 - 1. Quality assurance.
 - 2. Definition of terms.
 - 3. Submittals.
 - 4. Coordination.
 - 5. Record documents.
 - 6. Operation and maintenance manuals.
 - 7. Project management and coordination services.
 - 8. Contract modification pricing procedures.
 - 9. Excavation.
 - 10. Rough-in.
 - 11. Electrical installation.
 - 12. Cutting, patching, painting, and sealing.
 - 13. Field quality control.
 - 14. Cleaning.
 - 15. Project closeout.
 - 16. Interface/Responsibility Matrix.
- C. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete and operable installation.
 - 1. General and supplementary conditions: Drawings and general provisions of Contract and Division 01 of the Specifications, apply to all Division 26 Sections.

2. Earthwork: Include trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, in-grade pull boxes, vaults, lighting pole foundations, etc. Refer to Division 31, Earthwork.
 3. Selective demolition: Nondestructive removal of materials and equipment for reuse or salvage as indicated. Also dismantling electrical materials and equipment made obsolete by these installations. Refer to Division 02, Selective Demolition.
 4. Concrete work: Include forming, steel bar reinforcing, cast-in-place concrete, finishing and grouting as required for underground conduit encasement, light pole foundations, pull box slabs, vaults, housekeeping pads, etc. Also includes setting of floor boxes in existing concrete slabs, saw-cutting of existing slabs and grouting of conduits in saw-cut. Refer to Division 03, Concrete.
 5. Miscellaneous metal work: Include fittings, brackets, backing, supports, rods, welding and pipe as required for support and bracing of raceways, luminaires, panelboards, distribution boards, switchboards, motor control centers, etc. Refer to Division 05, Miscellaneous Metals.
 6. Miscellaneous lumber and framing work: Include wood grounds, nailers, blocking, fasteners and anchorage for support of electrical materials and equipment. Refer to Division 06, Rough Carpentry.
 7. Moisture protection and smoke barrier penetrations: Include membrane clamps, sheet metal flashing, counter flashing, caulking and sealant as required for waterproofing of conduit penetrations and sealing penetrations in or through fire walls, floors, ceiling slabs and foundation walls. All penetrations through vapor barriers at slabs on grade shall be taped and made vapor tight. Refer to Division 07, Thermal and Moisture Protection.
 8. Access panels and doors: Required in walls, ceilings, and floors to provide access to electrical devices and equipment. Refer to Division 08, Access Doors also, Division 05, Metals.
 9. Painting: Include surface preparation, priming and finish coating as required for electrical cabinets, exposed conduit, pull and junction boxes, etc. where indicated as field painted in this Division. Refer to Division 09, Painting.
 10. Luminaire supports: Provide slack support wire for luminaires installed in acoustical tile or lay-in suspended ceilings. Refer to Division 09, Acoustical Treatment.
- D. Work furnished and installed under another Division requiring connections under this Division includes but is not limited to:
1. Electric motors.
 2. Package mechanical equipment: fans, fan coil units, pumps, boilers, compressors, etc.
 3. Kitchen equipment and appliances.

4. Electric signage.
 5. Electric heat trace tape.
 6. Variable frequency drive units.
 7. Chiller starters.
 8. Projection screens.
- E. Items furnished under another Division, but installed and connected under this Division includes but is not limited to:
1. Speed control switches for ceiling exhaust fans.

1.2 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:
1. California Electric Code (CEC).
 2. California Building Code (CBC).
 3. California Fire Code (CFC).
 4. California Mechanical Code (CMC).
- D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:
1. ACI American Concrete Institute
 2. ANSI American National Standards Institute
 3. ASTM American Society for Testing Materials
 4. CBM Certified Ballast Manufacturers
 5. ETL Electrical Testing Laboratories

6. FS Federal Specification
 7. IEEE Institute of Electrical and Electronics Engineers, Inc.
 8. IPCEA Insulated Power Cable Engineer Association
 9. NEMA National Electrical Manufacturer's Association
 10. UL Underwriters' Laboratories
- E. Independent Testing Agency qualifications:
1. Testing Agency shall be an independent testing organization that will function as an unbiased authority, professionally independent of Manufacturer, Supplier and Contractor, furnishing and installing equipment or system evaluated by Testing Agency.
 2. Testing Agency shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.
 3. Testing Agency shall meet Federal Occupational Safety and Health Administration (OSHA) requirements for accreditation of independent testing laboratories, Title 9, Part 1907.
 4. On-site technical personnel shall be currently certified by the International Electrical Testing Association in electrical power distribution system testing.
 5. Testing Agency shall use technicians who are regularly employed by the firm for testing services.
 6. Contractor shall submit proof of above Testing Agency qualifications with bid documentation upon request.
- F. All base material shall be ASTM and/or ANSI standards.
- G. All electrical apparatus furnished under this Section shall conform to NEMA standards and the CEC and bear the UL label where such label is applicable.
- H. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

1.3 DEFINITION OF TERMS

- A. The following list of terms as used in the Division 26 documents shall be defined as follows:
1. "Provide": Shall mean furnish, install, and connect unless otherwise indicated.
 2. "Furnish": Shall mean purchase and deliver to Project site.
 3. "Install": Shall mean to physically install the items in-place.

4. "Connect": Shall mean make final electrical connections for a complete operating piece of equipment.
5. "As directed": Shall be as directed by the Owner or their authorized Representative.
6. "Utility Companies": Shall mean the company providing electrical, telephone or cable television services to the Project.

1.4 SUBMITTALS

- A. Format: Furnish submittal data in electronic format for each Specification Section with a table of contents listing materials by Section and paragraph number.
- B. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 01.
- C. Each submittal shall be labeled with the Specification Section Number and shall be accompanied by a cover letter or shall bear a stamp stating that the submittal has been thoroughly reviewed by the Contractor and is in full compliance with the requirements of the Contract Documents or provide a Specification Section line-by-line compliance response statement with detailed exception/ deviation response statements for all applicable provisions for the applicable Specification Section. Any Specification Section lines without a detailed exception/ deviation response statement shall be treated as the Contractor or Vendor is submitting in full compliance with the applicable Specification Section requirements. Cover letters shall list in full the items and data submitted. Failure to comply with this requirement shall constitute grounds for rejection of data.
- D. The Contractor shall submit detailed Drawings of all electrical equipment rooms and closets if the proposed installation layout differs from the construction documents. Physical size of electrical equipment indicated on the Drawings shall match those of the electrical equipment that is being submitted for review, i.e.: switchboards, panelboards, transformers, control panels, etc. Minimum scale: 1/4" = 1'- 0". Revised electrical equipment layouts must be approved prior to release of order for equipment and prior to installation.
- E. As part of the equipment and fixture submittals, the Contractor shall provide anchorage calculations for floor and wall mounted electrical equipment and fixtures, distribution conduits and raceways, in conformance with the 2019 California Building Code (CBC) and ASCE 7-16. Use the Occupancy Category, Ground Accelerations, Site Class, Seismic Design Category, and Seismic Importance Factor as noted in the structural drawings. For components required for Life Safety or containing hazardous materials use $I_p=1.5$. Structural Calculations shall be prepared, stamped, and signed by a California Registered Structural Engineer. Specify proof loads for drilled-in anchors, if used.

- F. The Manufacturer shall recommend the method of anchoring the equipment to the mounting surface and shall provide the Contractor with the assembly dimensions, weights, and approximate centers of gravity.
- G. Review of submittals is for general conformance to design concept and general compliance with the Specification Sections. Submittal Review Comments do not imply waiver of Specifications Section requirements unless specifically noted.
- H. All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments. Resubmittal packages will not be reviewed unless accompanied by this cover letter. Failure to include this cover letter will constitute rejection of the resubmittal package.
- I. Shop Drawings for the following systems must be prepared via a computer aided drafting (CAD)building information modeling (Revit) system for submission by the Contractor. The Engineer can provide CAD/Revit files of the electrical Contract Documents to the Contractor.
 - 1. Manufactured wiring system.
 - 2. Fire alarm system.
 - 3. Security system.
 - 4. Telecommunication cabling system.
- J. Independent Testing Agency report:
 - 1. Testing Agency shall provide 3 copies of the complete testing report.
 - 2. Test report shall include the following:
 - a. Summary of Project.
 - b. Description of equipment.
 - c. Equipment used to conduct the test.
 - i. Type.
 - ii. Manufacturer.
 - iii. Model number.
 - iv. Serial number.
 - v. Date of last calibration.
 - vi. Documentation of calibration leading to NIST standards.
 - d. Description of test.

- e. Test results, as compared to Manufacturers or industry accepted standards and tolerances.
 - f. Conclusion and recommendation.
 - g. Signature of responsible test organization authority.
3. Furnish completed test report to Engineer no later than 30-days after completion of testing, unless otherwise directed.
- K. Substitutions:
- 1. All requests for substitutions shall conform to the general requirements and procedure outlined in Division 01.
 - 2. Where items are noted as "or equal," a product of equal design, construction and performance will be considered. Contractor must submit to the Engineer all pertinent test data, catalog cuts and product information required substantiating that the product is in fact equal to that specified. Only one substitution will be considered for each product specified.
 - 3. Manufacturers' names and model numbers used in conjunction with materials, processes or equipment included in the Contract Documents are used to establish standards of quality, utility, and appearance. Materials, processes, or equipment, which in the opinion of the Engineer is equal in quality, utility, and appearance, will be approved as substitutions to that specified.
 - 4. Whenever any material, process or equipment is specified in accordance with a Federal specification, an ASTM standard, an ANSI specification, UL rating or other association standard, the Contractor shall present an affidavit from the Manufacturer certifying that the product complies with the particular standard specification. When requested by the Engineer, support test data to substantiate compliance shall be submitted by the Contractor at no additional cost.
 - 5. Substitutions shall be equal, in the opinion of the Architect/Engineer, to the specified product. The burden of proof of such shall rest with the Contractor. When the Architect/Engineer in writing accepts a substitution, it is with the understanding that the Contractor guaranteed the substituted article or material to be equal to the one specified and dimensioned to fit within the construction. Approved substitutions shall not relieve the Contractor of responsibilities for the proper execution of the Work or from any provisions of the Specifications.
 - 6. The Contractor shall be responsible for all expenses in connection with the substitution materials, processes, and equipment, including the effect of the substitution on the Contractor, Subcontractor's, or other Contractor's Work. No substitution of material, processes or equipment shall be permitted without written authorization of the Architect/Engineer. Any assumptions on the acceptability of a proposed substitution prior to acceptance by the Engineer are at the sole risk of the Contractor.

1.5 COORDINATION

A. Discrepancies:

1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 01, prior to the Bid Opening to allow the issuance of an Addendum.
2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.

B. Project conditions:

1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities, and the conditions in which the Electrical Work will take place. Verify all existing conditions in the field. No allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.
2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices, and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.
3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.

C. Preparation:

1. Drawings:
 - a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.
 - b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic within the constraints of the symbology applied.

- D. Utility company contacts:
1. Contact for electrical service:
 2. Contact for telephone service:
 3. Contact for television service:

1.6 RECORD DOCUMENTS

- A. Provide Project Record Drawings as described herein:
1. Drawings shall fully represent installed conditions including actual locations of outlets, true panelboard connections following phase balancing routines, correct conduit, and wire sizing as well as routing, revised luminaire schedule listing Manufacturers and products installed and revised panel schedules. Contractor shall record all changes in the Work during the course of construction on blue or black line prints. These prints shall be made subject of monthly review by the Owner's Representative to ascertain that they are current. If not current, monthly payments may be withheld.
 2. Record Drawings shall be the transfer of information on these prints to the construction documents via computer aided drafting (CAD)building information modeling (Revit) process. A set of Revit files of the electrical construction documents will be provided to the Contractor by the Engineer. For the BIM/clash detection process, a Revit file of the electrical construction documents will be provided to the Contractor by the Engineer, which will represent a LOD of 300 design level. The Contractor is responsible for updating the model with changes as well as taking the model to a LOD of 500 design level.
 3. Record drawing submissions shall be provided to the Engineer to review upon the completion of the following phases of Work:
 - a. All underground installation.
 - b. Building electrical rough-in.
 - c. Final electrical installation.
 4. Include in the record drawing submission the following shop drawing submission with all updated installation information:
 - a. Manufactured wiring system.
 - b. Fire alarm system.
 - c. Security system.
 - d. Telecommunication cabling system
 - e. Intercom system.

- f. School communication system.
5. A single set of half size prints of the Record Drawings shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made, and the Contractor shall provide the following:
- a. Two sets of full-size prints.
 - b. Four sets of half-size prints.
 - c. One set of full size reproducibles.
 - d. Electronic files of Drawings in PDF and CAD/Revit.
- B. Panel schedules:
- 1. Typewritten panel schedules shall be provided for panelboards indicating the loads served and the correct branch circuit number. Schedules shall be prepared on forms provided by the Manufacturer and inserted in the pocket of the inner door of each panelboard. See Section 262416: Panelboards for requirements.
 - 2. A single set of the record panel schedules shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made, and the Contractor shall provide the following:
 - a. Fold and insert one copy of the appropriate schedule in the pocket of the inner door of each panelboard.
 - b. Three binders, each containing a full set of the panel schedules. Provide index listing all schedules and dividers for separation of schedules as follows:
 - i. 120/208V normal.
- C. Field labels, markings, and warning signs: Provide in accordance and as required by:
- 1. General: CEC Article 110.21.
 - 2. High-Leg System: CEC Article 110.15.
 - 3. Arc-Flash Warning: CEC Article 110.16.
 - 4. Identification of Disconnecting Means: CEC Article 110.22 (A).
 - 5. Engineered Series Combination Systems: CEC Article 110.22 (B).
 - 6. Tested Series Combination Systems: CEC Article 110.22 (C).
 - 7. Available Fault Current: CEC Article 110.24.
 - 8. Depth of Working Space in Existing Buildings: CEC Article 110.26 (A)(1)(c).

9. Guarding of Live Parts: CEC Article 110.27 (C).
10. Locked Rooms or Enclosures: CEC Article 110.34 (C).
11. Manholes: CEC Article 110.75 (E).

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Prior to Project closeout furnish to the Owner, six (6) hard back 3-ring binders containing all bulletins, operation and maintenance instructions, part lists, service telephone numbers and other pertinent information as noted in each Section all equipment furnished under Division 26. Binders shall be indexed into Division Sections and labeled for easy reference. Bulletins containing more information than the equipment concerned shall be properly stripped and assembled.

1.8 PROJECT MANAGEMENT AND COORDINATION SERVICES

- A. Overview: Contractor shall provide a Project Manager/Engineer for the duration of the Project to coordinate the Division 26 Work with all other trades. Coordination services, procedures and documentation responsibility shall include, but shall not be limited to the items listed in this Section.
- B. Review of Shop Drawings prepared by other Subcontractors:
 1. Obtain copies of all Shop Drawings for equipment provided by others that require electrical service connections or interface with Division 26 Work.
 2. Perform a thorough review of the Shop Drawings to confirm compliance with the service requirements contained in the Division 26 Contract Documents. Document any discrepancy or deviation as follows:
 - a. Prepare memo summarizing the discrepancy.
 - b. Provide a copy of the specific shop drawing, indicating via cloud, the discrepancy.
 3. Prepare and maintain a shop drawing review log indicating the following information:
 - a. Shop drawing number and brief description of the system/material.
 - b. Date of your review.
 - c. Indication if follow-up coordination is required.
- C. Request for information (RFI):
 1. Thoroughly review the Contract Documents prior to the preparation and submission of an RFI. If an RFI is submitted, attach 8 1/2" x 11" copies of all relevant documents to clarify the issue.
 2. Prepare and maintain an RFI log indicating the following information:

- a. RFI number and brief summary of the issue.
 - b. Date of issuance and receipt of response.
- D. Clarification confirmation memo (CCM):
1. Either the Contractor will prepare CCM memos or the Engineer to confirm a decision clarifying the Contract Documents that does not impact cost or affect other trades.
 2. Prepare and maintain a CCM log indicating the following information:
 - a. CCM number: Use CCM-C1, C2, etc. for memos issued by the Contractor and CCM-E1, E2, etc. for memos issued by the Engineer.
 - b. Brief summary of issue and date issued.

1.9 CONTRACT PRICING MODIFICATION PROCEDURES

- A. Submission guidelines: This Section covers the criteria for direct costs, mark-ups, and documentation requirements to be followed by the Contractor for any pricing modification to the Base Contract, where unit pricing has not already been established.
1. Change orders: Pricing for additions or deletions to the Base Contract Scope of Work upon acceptance of bid value and receipt of authorization to proceed.
 2. Allowances: Cost allowances may be assigned for specific Scope of Work outlined within the Base Contract where design has not been fully delineated on the Contract Documents. When detailed information is available, the Contractor shall prepare and submit a price quotation for the Work. This price quotation will be compared to the allowance value and any adjustments necessary to the Base Contract value shall be made via change order.
- B. Direct costs:
1. Labor:
 - a. Hourly labor rates shall not exceed the prevailing wage for the County where the Work is being performed. The costs for all supervision, including general superintendents and foremen, shall be included in the mark-up defined herein. Working foremen will be considered a direct cost only if the individual is on the Project site physically installing Work under the change order.
 - b. Labor burden shall be based on rates currently in effect at the time the Work under the change order is being performed and shall include only fringe benefits by governing trade organizations, Federal Insurance Contribution Act, Federal and State Unemployment taxes, payroll taxes and net actual premium paid for public liability, workers' compensation, property damage and other forms of insurance

required by the Owner. No other cost will be included as labor burden.

- c. NECA Manual of Labor Units will be utilized as the basis for determining labor productivity rates for Electrical Work as follows:
 - i. 85% of NECA column 1 (normal) for change in scope issued well in advance of Work needing to be performed, so as not to cause slow-down or Work stoppage.
 - ii. 100% of NECA column 1 (normal) for Work being performed with other Base Contract Work, not out of sequence and with minimal slow-down or Work stoppage.
 - iii. 100% of NECA column 2 (difficult) for Work performed out of sequence, requiring Work stoppage and reconstruction in areas already complete. This Work may involve the removal of ceiling tiles or the cutting and patching of walls.
- d. No labor costs shall be included for the following items since the labor is already covered by the NECA labor units for conduit and construction channel:
 - i. Conduit straps and clips.
 - ii. Construction channel accessories (nuts, washers, etc.).
 - iii. Screws.
 - iv. Conduit elbows $\frac{3}{4}$ " and smaller.

2. Material:

- a. The cost of material shall be the direct cost, including sales tax and may include the cost of transportation from the Supplier to the Contractor, but charges for final delivery to the Project site will not be allowed.
- b. Electrical commodities priced based on most current Trade Service Book with a 15% discount. Non-commodities priced per invoice from Supplier.

3. Equipment rental:

- a. Payment for equipment costs will be made at the rental rates listed for such equipment as specified in the current edition, at the time of the Work, of "Labor Surcharge and Equipment Rental Rates," a Caltrans Publication. Such rental rates shall be adjusted as appropriate and will be used to compute payments for equipment; regardless of the whether the equipment is under Contractor's control through direct ownership, leasing, renting or other method of acquisition. Daily, weekly, or monthly rates shall be used, whichever is lower. Hourly rates including operator shall not be used.

- b. The actual time to be paid for equipment shall be the time the equipment is in productive operation on the Work. No payment will be made time while equipment is inoperative due to breakdown or for non-working days.
 - c. Individual pieces of equipment having a replacement value of \$1,000 or less shall be considered small tools or small equipment and no payment will be made since the costs of these tools and equipment are included as part of the Contractor's mark-up for overhead and profit.
 - d. Payment to Contractor for use of equipment as set forth herein shall constitute full compensation to Contractor for the cost of fuel, power, oil, lubricants, supplies, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators) and any and all costs to Contractor for incidental use of the equipment.
4. Performance bond: Only the actual cost of insurance and bond premiums, with no mark-up for overhead and profit, will be allowed.
- C. Mark-up for overhead and profit on direct costs:
- 1. Costs to be included as part of mark-up:
 - a. Field and home office personnel including, but not limited to, Principals, Project Managers, Superintendents, Supervisory Foremen, Estimators, Project Engineers, Detailers, Draftspersons, Schedulers and Administrative Assistants.
 - b. All field and home office expenses including, but not limited to, field trailers, parking, storage sheds, office equipment and supplies, telephone service at the Project site, long-distance telephone calls, fax machines, computers and software, temporary utilities, sanitary facilities, etc.
 - c. Administrative functions including, but not limited to, reviewing, coordinating, distributing, processing, posting, recording, estimating, negotiating, scheduling, schedule updating and revising, expediting, detailing, revising Shop Drawings and preparing Record Drawings.
 - d. Vehicles required for the transportation of Contractor's staff and field personnel.
 - 2. Maximum mark-up values:
 - a. For Work performed by the Contractor, the overhead mark-up shall equal a maximum of 10 percent of the direct costs, as defined herein.
 - b. Mark-up for profit shall equal a maximum of 5 percent of combined direct and overhead costs.

- c. For Work performed by a Subcontractor shall equal a maximum of 5 percent mark-up for profit. Subcontractor shall follow the same guidelines above for their mark-up allowance. No consideration shall be given for more mark-ups then this two-tier arrangement whereas the mark-up could excess 20%.
 - d. For Work scope changes that result in a net decrease in cost to the Contractor or a Subcontractor, the Owner shall receive a credit based on the actual net decrease in direct cost figured in the same manner as an add cost. It is understood that the mark-up value applied at bid time will not be credited back. Although, if this is a change to a previous change order, then mark-up values shall be included in credit back to Owner.
 - e. There will be no mark-ups on the cost of performance bond.
- D. Documentation:
- 1. Project change order request submission:
 - a. Provide copies of all take-off sheets showing material and labor charges in line item format.
 - b. Provide recap sheet showing all direct costs and mark-ups.
 - c. Provide copies of invoices for Subcontracted Work.
 - 2. Allowance account tracking:
 - a. Contractor shall prepare and maintain a spreadsheet for each allowance account to track and monitor the requested and approved charges.
 - b. Copies of these spreadsheets, along with the summary spreadsheets, shall be submitted to the Owner's Representative twice a month.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. All work shall be installed in a neat, workmanlike manner in accordance with ANSI/NECA 1-2015.
- B. Comply with the requirements of all listed codes and standards.
- C. All materials and equipment provided under this contract shall be new (except where otherwise noted) and shall be listed, labeled or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc. (UL), standards where test standards have been established. Materials and equipment which are not covered by UL standards will be accepted, providing that materials and equipment

are listed, labeled, certified or otherwise determined to meet the safety requirements of a NRTL.

- D. All equipment of the same type and capacity shall be by the same manufacturer.
- E. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.
- F. During construction the contractor shall at all times maintain electrical utilities of the building without interruption. Should it be necessary to interrupt any electrical service or utility, the contractor shall secure permission in writing from the owner's representative for such Interruption at least ten (10) business days in advance. Any interruption shall be made with minimum amount of inconvenience and any shut-down time shall have to be on a premium time basis and such time to be included in the contractor's bid. Arrange to provide and pay for temporary power source as required by project conditions.
- G. Working clearance around equipment shall not be less than that specified in the CEC for all voltages specified.
- H. The locations of switches, receptacles, lights, motors, etc. outlets shown are approximate. The contractor shall use good judgment in placing the preceding items to eliminate all interference with ducts, piping, etc. The contractor shall check all door swings so that light switches are not located behind doors. Relocate switches as required, with approval from the Design Professional. The owner's representative may direct relocation of outlets before installation, up to five (5) feet from the position indicated on the Drawings, without additional cost.
- I. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity. Normal maintenance shall not require the removal of protective guards from adjacent equipment. Install equipment as close as practical to the locations shown on the Drawings.
 - 1. Where the owner's representative determines that the Contractor has installed equipment not conveniently accessible for operations and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the owner.
 - 2. "Conveniently Accessible" is defined as being capable of being reached without climbing or crawling over or under obstacles such as motors, pumps, belt guards, transformers, racks, piping, ductwork, raceways or similar.
- J. Owner furnished equipment: Equipment furnished by the District shall be received, stored, uncrated, protected, and installed by the Contractor with all appurtenances required to place the equipment in operation, ready for use. The Contractor shall be responsible for the equipment as if he had purchased the equipment himself and shall hold the warranty

3.2 ROUGH-IN

- A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough ins with field measurements and with the requirements for the actual equipment to be connected.
- C. Refer to equipment specification in Divisions 22 through 33 for rough-in requirements.

3.3 ELECTRICAL INSTALLATION

- A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:
 - 1. Shop Drawings prepared by Manufacturer.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of the Work. Give attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
 - 7. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
 - 9. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect

equipment for ease of disconnecting, with minimum of interference with other installations.

11. Coordinate electrical systems, equipment, and materials installations with other building components.
12. Provide access panel or doors where devices or equipment are concealed behind finished surfaces. Furnish and install access doors per the requirements of Division 08.
13. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
14. Conform to the National Electrical Contractors Association "Standard of Installation" for general installation practice.

3.4 CUTTING, PATCHING, PAINTING AND SEALING

- A. Structural members shall in no case be drilled, bored, or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.
- B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- C. Cut, remove, and legally dispose of selected electrical equipment, components and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new work.
- D. Protect the structure, furnishings, finishes and adjacent materials not indicated or scheduled to be removed.
- E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
- F. Patch existing surfaces and building components using experienced installers and new materials matching existing materials and the original installation. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.
- G. Application of joint sealers:
 1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.
 2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.5 FIELD QUALITY CONTROL

- A. General testing requirements:
1. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 2. Tests and inspections shall determine suitability for energization.
 3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.
- B. Tests: In addition to specific system test described elsewhere, tests shall include:
1. Equipment operations: Test motors for correct operation and rotation.
 2. Lighting control circuits: Test lighting circuits for correct operation through their control devices.
 3. Alarm and interlock systems: Produce malfunction symptoms in operating systems to test alarm and interlock systems. In addition, all specific tests described in the fire alarm system shall be performed.
 4. Circuit numbering verification: Select on a random basis, various circuit breakers within the panelboards and cycle them on and off to verify compliance of the typed panel directories with actual field wiring.
 5. Voltage check:
 - a. At completion of job, check voltage at several points of utilization on the system that has been installed under this Contract. During test, energize all installed loads.
 - b. Adjust taps on transformers to give proper voltage, which is 118 to 122volts for 120volt nominal systems and proportionately equivalent for higher voltage systems. If proper voltage cannot be obtained, inform the Owner and the serving Utility Company.
- C. Contractor shall provide test power required when testing equipment before service energization and coordinate availability of test power with General Contractor after service energization. The Contractor shall provide any specialized test power as needed or specified herein.
- D. Testing safety and precautions:
1. Safety practices shall include the following requirements:
 - a. Applicable State and Local safety operating procedures.
 - b. OSHA.

- c. NSC.
 - d. NFPA 70E.
- 2. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required ungrounded by test procedure.
- E. Calibration of test equipment:
 - 1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
 - 2. Instruments shall be calibrated in accordance with the following frequency schedule:
 - a. Field instruments: Analog, 6-months maximum; Digital, 12-months maximum.
 - b. Laboratory instruments: 12-months.
 - c. Leased specialty equipment: 12-months where accuracy is guaranteed by lessor.
 - 3. Dated calibration labels shall be visible on test equipment.
 - 4. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
 - 5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
 - 6. Calibration standards shall be of higher accuracy than instrument tested.
 - 7. Equipment used for field testing shall be more accurate than instrument being tested.
- F. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.
- G. Notify Owner and Engineer one week in advance of any testing.
- H. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
- I. Testing Agency shall maintain written record of tests and shall assemble and certify final test report.
- J. Include all test results in the maintenance manuals.

3.6 CLEANING

- A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.7 PROJECT CLOSEOUT

- A. Training:
 - 1. At the time of completion, a period of not less than 4-hours shall be allotted by the Contractor for instruction of building operating and maintenance personnel in the use of all systems. This 4-hour training is in addition to any instruction time called out in the Specifications for specific systems. All personnel shall be instructed at one time, the Contractor making all necessary arrangements with Manufacturer's Representative. The equipment Manufacturer shall be requested to provide product literature and application guides for the users' reference. Costs, if any, for the above services shall be paid by the Contractor.
 - 2. All training sessions shall be video recorded. Confirm file type, i.e. MOV, AVI, MP4, etc. with the district. Each specification section that requires training shall include one file, and all Division 26 specifications shall be stored on a flash drive (USB3.0, 1TB min.) 3 flash drives shall be provided to the district representative with closeout documentation.
- B. Special tools: Provide one of each tool type required for proper operation and maintenance of the equipment provided under this Section. All tools shall be delivered to the Owner at the Project completion.
- C. Keying: Provide two keys for each lock furnished under this Section and turn over to Owner.

END OF SECTION.

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SECTION 26 00 60 – POWER SYSTEM STUDY

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Services necessary to complete the system analysis studies required for the item specified under this Division, including but not limited to:
 - 1. Short circuit study.
 - 2. Protective device evaluation study.
 - 3. Protective device coordination study.
 - 4. Arc flash and shock risk assessment.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with equipment specified elsewhere to perform a complete analysis study.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American National Standards Institute, Inc. (ANSI):
 - a. ANSI Z535.4; Product Safety Signs and Labels
 - 2. Institute of Electrical and Electronic Engineers (IEEE):
 - a. IEEE 1584; Guide for Performing Arc-Flash Hazard Calculations
 - 3. National Fire Protection Association (NFPA):
 - a. NFPA 70E; Standard for Electrical Safety in the Workplace

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. The results of the Power System Study shall be summarized in a final report. Three (3) bound copies of the final report shall be submitted.
 - 2. The report shall include the following Sections:
 - a. Description, purpose, basis and scope of the study and a single line diagram of that portion of the power system, which is included within the scope of the study.

- b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties and commentary regarding it.
 - c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection and commentary regarding it.
 - d. Fault current calculations including a definition of terms and guide for interpretation of computer printout.
 - e. Recommended size for power fuses and recommended settings for ground fault relays and for all adjustable trip relays.
 - f. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.
 - g. Tabulations of arc flash and shock risk assessment results and commentary regarding results.
 - h. Sample arc flash and shock hazard warning label.
3. Contractor shall also provide an electronic copy of the report as part of the Record Document process. Electronic copy of the report shall be in PDF format and its native file format (e.g. XXX.PRJ).
- B. The study shall be submitted prior to final review of the distribution equipment Shop Drawings, prior to release of equipment for manufacture. If formal completion of the study may cause delay in equipment manufacture, approval from the Architect may be obtained for a preliminary submittal of sufficient data to ensure that the selection of device ratings and characteristics will be satisfactory. Then the formal study will be provided to verify the preliminary findings.

1.4 QUALITY ASSURANCE

- A. The system analysis studies shall be performed by the Switchboard/Switchgear Manufacturer or by an approved Independent Testing Company. The analysis shall be stamped by a professional engineer licensed in the State of California.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 – EXECUTION

3.1 GENERAL

- A. The studies shall include all portions of the electrical distribution system from the main normal power services down to and including the 208volt AC distribution system. Normal system connections and those that result in maximum fault conditions shall be adequately covered in the study.

3.2 SHORT CIRCUIT STUDY AND PROTECTIVE DEVICE EVALUATION STUDY

- A. The short circuit study shall be performed with the aid of a computer program and shall be in accordance with the latest applicable IEEE and ANSI standards.

- B. The study input data shall include the maximum available short circuit contribution, resistance and reactance components of the branch impedance, the X/R ratios, base quantities selected and other source impedance.
- C. Short circuit close and latch duty values and interrupting duty values shall be calculated on the basis of maximum available current at each substation bus, switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel and other significant locations through the system. The short circuit tabulations shall include asymmetrical fault currents, symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio.
- D. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, switches, transfer switches and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Architect's attention.

3.3 PROTECTIVE DEVICE COORDINATION STUDY

- A. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, ground fault relays and low voltage breaker trip characteristics and settings. The studies shall be in accordance with the latest applicable IEEE and ANSI standards.
- B. The coordination study shall include all medium and low-voltage classes of equipment from the building or plant service protective devices down to and including low voltage motor control centers and panelboards. The phase and ground overcurrent protection shall be included as well as settings of all other adjustable protective devices
- C. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves and fuses, phase cable damage curves, ground cable damage curves, medium-voltage cable shield damage curves, ground resistor damage curves, etc. as appropriate for the project. The coordination plots shall indicate the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand parameters, cable thermal overcurrent withstand limits and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.

- D. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, Manufacturer and type, range of adjustment and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas or inadequacies shall be promptly brought to the Architect's attention.

3.4 ARC FLASH AND SHOCK RISK ASSESSMENT

- A. An arc flash and shock risk assessment shall be performed in accordance with NFPA 70E (utilizing IEEE 1584 calculation method for incident energy analysis method) at each switchboard, distribution board, panelboard, etc. in accordance with the referenced standards. NFPA 70E hazard/ risk tables for arc flash PPE category method are not acceptable for compliance with this section.
- B. The arc flash and shock risk assessment shall include all voltage classes of equipment from the service entrance down to and including the panelboards, etc. in addition to all possible scenario configurations from alternate power sources (e.g. generators, etc.).
- C. The company performing the arc flash and shock risk assessment shall provide arc flash and shock hazard warning labels for all equipment evaluated in accordance with NFPA 70E and ANSI Z535.4. Labeling shall be as follows:
 - 1. Label type:
 - a. White vinyl or polyester with the following warning symbol color and black text:
 - i. Incident energy below 40 cal/cm² = Orange.
 - ii. Incident energy for 40 cal/cm² and above = Red with DANGER symbol in lieu of WARNING.
 - b. Industrial grade self-adhesive backing.
 - c. Suitable for indoor or outdoor environments for a minimum of 3-years without fading or degrading.
 - 2. Label information (minimum):
 - a. Nominal system voltage.
 - b. Arc flash boundary (inches).
 - c. Available incident energy and the corresponding working distance (inches).
 - d. Limited approach boundary (inches).
 - e. Restricted approach boundary (inches).

- f. Equipment identification.
 - g. Date.
3. Labels shall be affixed to all equipment covered under the risk assessment by the company performing the arc flash and shock risk assessment.
 4. Prior to printing and affixing labels, coordinate with the Owner and Architect, which scenario will be used for the labels.

3.5 PROTECTIVE DEVICE TESTING, CALIBRATION AND ADJUSTMENT

- A. The equipment Manufacturer shall provide the services of a qualified field Engineer and necessary tools and equipment to test and calibrate the protective relays, ground fault relays and circuit breaker trip devices as recommended in the Power System Study.

END OF SECTION.

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SECTION 26 00 90 – ELECTRICAL DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor and equipment necessary to complete the demolition required for the item specified under this Division, including but not limited to:
 - 1. Electrical demolition

1.2 SYSTEM DESCRIPTION

- A. Disconnection, removal and relocation of all wiring, luminaires, outlets, conduit, and all other types of electrical equipment as described on Drawings.
- B. Purpose is to remove, relocate and extend existing installations to accommodate new construction.

PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment necessary for patching and extending Work, as specified in other Sections.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly review conditions in the area of demolition prior to commencing Work to ensure complete understanding of existing installation in relationship to demolition Work.

3.2 GENERAL REQUIREMENTS

- A. Remove all wiring, luminaires, outlets, conduit, and all other types of electrical equipment indicated to be removed. Devices that are to be removed may require reworking conduit and wiring in order to maintain service to other devices. If removed devices are on walls or ceilings that are to remain, blank coverplates are to be installed on outlet boxes.
- B. Where remodeling interferes with circuits in areas that are otherwise undisturbed, circuits shall be reworked as required.
- C. Existing devices and circuiting that are indicated are indicated only for informational purposes. Contractor shall visit the Project site and shall verify conditions as they exist and shall remove, relocate, and/or rework any electrical equipment or circuits affected (whether indicated or not) due to removal of existing walls, ceilings, etc. Coordinate all Work with that of other trades.
- D. All equipment, luminaires, devices, etc., which are removed shall be delivered to the Owner for disposition. All items which are removed and not wanted by the Owner

and which are not reused shall become the property of the Contractor and shall be legally removed from the Project site.

- E. Cutting and patching necessary for the removal of Electrical Work shall be included.
- F. Remove and replace luminaires, rework, relocate or replace conduit and wiring and do other Work required by the installation of new ductwork, piping, etc., above the ceiling. Coordinate with other trades and verify the extent of the Work.

3.3 LUMINAIRES

- A. Disconnect and remove abandoned luminaires. Remove conduits, wiring, boxes, brackets, stems, hangers, and other accessories.

3.4 OUTLETS

- A. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

3.5 CONDUIT

- A. Remove abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors and patch surfaces.

3.6 WIRING

- A. Removed abandoned wiring to source of supply.

3.7 EXISTING SYSTEMS

- A. Electrical distribution system: Disable system only to make switchovers and connections. Obtain permission from Owner's designated representative at least 24-hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to Work area.

3.8 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that shall remain.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaries: Remove lenses and lamps and clean all exposed surfaces. Also clean the lenses or replace if discolored. Provide all new lamping when re-assembling.

END OF SECTION

SECTION 26 05 19 – BUILDING WIRE AND CABLE

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Building wire.
 2. Cable.
 3. Wiring connections and terminations.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
1. Underwriters Laboratories, Inc. (UL):
 - a. UL 4; Armored Cable.
 - b. UL 44; Thermoset-Insulated Wires and Cables.
 - c. UL 62; Flexible Cord and Fixture Wire.
 - d. UL 83; Thermoplastic-Insulated Wires and Cables.
 - e. UL 183; Manufactured Wiring Systems.
 - f. UL 310; Electrical Quick-Connect Terminals.
 - g. UL 486A & B; Wire Connectors.
 - h. UL 486C; Splicing Wire Connectors.
 - i. UL 486D; Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
 - j. UL 493; Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
 - k. UL 510; Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
 - l. UL 854; Service-Entrance Cables.

- m. UL 1569; Metal-Clad Cables.
- n. UL 1581; Reference Standard for Electrical Wires, Cables and Flexible Cords.
- o. UL 2196; Standard for Tests of Fire Resistive Cables.
- 2. National Electrical Manufacturer Association (NEMA):
 - a. NEMA WC-70; Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
- 3. Institute of Electrical and Electronic Engineers (IEEE):
 - a. IEEE 82; Test Procedure for Impulse Voltage Tests on Insulated Conductors.
 - b. IEEE 576; Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Submit Manufacturer's installation instructions.
 - 4. Final test results.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.
- C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Building wire:
 - a. Cerrowire
 - b. General Cable
 - c. Southwire Company
 - d. Stabiloy (aluminum only)
 - e. United Wire and Cable
2. Flexible cords and cables:
 - a. Carol Cable Company
 - b. Cerrowire
 - c. PWC Corp
3. Wiring connectors and terminations:
 - a. 3M Company.
 - b. Ideal.
 - c. Blackburn-Holub.
 - d. Burndy.
 - e. Thomas & Betts Corp.
 - f. Beau Barrier.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 BUILDING WIRE

A. Conductor material:

1. Provide annealed copper for all wire, conductor, and cable, unless otherwise indicated.
2. All building wire shall be stranded, unless otherwise indicated.

B. Insulation material:

1. All insulated wire, conductor and cable shall be 600volt rated, unless otherwise noted on the Drawings.

2. Thermoplastic-insulated building wire.
3. Rubber-insulated building wire.
4. Copper feeders and branch circuits larger than #6 AWG: Type THW, XHHW or dual rated THHN/THWN.
5. Copper feeders and branch circuits #6 AWG and smaller: Type TW, THW, XHHW or dual rated THHN/THWN.
6. Conductors for variable frequency drives (VFD): Type XHHW-2.
7. Service Entrance: Type RHW or THWN.
8. Control Circuits: Type THW or dual rated THHN/THWN.
9. Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

2.3 FLEXIBLE CORDS AND CABLES (TYPE 'S')

- A. Provide flexible cords and cables of size, type and arrangement as indicated on the Drawings.
- B. Type 'S' flexible cords and cables shall be manufactured in accordance with CEC Article 400 and composed of two or more conductors and a full size green insulated ground wire with an outer jacket of rubber or neoprene as noted.
- C. Flexible cords and cables shall be fitted with wire mesh strain relief grips either as an integral component of the connector or as an independently supported unit.
- D. Suspended flexible cords and cables shall incorporate safety spring(s) unless otherwise noted.

2.4 WIRING CONNECTIONS AND TERMINATIONS

- A. Bolted pressure connectors: Provide wide range-taking connectors with cast bronze compression bolts, designed for parallel taps, tees, crosses or end-to-end connections.
- B. Electrical spring wire connectors:
 1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
 2. Self-striping pigtail and tap U-contact connectors shall not be used.
- C. Compression type terminating lugs:
 1. Provide tin-plated copper high-compression type lugs for installation with hand or hydraulically operated circumference-crimping tools and dies as

stipulated by the lug Manufacturer or as indicated on Drawings. Notch or single point type crimping is NOT acceptable.

2. Two-hole, long barrel lugs shall be provided for size #4/0 and larger wire where terminated to bus bars. Use minimum of three crimps per lug, on sizes where possible.
- D. Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7-mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000volts suitable for temperatures from minus 18-degrees C to 105-degrees C.
- E. Insulating putty:
1. Provide pads or rolls of non-corrosive, self-fusing, one-eighth inch thick rubber putty with PVC backing sheet. Scotch vinyl mastic pads and roll or equal.
 2. Use putty suitable for temperatures from minus 17.8-degrees C to 37.8-degrees C with a dielectric strength of 570volts/mil minimum.
- F. Insulating resin:
1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.
 2. Use resin with a set up time of approximately 30-minutes at 21.1-degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.
- G. Terminal strips:
1. Provide box type terminal strips in the required quantity plus 25% spare. Install in continuous rows in terminal cabinets.
 2. Use the box type terminal strips with barrier open backs and with ampere ratings as required.
 3. Identify all terminals with numbering sequence being used for a system.
- H. Crimp type connectors:
1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel with funnel wire entry and insulation support
 2. Fasten crimp type connectors or terminals using a crimping tool recommended by the connector Manufacturer.
 3. Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support.
 4. Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support.

- I. Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed using tool supplied by Manufacturer of ties.
- J. Wire lubricating compound:
 - 1. UL listed for the wire insulation and conduit type and shall not harden or become adhesive.
 - 2. Shall not be used on wire for isolated type electrical power systems.
- K. Bolt termination hardware:
 - 1. Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.
 - 2. Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
 - 3. Flat washers shall be steel or silicon bronze, Type A plain standard wide series, confirming to ANSI B27.2. SAE or narrow series shall not be used.
 - 4. Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.
 - 5. Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following values:
 - a. 1/4" bolt: 125amps
 - b. 5/16" bolt: 175amps
 - c. 3/8" bolt: 225amps
 - d. 1/2" bolt: 300amps
 - e. 5/8" bolt: 375amps
 - f. 3/4" bolt: 450amps

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 APPLICATION

- A. All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.
- B. Feeders and branch circuits in wet locations shall be rated 75-degree C.
- C. Feeders and branch circuits in dry locations shall be rated 90-degree C.
- D. Feeders and branch circuits for direct-current (DC) systems, such as PV installations, in wet locations shall be type XHHW-2 copper conductors.
- E. For wiring of the following, refer to the indicated Code Articles:
 - 1. Emergency systems shall comply with CEC Article 700.
 - 2. Fire alarm systems shall comply with CEC Article 760.
 - 3. Where the any above are required to be fire-resistive, refer to CEC Article 728.
- F. Minimum conductor size:
 - 1. Provide minimum AWG #12 for all power and lighting branch circuits.
 - 2. Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated.
- G. Color coding:
 - 1. For 120/208volt, 3-phase, 4-wire systems:
 - a. Phase A - Black
 - b. Phase B - Red
 - c. Phase C - Blue
 - d. Neutral - White
 - e. Ground - Green
 - 2. Switch leg individually installed shall be the same color as the branch circuit to which they are connected, unless otherwise noted.
 - 3. Travelers for 3-way and 4-way switches shall be a distinct color and pulled with the circuit switch leg or neutral.

3.3 WIRING METHODS

- A. Install wires and cables in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Install all single conductors in raceway system, unless otherwise noted.

- C. Parallel circuit conductors and terminations shall be equal in length and identical in all ways.
- D. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.
- E. 20amp power and lighting branch circuit containing no more than four (4) current carrying conductors (phases and neutrals). Use #10 AWG conductor for 120/208volt circuits located outside a 75-foot radius of panel source, unless otherwise noted.
- F. 20amp power and lighting branch circuits containing no more than eight (8) current carrying conductors (phases and neutrals). Use #10 AWG conductors for 120/208volt circuits located outside a 65-foot radius of panel source.
- G. Provide #10 AWG pig tails on all 20amp and 30amp wiring devices served by #8 AWG conductors and larger.
- H. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle with tie wrap each neutral with its associated phase conductor where more than one neutral is present in a conduit.
- I. Install cable supports for all vertical feeders in accordance with the CEC Article 300. Provide split wedge type fittings, which firmly clamp each individual cable and tighten due to cable weight.
- J. Neatly form, train, and tie the cables in individual circuits. For panelboards, cabinets, wireways, switches, and equipment assemblies.
- K. Seal cable or wire, entering a building from underground or exiting walk-in cold box or freezer, between the wire or cable and conduit, where it exits the conduit, with a non-hardening approved compound, i.e. duct seal or equal.
- L. Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type, and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.
- M. Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.
- N. Flexible cords and cables supplied, as part of a pre-manufacturer fixture or unit assembly shall be installed according to Manufacturers published installation instructions.

3.4 WIRING INSTALLATION IN RACEWAYS

- A. Install wire in raceway in accordance with IEEE 576, Manufacturer's written instructions, as indicated on the Drawings and as specified herein after interior of building has been physically protected from the weather and all mechanical Work likely to injure conductors has been completed. Pull all conductors into a raceway at

the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.

- B. Completely mandrel all underground or concrete encased conduits prior to installing conductors.
- C. Completely and thoroughly swab raceway system before installing conductors.
- D. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than #1 AWG.
- E. Wire pulling:
 - 1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.
 - 2. Use rope made of nonmetallic material for pulling feeders.
 - 3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.
 - 4. Pull in together multiple conductors or cables in a single conduit.
 - 5. Pulling tensions and sidewall pressures shall not exceed 60% of the manufacturer's recommended maximum values. Pulling tension shall be continuously monitored during the pull by a calibrated dynamometer. If pulling tension is exceeded during the pull, immediately notify the engineer to determine if the cables will be considered damaged and require contractor replacement.
- F. Install and test all cables in accordance with Manufacturer's instructions and warranty.

3.5 WIRE SPLICES, JOINTS AND TERMINATION

- A. Join and terminate wire, conductors, and cables in accordance with UL 486A, C, CEC and Manufacturer's instructions.
- B. Thoroughly clean wires before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Splices and terminations shall be made mechanically and electrically secure.
- E. Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.
- F. Terminate wires in Terminal Cabinets, relay, and contactor panels, etc. using terminal strip connectors.

- G. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.
- H. Install cable ties and maintain harnessing.
- I. Encapsulate splices in exterior outlets, pull boxes and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.
- J. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as the feed conductor. Form conductor prior to cutting and provide at least 6-inches of tail and neatly packed in box after splice is made up.
- K. Branch circuits (#10 AWG and smaller):
 - 1. Connectors: Solderless, screw-on, reusable spring pressure cable type, 600volt, 105-degree C. with integral insulation, approved for copper conductors.
 - 2. The integral insulator shall have a skirt to completely cover the stripped wires.
 - 3. The number, size and combination of conductors as listed on the Manufacturers packaging shall be strictly complied with.
- L. Feeder circuits: (#6 to 750 kCMIL)
 - 1. Join or tap conductors from #6 AWG to 750 kCMIL using bolted pressure connectors or insulate mechanical compression (hi-press) taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of the joint.
 - 2. Terminate conductors from size #6 AWG to 750 kCMIL copper using bolted pressure or mechanical compression lugs in accordance with Manufacturer recommendation or as specified elsewhere.
 - 3. Field installed compression connectors for cable sizes 250 kCMIL and larger shall have not less than two clamping elements or compression indents per wire.
 - 4. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.
- M. Termination hardware assemblies:
 - 1. AL/CU lugs connected to aluminum plated or copper buss, shall be secured using a steel bolt, flat washer (two per bolt), Belleville washer and nut.
 - 2. Copper lugs connected to copper bus, shall be secured using silicon bronze alloy bolt, flat washer (two per bolt), Belleville washer and nut.

3. The crown of Belleville washers shall be under the nut.
4. Bolt assemblies shall be torque to Manufacturer recommendation. Where manufacture recommendations are not obtainable, the following values shall be used:
 - a. 1/4" - 20 bolt at 80-inch pounds torque.
 - b. 5/16" - 18 bolt at 180-inch pounds torque.
 - c. 3/8" - 16 bolt at 20-foot pounds torque.
 - d. 1/2" - 13 bolt at 40-foot pounds torque.Fp
 - e. 5/8" - 11 bolt at 55-foot pounds torque.
 - f. 3/4" - 10 bolt at 158-foot pounds torque.

3.6 IDENTIFICATION

- A. Refer to Section 260553: Electrical Identification for additional requirements.
- B. Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.
- C. Color code conductors' size #8 and larger using specified phase color markers and identification tags, with exception of the grounded conductor which must have a continuous white or gray jacket if #6 or smaller.
- D. Provide all terminal strips with each individual terminal identified using specified vinyl markers.
- E. In manholes, pull boxes and handholes, provide tags of the embossed brass type and show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.7 FIELD QUALITY CONTROL

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements.
- B. Prefunctional testing:
 1. Visual and mechanical inspection:
 - a. Compare cable data with Contract Documents.
 - b. Inspect exposed sections of wires and cables for physical damage and proper connections.

- c. Verify tightness of accessible bolted connections with calibrated torque wrench in accordance with Manufacturer's published data.
 - d. Inspect compression applied connectors for correct cable match and indentation.
 - e. Verify visible cable bend meet or exceed ICEA and Manufacturer's minimum allowable bending radius.
 - f. If cables are terminated through window type current transformers, inspect to verify neutral and ground conductors are correctly placed for operation of protective devices.
 - g. Ensure wire and cable identification has been installed as specified herein.
2. Electrical testing:
- a. Contractor shall perform feeder and branch circuit insulation test after installation and prior to connection to utilization devices such as fixtures, motors, or appliances. Testing shall be as follows:
 - i. 100% of all feeders 100amp rated and above.
 - ii. 50% of all feeders smaller than 100amps.
 - iii. 10% of all branch circuits at each individual panelboard.
 - b. Perform insulation-resistance test using megohm meter with applied potential of 1000volt DC for a continuous duration of 60-seconds. Test conductors' phase-to-phase and phase-to-ground. Conductors shall test free from short-circuit and ground faults.
 - c. Perform continuity test of all feeder and branch circuits to ensure correct cable connections. Test all neutrals for improper grounds.
 - d. Contractor shall furnish instruments, materials, and labor for these tests.
3. Test values: Investigate resistance values less than 50-megohms.
4. Furnish test results in typewritten report form for review and inclusion in the operation and maintenance manuals.

END OF SECTION

SECTION 26 05 26 – GROUNDING AND BONDING

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Power system grounding.
 - 2. Electrical equipment and raceway grounding and bonding.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 05: Building Steel.
 - 3. Division 22: Cold Water Piping.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - a. UL 467; Grounding and Bonding Equipment.
 - 2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
 - a. IEEE No. 142; Recommended Practice for Grounding of industrial and Commercial Power Systems.
 - b. IEEE No. 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

1.3 SYSTEM DESCRIPTION

- A. Ground the electrical service system neutral at service entrance equipment as described herein and indicated on Drawings.
- B. Ground each separately derived system neutral as described herein and indicated on Drawings.
- C. Except as otherwise indicated, the complete electrical installation including the neutral conductor, metallic conduits and raceways, cable trays, boxes, cabinets and

equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically indicated or specified.

D. Resistance:

1. Resistance from the main switchboard ground bus through the ground electrode to earth shall not exceed 5-OHMS unless otherwise noted.
2. Resistance from the farthest panelboard, switchboard, etc. ground bus through the ground electrode to earth shall not exceed 20-OHMS

1.4 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Ground Rods:
 - a. Weaver.
 - b. Erico "Cadweld" Products, Inc.
2. Ground Wells:
 - a. Christy Concrete Products, Inc.
 - b. Forni Corp.
3. Ground Bushings, Connectors, Jumpers and Bus:

- a. O-Z/Gedney.
- b. Thomas & Betts Corp.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 GROUND CONDUCTORS

- A. Refer to Specification Section 260519: Building Wire and Cable for conductor specifications.
- B. General purpose insulated:
 - 1. UL approved and code sized copper conductor, with dual rated THHN/THWN insulation, color identified green.
 - 2. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non-aging, plastic tape in accordance with CEC.
- C. Bare conductors in direct contact with earth or encased in concrete: #4/0 AWG copper minimum, U.O.N.
- D. Bonding pigtails: Insulated copper conductor, identified green, sized per code, and provide with termination screw or lug. Provide solid conductors for #10 AWG or smaller and stranded conductors for #8 AWG or larger.

2.3 INSULATED GROUNDING BUSHINGS

- A. Plated malleable iron or steel body with 150-degree Centigrade molded plastic insulating throat and lay-in grounding lug.

2.4 CONNECTIONS TO PIPE

- A. For cable to pipe: UL and CEC approved bolted connection.

2.5 CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS OR SPLICES

- A. Where required by the Drawings, grounding conductors shall be spliced together, connected to ground rods or connected to structural steel using exothermic welds or high-pressure compression type connectors.
 - 1. Exothermic welds shall be used for cable-to-cable and cable-to-ground rod and for cable to structural steel surfaces. Exothermic weld kits shall be as manufactured by Cadweld or equal. Each particular type of weld shall use a kit unique to that type of weld.
 - 2. High-pressure compression type connectors shall be used for cable-to-cable and cable-to-ground rod connections.

2.6 EXTRA FLEXIBLE, FLAT BONDING JUMPERS

- A. Where required by Code, indicated on the Drawing, and specified herein.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of grounding system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 INSTALLATION

- A. Power system grounding:
 - 1. Provide, unless otherwise indicated, a main building power system ground bus mounted on the wall in the main electrical room. Connect the following items using CEC sized copper grounding conductors to lugs on the main building ground bus:
 - a. Grounding conductor from building reference ground bus in main service switchboard.
 - b. Bonding conductor to metallic cold-water piping system.
 - c. Bonding conductor to building structural steel.
 - d. Separately derived system grounding conductors in same room.
 - 2. At the building power system reference ground bus in the main service switchboard, connect the grounding electrode conductor from concrete encased UFER ground or other grounding electrode systems as indicated on the Drawing or herein.
- B. Separately derived electrical system grounding:
 - 1. Ground each separately derived system per requirements in CEC Article 250 as a minimum, unless greater requirements are required elsewhere in the Contract Documents.
 - 2. Transformers: Provide copper terminal bar for grounding and bonding the transformer in accordance with CEC Articles 250.30 and 450.10. Bond the terminal bar to the enclosure and connect the following to the terminal bar:
 - a. Primary feeder equipment ground conductor(s).
 - b. Secondary feeder supply-side bonding jumper(s).
 - c. Grounding electrode conductor.
 - d. Main bonding jumper to neutral (when present).
 - e. Supplemental grounding electrodes.
- C. Equipment bonding/grounding:

1. Provide a CEC sized insulated copper ground conductor in all 120volt AC through 600volt AC feeder and branch circuit distribution conduits and cables.
2. Provide a separate grounding bus at panelboards, switchboards. Connect all metallic enclosed equipment so that with maximum fault current flowing, shall be maintained at not more than 35volts above ground.
3. Conduit terminating in concentric, eccentric, or oversized knockouts at panelboards, cabinets, gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.
4. Provide bonding jumpers across expansion and deflection couplings in conduit runs, pipe connections to water meters, dielectric couplings in metallic cold-water piping system.
5. Provide internal ground wire in flexible conduit connected at each end via grounding bushing.

3.3 FIELD QUALITY CONTROL

- A. Independent Testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein.
- B. Prefunctional testing:
 1. Provide Testing Agency with Contract Documents for their review prior to the commencement of ground testing.
 2. Visual and mechanical inspection:
 - a. The Testing Agency shall inspect the grounding electrode and connections prior to concrete encasement, burial, or concealment.
 - b. Check tightness and welds of all ground conductor terminations.
 - c. Verify installation complies with the intent of the Contract Documents
 3. Obtain and record ground resistance measurements both from electrical equipment ground bus to the ground electrode and from the ground electrode to earth. Furnish and install additional bonding and add grounding electrodes as required complying with resistance limits specified under this Section of the Specification.
 4. A typewritten record of measured resistance values shall be submitted for review and included with the operation and maintenance manual furnished to the Owner at the time of Project closeout and before certificate of final payment is issued.

END OF SECTION.

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SECTION 26 05 29 – ELECTRICAL HANGERS AND SUPPORTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Conduit supports.
 - 2. Equipment supports.
 - 3. Fastening hardware.

- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 03: Cast-in-place concrete. Concrete equipment pads.
 - 3. Division 05: Miscellaneous metals. Hangers for electrical equipment.
 - 4. Division 09: Ceiling suspension systems. Slack support wires.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - a. UL 2239; Hardware for the Supports of Conduit, Tubing and Cable.

1.3 SYSTEM DESCRIPTION

- A. Provide devices specified in this Section and related Sections for support of electrical equipment furnished and installed under Division 26.
- B. Provide support systems that are adequate for the weight of equipment, conduit and wiring to be supported.

1.4 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein.

2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Concrete fasteners:
 - a. Phillips "Red-Head".
 - b. Remington.
 - c. Ramset.
 2. Concrete inserts and construction channel:
 - a. Unistrut Corp.
 - b. GS Metals "Globe Strut."
 - c. Thomas & Betts "Kindorf" Corp.
 3. Conduit straps:
 - a. O-Z/Gedney.
 - b. Erico "Caddy" Fastening Products.
 - c. Thomas & Betts "Kindorf" Corp.
- B. Substitutions: Under provisions of Section 26 00 10 – Basic Electrical Requirements.

2.2 CONCRETE FASTENERS

- A. Provide expansion-shield type concrete anchors.
- B. Provide powder driven concrete fasteners with washers. Obtain approval by Architect and Structural Engineer prior to use.

2.3 CONCRETE INSERTS

- A. Provide pressed galvanized steel, concrete spot insert, with oval slot capable of accepting square or rectangular support nuts of ¼ inch to ½ inch diameter thread for rod support.

2.4 THREADED ROD

- A. Provide steel threaded rod, sized for the load unless otherwise noted on the Drawings or in the Specifications.

2.5 CONSTRUCTION CHANNEL

- A. Provide 1.5-inch by 1.5-inch, 12-gauge galvanized steel channel with 17/32-inch diameter bolt holes and 1-1/2 inch on center in the base of the channel.

2.6 CONDUIT STRAPS

- A. One-hole strap, steel, or malleable iron, with malleable iron clamp-back spacer for surface mounted wall and ceiling applications.
 - 1. Use malleable strap with spacers for exterior and wet locations.
 - 2. Use steel strap without spacers for interior locations.
- B. Steel channel conduit strap for support from construction channel.
- C. Steel conduit hanger for pendant support with threaded rod
- D. Steel wire conduit support strap for support from independent #12-gauge hanger wires.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of supporting device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

- A. Coordinate size, shape, and location of concrete pads with Division 03, Cast-in-place concrete.
- B. Layout support devices to maintain headroom, neat mechanical appearance and to support the equipment loads.
- C. Where indicated on the Contract Documents, install freestanding electrical equipment on concrete pads.

3.3 INSTALLATION

- A. Furnish and install supporting devices as noted throughout Division 26.
- B. Electrical device and conduit supports shall be independent of all other system supports that are not structural elements of the building, unless otherwise noted.

- C. Fasten hanger rods, conduit clamps, outlet, and junction boxes to building structure using precast inserts, expansion anchors, preset inserts, or beam clamps.
- D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls.
- E. Use expansion anchors or preset inserts in solid masonry walls.
- F. Use self-drilling anchors, expansion anchor or preset inserts on concrete surfaces.
- G. Use sheet metal screws in sheet metal studs and wood screws in wood construction.
- H. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or acoustical ceiling suspension wires.
- I. Do not drill structural steel members unless first approved in writing by the Architect or Structural Engineer.
- J. Fabricate supports from structural steel or steel channel, rigidly welded, or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- K. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide additional support backing in stud walls prior to sheet rocking as required to adequately support cabinets and panels.
- L. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

3.4 ERECTION OF METAL SUPPORTS

- A. Cut, fit and place miscellaneous metal fabrications accurately in location, alignment and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS "Structural Welding Code."

3.5 WOOD SUPPORTS

- A. Cut, fit, and place wood grounds, nailers, blocking and anchorage accurately in location, alignment and elevation to support and anchor electrical materials and equipment.

3.6 ANCHORAGE

- A. All floor mounted, free standing electrical equipment such as transformers, switchboards, distribution boards, etc. shall be securely fastened to the floor structure.
- B. Anchorage of electrical equipment shall comply with the seismic requirements as outlined in Section 26 00 10 – Basic Electrical Requirements.

END OF SECTION

SECTION 26 05 31 – CONDUIT

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Rigid steel conduit and fittings.
 2. PVC insulated rigid steel conduit and fittings.
 3. Intermediate metal conduit and fittings.
 4. Electrical metallic tubing and fittings.
 5. Flexible metallic conduit and fittings.
 6. Liquidtight flexible metallic conduit and fittings.
 7. Miscellaneous conduit fittings and products.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 2. Division 01: Cutting and patching.
 3. Division 07: Sheet metal flashing and trim.
 4. Division 09: Painting. Exposed conduit and other devices.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
1. American National Standards Institute, Inc. (ANSI):
 - a. ANSI C80.1; Rigid Steel Conduit, Zinc-Coated.
 - b. ANSI C80.3; Electrical Metallic Tubing, Zinc Coated.
 - c. ANSI C80.5; Rigid Aluminum Conduit.
 - d. ANSI/ TIA-569-D Telecommunications Pathways and Spaces.
 2. Underwriters Laboratories, Inc. (UL):

- a. UL 1; Flexible Metal Conduit.
 - b. UL 6; Rigid Metal Conduit.
 - c. UL 360; Liquid-Tight Flexible Steel Conduit.
 - d. UL 514B; Conduit, Tubing and Cable Fittings.
 - e. UL 635; Insulating Bushings.
 - f. UL 797; Electrical Metallic Tubing - Steel.
 - g. UL 1242; Intermediate Metal Conduit - Steel.
3. National Electrical Manufacturer Association (NEMA):
- a. NEMA RN1; PVC Externally coated Galvanized Rigid Steel Conduit.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements the following items:
- 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Submit Manufacturer's installation instruction. Provide written instructions for raceway products requiring glues, special tools, or specific installation techniques.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
- 1. Metal conduit:
 - a. Allied Tube and Conduit Co.

- b. Triangle PWC, Inc.
- c. Western Tube and Conduit Corp.
- d. Spring City Electrical Manufacturing Co.
- e. Alflex Corp.
- f. American Flexible Metal Conduit Co.
- g. Anaconda.

2. Fittings:

- a. Appleton Electric Co.
- b. OZ/Gedney.
- c. Thomas & Betts Corp.
- d. Spring City Electrical Manufacturing Co.

B. Substitutions: Under provisions of Section 26 00 10 – Basic Electrical Requirements.

2.2 GALVANIZED RIGID STEEL CONDUIT (GRS)

- A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and UL 6.
- B. Standard threaded couplings, locknuts, bushings, and elbows: Only materials of steel or malleable iron are acceptable. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure; provide two locknuts at each box or can, inside and outside.
- C. Three-piece couplings: Hot dip galvanized, cast malleable iron.
- D. Insulating bushings: Threaded polypropylene or thermosetting phenolic rated 150-degree C minimum.
- E. Insulated grounding bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.
- F. Insulated metallic bushings: Threaded cast malleable iron body with plastic insulated throat rated 150-degrees C.
- G. All fittings and connectors shall be threaded.

2.3 PVC INSULATED GALVANIZED RIGID STEEL CONDUIT (PVC GRS)

- A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 20 or 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.
- B. Fittings: Conduit couplings and connectors shall be as specified for galvanized rigid steel conduit and shall be factory PVC coated with an insulating jacket equivalent to that of the coated material.

2.4 INTERMEDIATE METAL CONDUIT (IMC)

- A. Conduit: Hot dip galvanized steel meeting the requirements of CEC Article 345 and conforming to ANSI C80.6 and UL 1242.

- B. Fittings: Conduit couplings, connector and bushing shall be as specified for galvanized rigid steel conduit. Integral retractable type IMC couplings are also acceptable.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 Specifications and shall meet UL requirements.
- B. Set screw type couplings: Hot dip galvanized, steel, UL listed concrete tight. Use set screw type couplings with four setscrews each of conduit sizes over 2 inches. Setscrews shall be of case-hardened steel with hex-head and cup point to firmly seat in wall of conduit for positive grounding.
- C. Set screw type connectors: Hot dip galvanized, steel, UL listed concrete tight with male hub and insulated plastic throat, 150-degree C temperature rated. Setscrew shall be same as for couplings.
- D. Raintight couplings: Hot dip galvanized, steel; UL listed raintight and concrete tight, using gland and ring compression type construction.
- E. Raintight connectors: Hot dip galvanized, steel, UL listed raintight and concrete tight, with insulated throat, using gland and ring compression type construction.

2.6 FLEXIBLE METALLIC CONDUIT (FMC)

- A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design and conforming to UL 1.
- B. Fittings: Connectors shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Exception: Pressure cast screw-in connectors shall be acceptable for luminaire connection in suspended ceilings and cut-in outlet boxes within existing furred walls.

2.7 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC)

- A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strips, interlocking spirally wound, covered with extruded liquidtight jacket of polyvinyl chloride (PVC) and conforming to UL 360. Provide conduit with a continuous copper-bonding conductor wound spirally between the convolutions.
- B. Fittings: Connector body and gland nut shall be of cadmium plated steel or cast malleable iron, with tapered, male, threaded hub; insulated throat and neoprene "O" ring gasket recessed into the face of the stop nut. The clamping gland shall be of molded nylon with an integral brass push-in ferrule.

2.8 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

- A. Watertight conduit entrance seals: Steel or cast malleable iron bodies and pressure clamps with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Fittings shall be supplied with neoprene sealing rings between the body and PVC sleeve.

- B. Watertight cable sealing bushings: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel sealing screws and zinc plated cast malleable iron locking collar.
- C. Expansion fittings: Multi-piece unit comprised of a hot dip galvanized malleable iron or steel body and outside pressure bussing designed to allow a maximum of 4" conduit movement (2" in either direction). Furnish with external braid tinned copper bonding jumper. Unit shall be UL listed for wet or dry locations.
- D. Expansion/deflection couplings: Multi-piece unit comprised of a neoprene sleeve with internal flexible tinned copper braid attached to bronze end couplings with stainless steel bands. Coupling shall accommodate 0.75-inch deflection, expansion or contraction in any direction and allow 30-degree angular deflections. Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber jacket and stainless-steel jacket clamps. Unit shall comply with UL467 and UL514. Manufacturer shall be OZ/Gedney Type DX, Steel City Type EDF or equal.
- E. Fire rated penetration seals:
 - 1. UL building materials directory classified.
 - 2. Conduit penetrations in fire rated separation shall be sealed with a UL classified fill, void or cavity material.
 - 3. The fire rated sealant material shall be the product best suited for each type of penetration and may be a caulk, putty, composite sheet, or wrap/strip.
- F. Standard products not herein specified:
 - 1. Provide listing of standard electrical conduit hardware and fittings not herein specified for approval prior to use or installation, i.e. locknuts, bushings, etc.
 - 2. Listing shall include Manufacturers name, part numbers and a written description of the item indicating type of material and construction.
 - 3. Miscellaneous components shall be equal in quality, material and construction to similar items herein specified.
- G. Hazardous area fittings: UL listed for the application.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of conduit system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 APPLICATION

- A. Galvanized rigid steel conduit (GRS) can be used in the following applications:

1. For feeders and branch circuits located indoors, concealed or exposed above suspended ceilings, in damp/wet locations, in crawl spaces, in attics, chases, furred spaces, equipment rooms, loading docks or in hazardous locations in accordance with CEC and local Codes.
 2. For feeders and branch circuits concealed in concrete floors and walls when not in contact with earth.
 3. For use where conduit is subject to physical damage.
 4. For feeders and branch circuits installed exposed on the roof.
- B. PVC insulated galvanized rigid steel conduit can be used in the following applications:
1. Use 40-mil coating for feeders and branch circuits in damp or wet locations.
 2. Use 20- or 40-mil for feeders and branch circuits concealed in concrete walls or slabs in contact with earth.
 3. Use 20- or 40-mil for runs beneath floor slabs on grade.
 4. Use 40-mil for all below grade penetrations through floor slabs on grade or exterior walls.
- C. Intermediate metal conduit (IMC): Can be used for the same application as galvanized rigid steel conduit as specified herein, except for hazardous locations prohibited by CEC or Local Codes.
- D. Electrical metallic tubing (EMT): Can be used exposed or concealed for interior electrical feeders 4" and smaller, interior power and lighting branch circuits and low tension distribution system where run above suspended ceilings, in concrete slabs and walls not in contact with earth; in stud walls, furred spaces and crawl spaces. EMT shall not be installed exposed below 8 feet above the finish floor except within electrical, communication or signal rooms or closets (subject to physical damage).
- E. Flexible metallic conduit (FMC): Can be used only in dry locations for connections from an adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices and to luminaires installed in suspended ceilings.
- F. Liquidtight flexible metallic conduit (LFMC): Can be used in wet or damp locations for connections from adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices. These areas are typically food preparation and dishwashing areas, sump wells, loading docks, pump rooms, exterior areas, etc.
- G. Fire-Resistive Systems: Refer to CEC Article 728. All devices utilized, mountings, and supports shall be listed as part of the fire-resistive system.

3.3 PREPARATION

- A. Locations of conduit runs shall be planned in advance of the installation and coordinated with ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor prevent removal of ceiling tiles or panels, nor block access to mechanical or electrical equipment.
- B. Where practical, install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary offsets.
- C. All conduits shall be run parallel or at right angles to the centerlines of columns and beams, whether routed exposed, concealed above suspended ceiling or in concrete slabs.
- D. Conduits shall not be placed closer than 12-inches to a flue, parallel hot water, steam line or other heat producing source or three inches from such lines when crossing perpendicular to the runs.
- E. Communications conduits shall not be placed closer than 12 inches to power, a flue, parallel hot water, steam line or other heat producing source or three inches from such lines when crossing perpendicular to the runs.
- F. Exposed conduit installation shall not encroach into the ceiling height headroom of walkways or doorways. Where possible, install horizontal raceway runs above water and below steam piping.
- G. The largest trade size conduits in concrete floor and wall slabs shall not exceed 1/3 the floor or wall thickness and conduits shall be spaced a minimum of three conduit diameters apart unless otherwise noted on the Drawings. All conduits shall be installed in the center of concrete slabs or wall and shall not be placed between reinforcing steel and the bottom of floor slabs.
- H. In long runs of conduit, provide sufficient pull boxes inside buildings to facilitate pulling wires and cables, with spacing not to exceed 150-feet. Support pull boxes from structure independent of conduit supports. These pull boxes are not indicated on the Drawings.
- I. Provide all reasonably inferred standard conduits fitting and products required to complete conduit installation to meet the intended application whether noted, indicated, or specified in the Contract Documents or not.
- J. Connect recessed luminaires to conduit runs with maximum six feet of flexible metal conduit.

3.4 INSTALLATION

- A. Install conduit in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Minimum Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 3/4" for interior applications and 1" for exterior and underground applications.

- C. Minimum Communication and Signal Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 1" for interior applications and 2" for exterior and underground applications.
- D. All conduit sizes indicated on the Drawings are sized for copper conductors with THHN/THWN insulation. If conductor type or size is changed the Contractor shall be responsible for resizing conduits upward to meet Code.
- E. All communication and signal conduit sizes indicated on the Drawings are sized for 40% fill or less for category 6 or 6A cable. If cable type or size is changed the Contractor shall be responsible for resizing conduits upward to meet a maximum 40% fill.
- F. In general, all conduit work shall be concealed where possible. Exceptions shall be electrical, communication and mechanical rooms, exposed ceiling areas, and parking garages.
- G. Conduit connections to motors and surface cabinets shall be concealed, except for electrical, communication and mechanical rooms, or unless exposed Work is clearly called for on the Drawings.
- H. Install conduits in complete runs before pulling in cables or wires.
- I. Install conduit free from dented, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.
- J. Conduits shall be well protected and tightly covered during construction using metallic bushings and bushing "pennies" to seal open ends.
- K. In making joints in rigid steel conduit, ream conduit smooth after cutting and threading. Coat all field-threaded joints with UL approved conductive type compound to ensure low resistance ground continuity through conduit and to prevent seizing and corrosion.
- L. Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.
- M. In all empty conduits or ducts, install a "True Tape" conduit measuring tape line to provide overall conduit length for determining length of cables/conductors for future use.
- N. Conduit systems shall be mechanically and electrically continuous throughout. Install code size, insulated, copper, green-grounding conductors in all conduit runs for branch circuits and feeders. This conductor is not indicated on the Drawings. Refer to Section 260526: Grounding and Bonding.
- O. Metallic conduit shall not be in contact with other dissimilar metal pipes (i.e. plumbing).
- P. Make bends with standard conduit bending hand tool or machines. The use of any item not specifically designed for the bending of electrical conduit is strictly prohibited.

- Q. A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of four quarter bends (360-degrees, total).
- R. A run of communications and signal conduit between terminations at wire pulling points shall not contain more than the equivalent of two quarter bends (180-degrees, total).
- S. Emergency power raceway system: Install entirely independent of other raceway systems, except where specifically allowed by CEC Article 517.

3.5 PENETRATIONS

- A. Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, wall, etc. Penetrations are acceptable only when the following occurs:
 - 1. Where indicated on the Structural Drawings.
 - 2. As approved by the Structural Engineer prior to construction and after submittal of Drawing showing location, size, and position of each penetration.
- B. Cutting or holes:
 - 1. Cut holes through concrete, masonry block or brick floors and floors of structure with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Structural Engineer as required by limited working space. Obtain the approval of the Structural Engineer prior to drilling through structural sections.
 - 2. Provide sleeves or “can outs” for cast-in-place concrete floors and walls. Following conduit installation, seal all penetrations using non-iron bearing, chloride free, non-shrinking, dry-pack grouting compounds; or fire rated penetration-sealing materials.
 - 3. Cut holes for conduit penetrations through non-concrete and non-masonry walls, partitions, or floors with a hole saw. The hole shall be only as large as required to accommodate the size of the conduit.
 - 4. Provide single piece escutcheon plates around all exposed conduit penetrations in public places.
- C. Sealing:
 - 1. Non-rated penetrations: Pack opening around conduits with non-flammable insulating material and seal with gypsum wallboard taping compound.
 - 2. Fire stop: Where conduits, wireways and other electrical raceways pass through fire rated partitions, walls, smoke partitions or floor; install a UL classified fire stop material to provide an effective barrier against the spread of fire, smoke, and gases. Completely fill and seal clearances between raceways and openings with the fire stop material.

- D. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Division 07: Sealants and Caulking.
1. Install specified watertight conduit entrance seals at all below grade wall and floor penetrations. Conduits penetrating exterior building walls and building floor slab shall be PVC coated rigid galvanized steel.
 2. For roof penetrations furnish and install roof flashing, counter flashing and pitch-pockets as specified under Roofing and Sheet Metal Sections of the Specifications.
 3. Provide membrane clamps and cable sealing fittings for any conduit that horizontally penetrates the waterproof membrane.
 4. Conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration on the exterior side a minimum of two times the conduit diameters.

3.6 CONCEALED IN CONCRETE

- A. Install conduits approximately in the center of the slab so that there will be a minimum of 3/4-inch of concrete around the conduits.
- B. Installation of conduit in structural concrete that is less than three inches thick is prohibited. Topping slabs, maintenance pads and curbs are exempted.
- C. Tie conduits to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Run conduit larger than 1-inch trade size, parallel with or at right angles to the main reinforcement; where at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab.
- D. Where nonmetallic conduit or tubing is used, raceways must be converted to PVC coated rigid steel conduit before rising above floor.
- E. Make couplings and connections watertight.
- F. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

3.7 TERMINATIONS AND JOINTS

- A. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.
- B. Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.
- C. Conduits shall be securely fastened to cabinets, boxes and gutters using two locknuts and an insulating bushing or specified insulated connectors. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings

or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors. Install grounding bushings or bonding jumpers on all conduits terminating at concentric or eccentric knockouts.

- D. Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.
- E. Stub-up connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this contract, install screwdriver operated threaded flush plugs with floor.
- F. Install specified cable sealing bushings on all conduits originating outside the building walls and terminating in switchgear, cabinets, or gutters inside the building. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction, or outlet boxes.
- G. Raceway seal: Inject into wire filled raceways, a pre-formulated rigid 2 lbs. density polyurethane foam which expands a minimum 35 times its original bulk. Foam shall have the physical properties of water vapor transmission of 1.2 to 3.0 perms: water absorption less than 2% by volume, fungus and bacterial resistant. Foam shall permanent seal against water, moisture, insects, and rodents. Install raceway sealing foam at the following points:
 - 1. Where conduits pass from warm locations to cold locations to prevent passage of water vapor (such as refrigerated spaces, constant temperature rooms, air-conditioned spaces, etc.).
 - 2. Where conduits enter buildings from below grade.
- H. Install expansion couplings where any conduit crosses a building separation or expansion joint as follows:
 - 1. Conduits three inches and larger, shall be rigidly secured to the building structure on opposite sides of a building expansion joint and provided with expansion or deflection couplings. Install the couplings in accordance with the Manufacturer's recommendations.
 - 2. Conduits smaller than three inches shall be rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint. Connect conduits to junction boxes with 15 inches of slack flexible conduit. Flexible conduit shall have a green copper ground-bonding jumper installed. For concrete embedded conduit, use expansion and deflection couplings as specified above for three inches and larger conduits.
- I. Use short length (maximum of 6ft) of the appropriate FMC or LFMC conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Provide liquidtight flexible metal conduit for installation in exterior locations, moisture or humidity-laden atmosphere, corrosive atmosphere, water hose or spray wash-down operations and

locations subject to seepage or dripping of oil, grease, or water. Provide a green ground wire with FMC or LFMC conduit.

3.8 SUPPORTS

- A. Provide supports for raceways as specified in Section 260529: Electrical Hangers and Supports.
- B. All raceways systems shall be secured to building structures using specified fasteners, clamps and hangers spaced according to the CEC.
- C. Support single runs of conduit using one-hole pipe straps. Where run horizontally on walls in damp or wet locations, install "clamp backs" to space conduit off the surface.
- D. Multiple conduit runs shall be supported using "trapeze" hangers fabricated from specified construction channel, mounted to 3/8-inch diameter, threaded steel rods secured to building structures. Fasten conduit to construction channel with standard one-hole pipe clamps or the equivalent. Provide lateral seismic bracing for hangers.
- E. Individual 1/2" and 3/4" conduits installed above suspended ceilings may be attached to the ceiling's hanger wire using spring steel support clips provided that not more than two conduits are attached to any single support wire.
- F. Support exposed vertical conduit runs at each floor level, independent of cabinets or switches to which they run, by means of acceptable supports.
- G. Fasteners and supports in solid masonry and concrete:
 - 1. Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
 - 2. After concrete installation:
 - a. Steel expansion anchors not less than 1/4 inch bolt size and not less than 1-1/8" embedment.
 - b. Power set fasteners not less than 1/4 inch diameter with depth of penetration not less than three inches.
 - c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- H. Hollow masonry: Toggle bolts are permitted. Bolts supported only by masonry block are not acceptable.
- I. Metal structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

END OF SECTION

SECTION 26 05 33 – BOXES

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Wall and ceiling outlet boxes.
 2. Pull and junction boxes.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 2. Division 08: Access doors. Wall and ceiling access doors.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
1. American National Standards Institute/National Electrical Manufacturer Association:
 - a. ANSI/NEMA OS-1; Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
 - b. ANSI/NEMA OS-2; Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
 - c. NEMA 250; Enclosures for Electrical Equipment (1000 volts maximum).
 2. Underwriters Laboratories (UL):
 - a. UL 50; Enclosures for Electrical Equipment.
 - b. UL 514A; Metallic Outlet Boxes.
 - c. UL 1773; Termination Boxes.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 1. Outlet and junction boxes:
 - a. Spring City Electrical Manufacturing Co.
 - b. Thomas & Betts Corp.
 - c. Raco, Inc.
 2. Cast boxes:
 - a. Appleton Electric Co.
 - b. Crouse-Hinds.
 3. Pullboxes:
 - a. Circle AW Products.
 - b. Hoffman Engineering Co.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 OUTLET BOXES

- A. Standard outlet box:
 1. Provide galvanized, one-piece die formed or drawn steel or welded, knockout type box of size and configuration best suited to the application indicated on the Drawings.

2. 4-inch square by 2-1/4-inch deep shall be minimum box size.
 3. ANSI/NEMA OS 1.
- B. Tile box:
1. Provide outlet boxes for installation in tile or concrete block walls.
 2. Standard outlet boxes with raised, square corners and device covers are acceptable.
 3. ANSI/NEMA OS 1.
- C. Cast metal outlet body:
1. Provide 4-inch round, galvanized cast iron alloy with threaded hubs and mounting lugs as required.
 2. Provide boxes with cast cover plates of the same material as the box and neoprene cover gaskets.
- D. Conduit outlet body: Provide malleable iron, oblong conduit outlet bodies with threaded conduit hubs and neoprene gasket, cast iron covers.

2.3 PULL AND JUNCTION BOXES

- A. Sheet metal pull and junction box:
1. Provide standard outlet or concrete ring boxes wherever possible; otherwise use minimum 16-gauge galvanized sheet metal, NEMA 1 boxes, sized to Code requirements with covers secured by cadmium plated machine screws located 6 inches on centers.
 2. ANSI/NEMA OS 1.
- B. Flush mounted pullboxes and junction boxes: Provide overlapping covers with flush head cover retaining screws, prime coated.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of box installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

- A. Install all outlet boxes flush with building walls, ceilings, and floors except where boxes are installed in mechanical and electrical rooms, in cabinetry, above accessible ceilings or where exposed Work is called for on the Drawings.

- B. Locate pullboxes and junction boxes in concealed locations above removable ceilings or exposed in electrical rooms, utility rooms or storage areas.
- C. Install outlet boxes at the locations and elevations indicated on the Drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.
- D. Locate outlet boxes above hung ceilings having concealed suspension systems, adjacent to openings for removable recessed luminaires.
- E. Do not install outlet boxes back-to-back, separate boxes by at least 6". In fire-rated walls separate boxes by at least 24" and wall stud.

3.3 INSTALLATION

- A. Install boxes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- B. Locate electrical boxes as indicated on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.
- C. Install junction or pullboxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not indicated on the Drawings.
- D. Install raised covers (plaster rings) on all outlet boxes in stud walls or in furred, suspended, or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.
- E. Leave no unused openings in any box. Install close-up plugs as required to seal openings.
- F. Provide cast metal boxes with gasketed cast metal cover plates where boxes are exposed in damp or wet locations.
- G. Welded outlet boxes shall only be used in concealed interior installations.
- H. Provide precast concrete boxes in exterior planting areas, walkways, roads etc.
- I. Provide an access panel in permanent ceiling or wall where boxes are installed and will be inaccessible.
- J. For boxes mounted in exterior walls, make sure that there is insulation behind outlet boxes to prevent condensation in boxes.
- K. For outlets mounted above counters, benches or backsplashes, coordinate location and mounting heights with built-in units. Adjust mounting height to agree with required location for equipment served.
- L. Use conduit outlet bodies to facilitate pulling of conductors or to make changes in conduit direction only. Do not make splices in conduit outlet bodies.

- M. Add additional sheet rock as necessary to maintain original fire rating of walls where boxes are installed.
- N. Install galvanized steel coverplates on boxes in unfinished areas, above accessible ceilings and on surface mounted outlets.

3.4 SUPPORTS

- A. Provide boxes installed in metal stud walls with brackets designed for attaching directly to the studs or mount boxes on specified box supports.
- B. Mount boxes, installed in suspended ceilings of gypsum board or lath and plaster construction, to 16-gauge metal channel bars attached to main ceiling runners.
- C. Support boxes independently of conduit system.
- D. Support boxes, installed in suspended ceilings supporting acoustical tiles or panels, directly from the structure above wherever pendant mounted luminaires are to be installed from the box.
- E. Support boxes mounted above suspended acoustical tile ceilings, directly from the structure above.

END OF SECTION.

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SECTION 26 05 43 – UNDERGROUND DUCTS AND STRUCTURES

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Underground conduits and ducts.
 - 2. Handhole and pullboxes.
 - 3. Excavation, trenching and backfill.

- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 31 - Earthwork: General requirements for Excavation and Backfill and related items for ducts, manholes, pullboxes and handholes.
 - 3. Division 03 - Cast-in-place concrete: Protective envelope for ducts.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. American Concrete Institute (ACI):
 - a. ACI 318; Building Code Requirements for Structural Concrete
 - 2. American Society for Testing And Materials (ASTM):
 - a. ASTM C31; Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - b. ASTM C39; Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - c. ASTM C172; Standard Practice for Sampling Freshly Mixed Concrete
 - d. ASTM C192; Practice for Making and Curing Concrete Test Specimens in the Laboratory
 - e. ASTM C231; Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

- f. ASTM C478; Specification for Precast Reinforced Concrete Manhole Sections
 - g. ASTM C805; Test Method for Rebound Number of Hardened Concrete
 - h. ASTM C857; Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
 - i. ASTM C858; Specification for Underground Precast Concrete Utility Structures
 - j. ASTM C877; Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections
 - k. ASTM C891; Practice for Installation of Underground Precast Concrete Utility Structures
 - l. ASTM C990; Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
 - m. ASTM C1037; Practice for Inspection of Underground Precast Concrete Utility Structures
 - n. ASTM C1064; Standard Test Method for Temperature of Freshly Mixed Concrete
 - o. ASTM C1231; Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinder
 - p. ASTM C1611; Standard Test Method for Slump Flow of Self-Consolidating Concrete
3. Underwriters Laboratories, Inc. (UL):
- a. UL 651; Schedule 40 and 80 Rigid PVC Conduit.
4. National Electrical Manufacturer Association (NEMA):
- a. NEMA RN1; PVC Externally-coated Galvanized Rigid Steel Conduit.
 - b. NEMA TC 2; Electrical Plastic Tubing and Conduit.
 - c. NEMA TC 3; PVC Fittings for use with Rigid PVC Conduit.
 - d. NEMA TC6; PVC Plastic Utilities Duct (EB and BD Type).

1.3 DEFINITIONS

- A. Duct: Electrical conduit and other raceway, either metallic or nonmetallic, used underground embedded in earth.

- B. Duct bank: Two or more conduits or another raceway installed underground in same trench.
- C. Handhole: An underground junction box in a duct or duct bank.

1.4 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Shop Drawings showing details and design calculations for precast handholes, including reinforced steel.
 - 4. Submit Manufacturer's installation instructions.
 - 5. Complete bill of material listing all components.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.
- C. Precast concrete vaults shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete units similar to that indicated in the project specifications or drawings for at least 10 years.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Underground precast concrete utility structures:
 - a. Oldcastle Enclosure Solutions.
 - b. Jensen Precast.
 - 2. Conduits, ducts and fittings:
 - a. Prime Conduit.

- b. JM Eagle.
- c. Cantex.
- d. Occidental Coating Company (OCAL).

B. Substitution: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 CONDUIT AND DUCT

A. Refer to Section 260531: Conduit.

B. Rigid non-metallic conduit (PVC):

1. Conduit:

- a. Rigid polyvinylchloride, schedule 40 or 80 conforming to NEMA TC2 and UL 651. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.
- b. Rigid polyvinylchloride, type EB or DB conforming to NEMA TC 6 and UL 651. UL listed for concrete encased burial and direct burial applications and for 90 degree C conductor insulation. Conduit shall include an integral bell fitting at one end.

2. Fittings: Couplings, adaptors, transition fittings, bell ends, etc., shall be molded PVC, slip on and solvent weld type. Schedule 40 or 80 conforming to NEMA TC 3 and type EB or DB conforming to NEMA TC 9.

C. Elbows:

1. Low voltage systems (1000 volts and less):

- a. Minimum radius bends shall be 18" for conduits up to 2" diameter, 36" for conduits greater than 2" diameter, or greater if indicated on the drawings or required by the cable manufacturer.

D. Duct supports: Rigid PVC spacers selected to provide minimum duct spacing and concrete cover depths, while supporting ducts during concrete pour.

E. Duct sealing compound: Non-hardening, safe for human skin contact, not deleterious to cable insulation, workable at temperatures as low as 35 degree F, withstands temperature of 300 degrees F without slump and adheres to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, cable sheaths and jackets, etc.

2.3 PULLBOXES AND HANDHOLES

A. Construction: High densities precast reinforced concrete box, extension, base, and cover. Furnish box with end and side knockouts and non-settling shoulders. Cover shall have hold-down bolts and two lifting eyes.

- B. Size: As indicated on the Drawings.
- C. Cover markings: Covers shall read "ELECTRICAL".
- D. Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of duct and manhole installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 EARTHWORK

- A. Excavation and backfill: Conform to Division 31, Earthwork.
- B. Excavation for underground electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus, a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.
 - 1. Excavate, by hand, areas within dripline of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
 - 2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.
- C. Trenching: Excavate trenches for electrical installation as follows:
 - 1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both sides of raceways and equipment.
 - 2. Excavate trenches to depth indicated or required.
 - 3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.
 - 4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.
- D. Backfilling and filling: Place soil materials in layers to required sub-grade elevations for each area classification, using materials and methods specified in Division 31: Earthwork.

1. Under building slabs, use drainage fill materials.

3.3 CONDUIT AND DUCT INSTALLATION

- A. Install duct lines in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Application:
 1. Direct burial ducts: Schedule 40, minimum 24-inches below finished grade.
 2. Below building slab-on-grade: Schedule 40, minimum 4-inches below bottom of slab except that bends and penetrates through floor slab shall be insulated galvanized rigid steel conduit.
 3. Below roads and paved surfaces:
 - a. Schedule 80, minimum 36-inches below finished grade.
 4. Penetrations of building and equipment slabs: Insulated galvanized rigid steel conduit .
- C. Slope duct to drain towards handholes and away from building and equipment entrances. Pitch not less than 4-inches per 100-feet.
- D. Curved sections in duct lines shall consist of long sweep bends with a minimum radius of 25-feet in the horizontal and vertical directions. The use of manufactured bends is limited to building entrances and equipment stub-ups.
- E. Underground conduit stub-ups to inside of building and exterior equipment shall be insulated galvanized rigid steel conduit.
- F. Make joints in ducts and fittings watertight according to Manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in the same plane.
- G. Terminate duct lines at handholes with end bells spaced 10-inches on center for 5-inch ducts and varied proportionately for other duct sizes. Change from regular spacing to end-bell spacing 10-feet from the end bell without reducing duct line slope and without forming trap in the line.
- H. Separation between direct buried duct lines shall be 3-inches minimum for like systems and 12-inches minimum between power and signal ducts.
- I. For direct burial installations install continuous warning strip of heavy gage plastic imprinted "electrical ducts below", approximately 12-inch wide at 12-inches above ducts.
- J. Mandrel all ducts upon completion of installation and prior to pulling cables.

3.4 HANDHOLE AND PULL BOX INSTALLATION

- A. Install handholes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

- B. Handholes shall be installed flush with finished grade or surface. Install on a level 6-inch bed of well-tamped gravel or crushed stone.
- C. Orientation of handholes shall be coordinated in advance with Landscape Architect and arranged to minimize connecting duct bends and deflections.

3.5 FIELD QUALITY CONTROL

- A. Testing: Demonstrate capability and compliance with requirements upon completion of installation of underground duct and structures.
 - 1. Duct integrity: Rod ducts with a mandrel 1/4-inch smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove the obstructions and retest.

3.6 CLEANING

- A. Pull brush through full length of ducts. Use round bristle brush with a diameter 1/2-inch greater than internal diameter of duct.
- B. Clean internal surfaces of handholes. Remove foreign material.

END OF SECTION.

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SECTION 26 05 53 – ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Electrical equipment nameplates.
 - 2. Panelboard directories.
 - 3. Wire and cable identification.
 - 4. Buried electrical line warnings.
 - 5. Junction box identification.
 - 6. Warning and caution signs.
 - 7. Inscribed device coverplates.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
 - 1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 - 2. Division 09: Painting.

1.2 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein.
 - 2. Schedules for nameplates to be furnished.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Conduit and wire markers:
 - a. Thomas & Betts Corp.

- b. Brady.
- c. Griffolyn.

2. Inscription Tape:

- a. Kroy.
- b. Merlin.

- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 NAMEPLATES

- A. Type NP: Engraved, plastic laminated labels, signs, and instruction plates. Engrave stock melamine plastic laminate 1/16-inch minimum thickness for signs up to 20-square inches or 8-inches in length; 1/8-inch thick for larger sizes. Engraved nameplates shall have white letters and be punched for mechanical fasteners.

- B. Color and letter height as specified in Part 3: Execution.

2.3 LEGEND PLATES

- A. Type LP: Die-stamped metal legend plate with mounting hole and positioning key for panel mounted operator devices, i.e. motor control pilot devices, hand-off-auto switches, reset buttons, etc.

- B. Stamped characters to be paint filled.

2.4 BRASS TAGS

- A. Type BT: Metal tags with die-stamped legend, punched for fastener.

- B. Dimensions: 2" diameter 19 gauge.

2.5 PANELBOARD DIRECTORIES (400 AMP OR LESS)

- A. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panel door.

- B. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side. Multi-section panelboards shall have continuous consecutive circuit numbers, i.e. Section 1 (circuit numbers 1-42), Section 2 (circuit numbers 43-84), Section 3 (circuit numbers 85-126) for all 42-pole panelboards. For 84-pole panelboards the numbering is Section 1 (circuit numbers 1-84), Section 2 (circuit numbers (85-168), etc.

2.6 WIRE AND TERMINAL MARKERS

- A. Provide self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips.

- B. Blank markers shall be inscribed using the printer or pen recommended by Manufacturer for this purpose.

2.7 CONDUCTOR PHASE MARKERS

- A. Colored vinyl plastic electrical tape, 3/4" wide, for identification of phase conductors. Scotch 35 Brand Tape or equal.

2.8 UNDERGROUND CONDUIT MARKER

- A. 6-inch wide, yellow polyethylene tape, with continuous black imprinting reading "Caution - Buried Electric Line Below".

2.9 INSCRIBED DEVICE COVERPLATES

- A. Coverplate material shall be as specified in Section 262726: Wiring Devices.
- B. Methods of inscription: (Unless otherwise noted)
 - 1. Type-on-tape:
 - a. Imprinted or thermal transfer characters onto tape lettering system.
 - b. Tape trimmer.
 - c. Matte finish spray-on clear coating.
 - 2. Engraving:
 - a. 1/8" high letters.
 - b. Paint filled letters finished in black.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of identification device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 NAMEPLATES

- A. Installation:
 - 1. Degrease and clean surfaces to receive nameplates.
 - 2. Install nameplates parallel to equipment lines.
 - 3. Secure nameplates to equipment fronts using machine screws.
- B. Provide type 'NP' color coded nameplates that present, as applicable, the following information:
 - 1. Equipment or device designation:

- a. Equipment designations shall conform to the following:
 - i. Building number designation – 1.
 - ii. Power source:
 - 1) Normal - __
 - iii. Equipment description:
 - 1) 120/208volt panelboard – L
 - iv. Floor number where equipment is located – 03
 - v. Equipment designation – B
2. Amperage, KVA or horsepower rating, where applicable.
3. Voltage or signal system name.
4. Source of power or control.
5. Examples:
 - a. Boards: 2EHD03A; 1200A, 277/480volt, 3-phase, 4-wire; Served from 2EATS03A
 - b. Disconnects or Individual Motor Starters: EF-1; 20HP; 480volt, 3-phase,3-wire; Served from 2EHD03A
- C. Nameplates for power system distribution equipment and devices are to be black.
- D. Nameplates for signal systems equipment and devices are to be black except as follows:
 1. Fire alarm and life safety - Red.
- E. Minimum letter height shall be as follows:
 1. For panelboards, switchboards, battery panels, etc.: ½ inch letters to identify equipment designation. Use ¼ inch letters to identify voltage, phase, wires, etc.
 2. For individual circuit breakers, switches and motor starters in panelboards, distribution boards, and switchboards use 3/8-inch letters to identify equipment designation. Use 1/8-inch letters to identify all other.
 3. For individual mounted circuit breakers, disconnect switches, enclosed switches and motor starters use 3/8-inch letters to identify equipment designation. Use 1/8" letters to identify all other.

3.3 LEGEND PLATES

- A. Provide panel-mounted operators devices such as pilot lights, reset buttons, "HAND-OFF-AUTO" switches, etc.

3.4 BRASS TAGS

- A. Provide type BT tags for individual ground conductors to exposed ground bus indicating connection i.e. "UFER", "Cold water bond", etc.
- B. Provide tags for all feeder cables in underground vaults and pull boxes.
- C. Provide tags for empty conduits in underground vault, pull boxes and stubs.

3.5 PANELBOARD DIRECTORIES (400AMP OR LESS)

- A. Provide typewritten directories arranged in numerical order denoting loads served by room number or area for each circuit.
- B. Verify room numbers or area designation with Project Manager.
- C. Mount panelboard directories in a minimum 6" x 8" metal frame under clear plastic cover inside every panelboard.

3.6 WIRE AND CABLE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboards, pull boxes, outlet, and junction boxes and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on equipment Manufacturer's Shop Drawings for control wiring.
- B. Provide colored phase markers for conductors as noted in Section 260519: Building Wire and Cable. Apply colored, pressure sensitive plastic tape in half-lapped turns for a distance of 3-inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markings by taping.

3.7 UNDERGROUND CONDUIT MARKERS

- A. During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

3.8 JUNCTION BOX IDENTIFICATION

- A. The cover of junction, pull and connection boxes for both power and signal systems, located above suspended ceilings and below ceilings in non-public areas, shall be clearly marked with a permanent ink felt pen. Identify the circuit(s) (panel designation and circuit numbers) contained in each box, unless otherwise noted or specified.

3.9 WARNING, CAUTION, AND INSTRUCTION SIGNS

- A. Provide warning, caution or instruction signs where required by CEC, where indicated or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items.
- B. Emergency Operating Signs: Install engraved laminate signs with white letters on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding or other emergency operations.

3.10 INSCRIBED DEVICE COVERPLATE

- A. General:
 - 1. Lettering type: Helvetica, 12 point or 1/8" high.
 - 2. Color of characters shall be black.
 - 3. Locate the top of the inscription 1/2" below the top edge of the coverplate.
 - 4. Inscription shall be centered and square with coverplate.
- B. Application:
 - 1. Type-on-tape inscriptions shall be provided for the following devices:
 - a. Receptacles.
 - b. Outlets in surface raceways.
 - c. Telecommunication outlets.
 - 2. Engraved inscriptions shall be provided for the following devices:
 - a. Multi-ganged switches.
 - b. Special purpose switches.
 - 3. Type-on-tape installation:
 - a. Tape shall be trimmed to the height of the letters.
 - b. Trim tape length to 1/4-inch back from each edge of coverplate.
 - c. Contractor hands shall be clean or covered with surgical type glove prior to application of tape. Tape installations with visible fingerprints or smudges will not be acceptable.

END OF SECTION

SECTION 26 24 16 – PANELBOARDS

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Branch circuit panelboards.
 - 2. Distribution panelboards (400amps to 800amps).
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 - 1. National Electrical Manufacturers Association (NEMA):
 - a. NEMA AB 1; Molded Case Circuit Breakers.
 - b. NEMA PB 1; Panelboards.
 - c. NEMA PB 1.1; General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
 - 2. Underwriters Laboratories, Inc. (UL):
 - a. UL 67; Panelboards.
 - b. UL 486E; Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
 - c. UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - d. UL 870; Wireways, Auxiliary Gutters and Associated Fittings.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards

2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 3. Shop Drawings: Include elevations, cabinet dimensions, gutter sizes, layout of contactors, relays, time clocks, lug sizes, bussing diagrams; make, location and capacity of installed equipment; mounting style; finish and panelboard nameplate inscription.
 4. Furnish structural calculations for equipment anchorage as described in Section 26 00 10: Basic Electrical Requirements.
 5. Submit Manufacturer's installation instructions.
 6. Complete bill of material listing all components.
 7. Warranty.
- B. Dimensions and configurations of panelboards shall conform to the spaces allocated on the Drawings for their installation. The Contractor shall include with the submittal a layout of the electrical room if it differs from construction documents for review and approval by the Engineer prior to release of order.

1.4 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
1. A detailed explanation of the operation of the system.
 2. Instructions for routine maintenance.
 3. Pictorial parts list and parts number.
 4. Telephone numbers for authorized parts and service distributors.
 5. Final testing reports.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Panelboard components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.

- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with NEMA PB1.1 and Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.7 WARRANTY

- A. Units and components offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.8 EXTRA MATERIAL

- A. Turn over two (2) sets of panelboard keys to the Owner at completion of Project. All panelboards shall be keyed alike.
- B. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Square D.
 - 2. ABB/ General Electric.
 - 3. Eaton.
 - 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 PANELBOARDS - GENERAL

- A. Enclosure:
 - 1. Cabinets shall be NEMA Type 1 enclosure, door, and trim of code gauge galvanized steel. Provide NEMA Type 3R enclosures for exterior mounted panelboard.
 - 2. Panelboard covers shall be door-in-door construction such that inner door exposes the overcurrent protective devices and the outer door exposes the complete panelboard interior (i.e. branch circuit conductors, lugs, neutral and

ground bus, overcurrent protective devices, etc.). Outer door shall have full-length piano hinge and inner door shall have two-point hinges.

3. Provide combination spring catch and lock on inside edge of the inner door trims with flush fitting joint between door and trim. Locks on all panelboards shall be keyed alike. Doors 36 inches and over in height shall be provided with three-point catch and lock. Provide quarter-turn captive bolts on the outer door.

B. Bus assembly and terminations:

1. Bus shall be bolted copper with taps arranged for distributed phase connections to branch circuit devices
2. Cross connectors shall be copper, drilled and tapped for bolt-on device connections, arranged for double row placement of device and designed to permit removal or addition of overcurrent protection devices without disturbing adjacent devices or removing main bus connections.
3. Neutral bus shall be 100 percent rated of phase bus bars and shall have lugs for each outgoing branch circuit or feeder requiring a neutral connection unless otherwise noted.
4. Ground bus shall be full size with lugs for each outgoing branch circuit and feeder.
5. Refer to panelboard schedules on Drawings for bus rating. Bus rating shall match or be greater than main device or main lug rating.
6. As a minimum, bus bars shall be rated 10,000 AIC for 120/208volt panelboards.
7. Provide full sized bussing in all sections of multi-section panelboards.
8. Termination Lugs: Rated for use with aluminum/copper conductors.
9. All "SPACES" shall be ready for installation of future overcurrent protective device.

C. Miscellaneous requirements:

1. Circuit numbering: Starting at the top, indicate odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side. Multi-section panelboards shall have continuous consecutive circuit numbers. Provide metal embossed circuit identification of panelboards.
2. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panelboard door to reflect conditions at completion of Work. Directory shall be typewritten denoting loads served by room number or area for each circuit.

3. Nameplates: Provide engraved nameplate for each panelboard. See Section 260533: Electrical Identification for requirements.
- D. Refer to Panelboard Schedules for the following:
1. Mounting style; service voltage; terminal lug size, location, and quantity; bus ampacity; interrupting capacity of bus and breakers; quantity, poles and rating of overcurrent protective devices.
- E. Overcurrent protective devices:
1. Refer to Section 26 28 16: Overcurrent Protection Devices.
 2. Overcurrent protective devices shall be molded case circuit breakers.
 3. Main devices shall be hard bus connected to the panelboard bus bars.
 4. In all cases, panelboards fed directly from a transformer shall have a main overcurrent protective device. If not indicated on the Drawings or Panelboard Schedules, provide this device sized to provide the full capacity of the transformer rating.
 5. Main devices shall be vertically mounted and shall have their operating handle in the up position when energized. Main devices that are mounted in the same manner as the branch devices are NOT acceptable, i.e. main devices shall be individually mounted at the top or bottom of the phase bus bars.
 6. Panelboards overcurrent protective devices layout shall conform to the layout indicated on the panelboard schedules.
 7. Provide identified handle ties for single pole circuit breakers that share a neutral conductor.
- F. Finish: Five step zinc phosphate pre-treatment, one coat of rust inhibiting dichromate primer and one coat of baked-on enamel finish, ANSI 61 (light gray).

2.3 DISTRIBUTION PANELBOARDS

- A. Enclosures shall be sized as required and shall meet the space restriction allocated on Drawings. Panelboard shall comply with NEMA PB 1.
- B. Provide necessary hardware to permit locking every overcurrent protective device handle in the "OFF" position.
- C. Where "SPACE" is indicated on panelboard schedules or Drawings, install cross connectors and mounting hardware to match the frame size ampere rated noted.

2.4 BRANCH CIRCUIT PANELBOARDS

- A. Enclosure shall be 20" wide x 5-3/4" deep, surface or flush mounted and shall comply with NEMA PB 1.

- B. Flush panelboards mounted adjacent to each other shall be same physical size.
- C. Where "SPACE" is indicated on panelboard schedules or Drawings, install minimum 100amp branch circuit cross connectors and mounting hardware. For future device spaces larger than 100amps, cross connectors shall match the frame size ampere rated noted.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of panelboard installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.
- B. Where panelboards are shown to be flush mounted in walls, the contractor shall insure that 6" deep studs are employed in wall construction to accommodate the 5-3/4" deep panelboard enclosure.

3.2 INSTALLATION

- A. Install panelboards in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Set panels plumb and symmetrical with building lines in conformance with PB1.1. Furnish and install all construction channel bolts, angles, etc., required to mount the equipment furnished under this Section.
- C. Mounting height shall be 6 feet.
- D. Panelboards shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.
- E. Provide mounting hardware brackets, busbar drillings and filler pieces for all unused spaces.
- F. "Train" interior wiring; bundle and clamp, using specified plastic wire wraps specified under Section 260519: Building Wire and Cable.
- G. Replace panel pieces, doors or trim exhibiting dents, bends, warps, or poor fit that may impede ready access, security, or integrity.
- H. Conduits terminating in concentric, eccentric, or oversized knockouts at panelboards shall have ground bushings and bonding jumpers installed interconnecting all such conduits and the panelboard.
- I. Check and tighten all bolts and connections with a torque wrench using Manufacturer's recommended values.
- J. Provide four 3/4" spare conduits stubbed-out of flush mounted panelboards to nearest accessible ceiling space.

- K. Visually inspect panelboard for rust and corrosion. If signs of rust and corrosion are present, restore or replace panelboard to new condition.
- L. In damp and wet locations, mount panelboards with a minimum one inch of air space between cabinet and the wall or other support material.
- M. Provide close up plugs in all unused openings in the cabinet.
- N. Field install handle ties on single pole circuit breakers that share a neutral conductor.
- O. Circuit breakers feeding "Fire Alarm Control Panel(s)" or other fire alarm equipment shall be red in color.

3.3 FIELD QUALITY CONTROLS

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:
 - 1. Assure panelboard installation conforms to specified requirements and operates within specified tolerances.
 - 2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
 - 3. Prepare final test report including results, observations, failures, adjustments, and remedies.
 - 4. Apply label on panelboards upon satisfactory completion of tests and results.
 - 5. Verify ratings and settings and make final adjustments.
- B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.
- C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.
- D. Testing of overcurrent protective devices shall be done only after all devices are installed and system is energized.
- E. Prefunctional testing:
 - 1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
 - 2. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects alignment and fit.
 - b. Perform mechanical operational tests in accordance with Manufacturer's instructions.

- c. Compare nameplate information and connections to Contract Documents.
 - d. Check tightness of all power connections.
 - e. Check that all covers, barriers, and doors are secure.
3. Electrical tests:
- a. Insulation resistance: 1000volt DC tests for one minute on all 600volt and lower rated equipment, components, buses, feeder and branch circuits and control circuits. Test phase-to-phase and phase-to-ground circuits showing less than 10-megohms resistance to ground shall be repaired or replaced.
 - b. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.
 - c. Ground resistance: Test resistance to ground of system and equipment ground connection.
 - d. Test overcurrent protection devices per Section 262816: Overcurrent Protective Devices.
- F. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation. The Contractor shall bear all costs incurred by the necessity for retesting including test equipment, transportation, subsistence, and the Engineer's hourly rate.
- G. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- H. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.4 CLEANING

- A. Prior to energizing of panelboards, the Contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of panelboards per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

END OF SECTION

SECTION 26 27 19 – SURFACE RACEWAYS

PART 1 – GENERAL

1.1 SUMMARY

1. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - a. Surface metal raceways.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
 1. Federal Specifications (FS):
 - a. FS W-C-582; Conduit, Raceway, Metal and Fitting; Surface.
 2. Underwriters Laboratories, Inc. (UL):
 - a. UL 5; Standard for Surface Metal Raceways and Fittings.
 - b. UL 870; Wireways, Auxiliary Gutters and Associated Fittings.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and proposed application.
 3. Submit Manufacturer's installation: Provide written instructions for raceway products special installation techniques.
 4. Complete bill of material listing all components.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Surface metal raceways and multi-outlet assemblies:
 - a. Wiremold (Legrand)
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 SURFACE METAL RACEWAYS

- A. Assembly: Single or Double compartment raceway shall be complete to include bases, covers, end plates, compartment divider, fittings and connections as required. Raceways shall be UL labeled.
- B. Construction: Raceway base, cover, compartment divider and end plates shall be constructed of cold rolled steel with 0.094" minimum wall thickness. or of extruded aluminum of No. 6063-T5 aluminum alloy extrusion. Corner extrusions shall be identical to linear extrusions.
- C. Size: Raceway size and length shall be as indicated on Drawings.
- D. Fittings: Boxes, extension rings, couplings, elbows, and connectors shall be designed for use with raceway system.
- E. Finish: To be determined by the Architect.
- F. Application: Utilize for power-only applications.
 - 1. Legrand/Wiremold 500 or 700 series, or equal, as required.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of surface raceway installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 SURFACE METAL RACEWAY

- A. Installation:
 - 1. Install raceway in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

2. Contractor shall coordinate raceway lengths with building walls, counter, and actual field conditions.
 3. Raceways mounted on walls above benches and counters shall align exactly with each end of bench or counter.
 4. Use flat-head screws to fasten channel to surfaces, at heights indicated on Drawings, per Manufacturer's instructions. Mount plumb and level. Channel must be mechanically fastened; use of double-sided tape or other methods of attachment are not acceptable.
 5. Installed complete with all necessary corner connectors, 'T' connectors, feed connectors, compartment dividers and any other hardware required to provide a complete system as described in the Drawings.
 6. Provide fittings to feed the raceway from the back.
- B. Branch circuiting: Provide connection to pre-wired or field wired assembly as indicated on Drawings. Install circuit identification tags on pigtails. Receptacles shall be identified with panel and circuit I.D. above each outlet with gray dymo label.
- C. Grounding: Ground continuity shall be maintained throughout entire raceway length per CEC.

END OF SECTION.

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SECTION 26 27 26 – WIRING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Wall switches.
 2. Occupancy/vacancy sensors, including wallbox and ceiling mounted.
 3. Receptacles.
 4. Coverplates.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 2. Division 03: Cast-in-place concrete.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.
1. National Electrical Manufacturer's Association (NEMA):
 - a. NEMA WD-1; General-Purpose Wiring Devices.
 - b. NEMA WD-2; Semiconductor Dimmers for Incandescent Lamps.
 - c. NEMA WD-5; Specific-Purpose Wiring Devices.
 - d. NEMA SSL 7A;Phase-Cut Dimming for Solid State Lighting
 2. Underwriter's Laboratories (UL):
 - a. UL 20 General-Use Snap Switches.
 - b. UL 231; Power Outlets.
 - c. UL 310; Electrical Quick-Connect Terminals.
 - d. UL 498; Attachment Plugs and Receptacles.
 - e. UL 514A; Metallic Outlet Boxes.

- f. UL 514D; Cover Plates for Flush-Mounted Wiring Devices.
- g. UL 943; Ground-Fault Circuit-Interrupters.
- h. UL 1681; Wiring Device Configurations.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 3. Provide color finishes for Architect to select from.
 - 4. Submit Manufacturer's installation instructions.
- B. Where inscribed device coverplates are noted on the Drawings or in the Specifications, conform to the requirements of Section 260553: Electrical Identification.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.5 WARRANTY

- A. Occupancy sensors offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Switches, receptacles and coverplates:
 - a. Pass & Seymour.
 - b. Hubbell.

- c. Leviton.
- 2. Occupancy/vacancy sensors switches, time switches:
 - a. Match existing in the building.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 WALL SWITCHES

- A. Standards: Provide general-purpose 120/277volt AC switches that conform to NEMA WD-1 Specifications.
- B. Color: Device color shall be as selected by the Architect, unless otherwise noted.
- C. Wall switches:
 - 1. Provide twenty amperes, 120/277volt, Specification grade, toggle handle, quick-make slow-break, quiet type snap switch with silver cadmium alloy contacts, binding head terminal screws, back and side wired with totally enclosed case.
 - 2. Single-pole, single-throw switches: Hubbell #1221 series, Pass & Seymour #20AC1 series or Leviton #1221 series.
 - 3. Three-way switches: Hubbell #1223 series, Pass & Seymour #20AC3 series or Leviton #1223 series.

2.3 OCCUPANCY/VACANCY SENSOR SWITCHES

- A. Occupancy sensors: automatic on, automatic off.
- B. General:
 - 1. Occupancy sensors shall comply with the latest edition of the California Building Energy Efficiency Standards, California Building Code, Part 6 and be certified by The California Energy Commission. All sensors shall be listed in the most current directory of Certified Occupancy Sensing Devices or be on file with the CEC.
 - 2. Sensors shall be dual-technology type infrared/ultrasonic or infrared/microphonic or as specified herein.
 - 3. Neutral connection required. Sensors that rely on ground leakage current for operation shall not be provided.
 - 4. All sensors shall have an adjustable time delay off setting and a sensitivity adjustment.
 - 5. Ceiling mounted sensors shall operate be line voltage or low voltage with separate control unit. Control unit shall contain power supply and relays for switching loads.

6. Units shall be furnished with area coverage to suit application. No allowance shall be given for providing sensors improperly sized for the square footage of the controlled area.
- C. Color: Device color shall be as selected by Architect, unless otherwise noted.
- D. Ceiling mounted omnidirectional sensors:
1. Sensor shall provide minimum omnidirectional coverage of 1000-square feet.
 2. Operation shall be automatic "ON" and automatic "OFF". Provide with a manual override switch.
 3. Time delay adjustment from 30-seconds to 20-minutes. Set initial time-out setting at 10-minutes. Set sensitivity adjustment at maximum.
 4. Load capacity of 20amps per power or slave pack at connected voltage.
 5. Power pack, if required, consisting of Class 2, 24volt output transformer and relay in single housing, capable of powering up to 2 sensors and mounted inside standard 4-inch square box.
 6. For use in large storage rooms and similar areas.

2.4 RECEPTACLES

- A. Standards:
1. Provide general purpose 20amp, 125/250volt AC receptacles that conform to NEMA WD-1 Specifications. Specialty receptacles shall conform to NEMA WD-5 Specifications as applicable.
 2. Provide NEMA 5-20R, industrial (heavy-duty) specification grade as noted herein, 20amp, 125volt AC, 2-pole, 3-wire grounding type receptacles.
 3. Receptacles shall be the standard conventional style device.
 4. Receptacles shall be tamper-resistant to meet the requirements of CEC Article 406.12.
- B. Color:
1. Device color shall be as selected by the Architect, unless otherwise noted.
 2. Devices connected to an emergency circuit shall be red.
- C. General purpose single outlets:
1. Provide self-grounding back and side wired with binding head staked terminal screw.
 2. Use Hubbell #5361 series, Pass & Seymour #5361 series Leviton #5361 series.

- D. General purpose duplex receptacles:
1. Provide self-grounding, back and side wired with binding head staked terminal screws and break-off strip for two-circuit wiring.
 2. Use Hubbell #5362 series, Pass & Seymour #5362 series or Leviton #5362 series.
- E. Ground fault circuit interrupting (GFCI) receptacles:
1. Provide 20amp, 125volt AC, receptacles consisting of NEMA 5-20R duplex device with integral solid state sensing and signaling circuitry capable of detecting and interrupting a maximum 5-milli-amp line-to-ground fault current in approximately 1/40th of a second.
 2. Provide visual device with trip indication, manual reset, and test mechanisms and with point of use and multi-outlet protection.
 3. Provide self-test and monitor feature with visual indicators on device face representing power status, trip condition, ground fault condition and end of life status.
 4. Provide weather resistant devices at all damp and wet locations.
 5. Use Pass & Seymour #2097TR series, Hubbell GFTRST20 series, Leviton #S7899 series, for Specification grade GFCI receptacles.
 6. Use Pass & Seymour #2097TRWR series, Hubbell GFTWRST20 series, Leviton #WT899 series for weather resistant GFCI receptacles.

2.5 COVERPLATES

- A. General:
1. Provide all coverplates with rounded edges and corners, smooth and free of grooves, embossing or other embellishment.
 2. Provide mounting screws to match the plate finish.
 3. Provide gang type coverplates where two or more devices are installed at one location. Individual gangable coverplates are not acceptable.
 4. Provide plates of one design, standard conventional designer decora style, throughout the Project unless otherwise specified.
- B. Color: Coverplate color shall be ivorywhiteblackgrayas specified by the Architect, unless otherwise noted.
- C. Plastic coverplates:
1. Provide smooth, high impact, self-extinguishing thermoplastic coverplates and 0.100 inches thick with rounded edges and corners.

2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
- D. Metal coverplates:
1. Provide smooth, type 430 stainless steel coverplates, 0.035" thick with rounded edges and corners.
 2. Provide openings to accommodate the devices indicated on the Drawings and in the Specifications.
 3. Provide removable plastic film to protect coverplates during installation. Remove film at time of final acceptance.
- E. Weatherproof coverplates:
1. Non-public areas:
 - a. Provide horizontal mounted, weatherproof in-use coverplate for one duplex or one GFCI receptacle. Provide gasketed, spring loaded, vertically self-closing covers suitable for use in damp and wet locations as described in UL 514 and CEC 406. Covers shall allow the use of the device with the cover closed.
 - b. Furnish base plates, covers, hinge pins, spring, and screws of corrosion resistant type 302 stainless steel.
 2. Public area receptacles:
 - a. Provide horizontal mounted weatherproof in-use coverplate for one duplex or one GFCI receptacle. Provide gasketed, spring loaded, lockable, vertically self-closing covers suitable for use in damp and wet locations as described in UL 514 and CEC 406. Covers shall allow the use of the device with the cover closed.
 - b. Furnish base plates, covers, hinge pins, spring and screws of corrosion resistant type 302 stainless steel.
 - c. Provide two (2) keys for each locking type coverplate.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of wiring device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

- A. Coordinate device heights in vending, kitchen and utility areas with benches and counters.

- B. Coordinate switch mounting location with Architectural details. Unless otherwise noted, locate switches on latch side of door.

3.3 INSTALLATION

- A. Install wiring devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Install devices with the vertical centerline plumb and with all edges of the device flush against the adjacent wall surfaces.
- C. Mount switches at 42 inches to center above finished floor unless otherwise noted.
- D. Mount receptacles vertically with the centerline 18-inches above finished floor and with grounding slot at bottom.
- E. Mount receptacles vertically horizontally when mounting above counters, mount with grounding slot to the left.
- F. Mount GFCI receptacles in the following locations, whether indicated as GFCI type or not on the drawings:
 - 1. In bathrooms.
 - 2. Where receptacles are installed within 6'0" from edge of sinks.
 - 3. In kitchens.
 - 4. On rooftops.
 - 5. Outdoors.
 - 6. Where serving vending machines.
 - 7. Where serving electric drinking fountains.
- G. Provide coverplates for all outlet boxes, switches, receptacles, etc.
- H. Install blank coverplates on all outlet boxes in which no device is required or installed.
- I. Provide coverplates that completely cover wall opening and seat against wall.
- J. Provide stainless steel coverplates for all devices in kitchen/food service equipment areas.

3.4 OCCUPANCY/VACANCY WALLBOX SENSORS

- A. All occupancy/vacancy sensors shall have a sensitivity appropriate for the space. Contractor shall be responsible for testing the sensitivity of the sensor in the space and adjusting as needed.

- B. Where no direction is provided in a sequence of operation or by the owner set the occupancy sensor timeout to values as indicated in Part 2 above.
- C. Install wall mounted devices with the vertical centerline plumb and alleges of device flush against adjacent wall surfaces. Mount devices at 42-inches to center above finished floor unless otherwise noted.

3.5 FIELD QUALITY CONTROL

- A. Electrical testing:
 - 1. Test proper polarity of all receptacles.
 - 2. Test ground continuity of all wiring devices.
 - 3. Test ground fault interrupting device operation.
- B. Visual and mechanical inspection:
 - 1. Check proper operation of all switches.
 - 2. Check indicating lights on all SPD receptacles.
 - 3. Visually inspect and replace damaged or defective devices.

3.6 CLEANING

- A. Clean interior of all boxes from dirt and paint prior to installation of devices.
- B. Clean wiring devices and coverplates from dirt and paint over spray.

END OF SECTION

SECTION 26 28 16 – OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Molded case circuit breakers.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
 - 1. Underwriters Laboratories, Inc. (UL):
 - a. UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
 - 2. National Electrical Manufacturer Association (NEMA):
 - a. NEMA AB 1; Molded Case Circuit Breakers.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. Describe product operation, equipment and dimensions and indicate features of each component.
 - 3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 - 4. Provide factory certification of trip characteristics for each type and rating of circuit breaker.
 - 5. Provide current let-through and melting time information for each type and rating of fuses.
 - 6. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.

7. Submit Manufacturer's installation instructions.
8. Complete bill of material listing all components.
9. Warranty.

1.4 OPERATION AND MAINTENANCE MANUAL

- A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:
 1. A detailed explanation of the operation of the system.
 2. Instructions for routine maintenance.
 3. Parts list and part numbers.
 4. Telephone numbers for authorized parts and service distributors.
 5. Final testing reports.

1.5 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.7 WARRANTY

- A. Units and components offered under this Section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Circuit breakers:
 - a. Square D.
 - b. ABB/ General Electric.
 - c. Eaton.
 - d. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 GENERAL

- A. Overcurrent protective devices shall satisfy all CEC mandated selective coordination requirements (e.g. CEC Articles 517, 620, 645, 695, 700, 701, 708).
- B. Circuit breakers rated (or can be adjusted) 1200amps or higher shall satisfy CEC Article 240.87 requirements.

2.3 MOLDED CASE CIRCUIT BREAKERS

- A. Branch and feeder circuit breakers shall be molded case, bolt on and trip indicating.
- B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.
- C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings or if not indicated, not less 10,000 RMS symmetrical amps for 208volt systems.
- D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.
- E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.
- F. Provide identified handle ties for single pole circuit breakers that share a neutral conductor.

- G. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.
- H. All terminals shall be dual rated for aluminum or copper wire.
- I. Circuit breakers with frame ratings 100amps and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100amps shall be installed in distribution type panels.
- J. Circuit breakers with frame ratings above 100amps through 400amps shall have solid state electronic trips with true RMS reading through the 13th harmonic with 1% accuracy, interchangeable trip via front accessible current plug, adjustable instantaneous and short time be rated as indicated on Drawings at the voltage indicated.
- K. Circuit breakers with frame ratings above 400amps through 2500amps shall have microprocessor-based RMS sensing trip units with the following characteristics:
 - 1. Interchangeable current rating plug or an adjustable trip setting to match the trip rating as indicated on Drawings.
 - 2. Adjustable long-time pick-up setting. Minimum of five settings from 50% to 100%.
 - 3. Adjustable long-time delay setting. Minimum of three delay bands.
 - 4. Adjustable short time pick-up setting. Minimum of five settings from 200% to 800%.
 - 5. Adjustable short-time delay setting. Minimum of three delay bands with I2t IN and OUT curves.
 - 6. Adjustable instantaneous pick-up setting. Minimum of five settings from 200% to 1000%. Where the instantaneous feature is omitted on the Drawings, the trip unit shall have an instantaneous override feature.
 - 7. Zone selective interlocking (ZSI) for short-time delay and ground-fault delay trip functions, if indicated on the drawings.
 - 8. LED status indication to show "health" of trip unit.
 - 9. Three-phase ammeter, if indicated on the drawings.
 - 10. Trip indication targets on overload, ground fault and short circuit, if indicated on the drawings.
- L. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.

- M. Spaces in the boards shall be able to accept any combination of 1, 2 or 3-pole circuit breakers as indicated. Provide all necessary bus, device supports, and mounting hardware sized for frame, not trip rating.
- N. Series rated breakers are not acceptable unless specifically noted on the Drawings.
- O. Breaker shall be rated to operate in an ambient temperature of 40-degrees C and at 100% of their frame ampere rating on a continuous basis, if indicated on the drawings.
- P. For circuit breakers rated or can be adjusted to 1200amps (or higher), provide zone selective interlocking (ZSI) with downstream protective devices, if indicated on the drawings. If ZSI is not indicated on the drawings, provide a key interlock maintenance mode switch and blue LED indicating lamp in the same section, which shall allow an operator to manually enable temporary protective device maintenance settings to reduce the arc flash energy level. Key shall be held captive when maintenance mode signal is disabled and removable when maintenance mode signal is enabled. Maintenance mode switch positions shall be labeled "Enabled" and "Disabled". Blue indicating lamp shall be push-to-test type.
- Q. Refer to the Drawings for breakers requiring ground fault protection. See Section 262413: Switchboards for requirements of ground fault protection system.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of overcurrent protective device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 INSTALLATION

- A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.
- C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable CEC and NEMA standards for installation.
- D. Circuit breakers serving "Fire Alarm Control Panel(s)" and other fire alarm devices shall be red in color.

3.3 FIELD QUALITY CONTROL

- A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:
 - 1. Assure overcurrent protective device installation conforms to specified requirements and operates within specified tolerances.
 - 2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
 - 3. Prepare final test report including results, observations, failures, adjustments, and remedies.
 - 4. Verify ratings and settings and make final adjustments.
- B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.
- C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.
- D. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.
- E. Prefunctional testing:
 - 1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
 - 2. Visual and mechanical inspection:
 - a. Inspect for physical damage, defects alignment and fit.
 - b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
 - c. Compare nameplate information and connections to Contract Documents.
 - d. Check tightness of all control and power connections.
 - e. Check that all covers, barriers, and doors are secure.
 - 3. Electrical tests:
 - a. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.
 - b. Test all circuit breakers with frame size 225amps and larger in each panelboard, distribution board, switchboard, etc. unless otherwise

noted via primary current injection testing. Testing shall verify the following:

- i. Determine that circuit breaker will trip under overcurrent conditions, with tripping time in conformance with NEMA AB 1 requirements.
 - ii. Circuit breaker pickup and delay measurements are within the manufacturers published tolerances for long time, short time, instantaneous, and ground fault.
 - iii. For circuit breakers rated or can be adjusted to 1200amps (or higher), confirm ZSI protection is acceptable or the maintenance mode switch is operational (enabled and disabled) with reduced pickup and delay measurements when enabled.
- F. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.
- G. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.4 ADJUSTING

- A. Adjust circuit breaker trip settings based on recommendations of Section 260060: Power System Study.
- B. Adjust circuit breaker trip settings for coordination with other overcurrent protective devices in system.
- C. Adjust circuit breaker trip settings for adequate protection from overcurrent and fault currents.

3.5 CLEANING

- A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

3.6 TRAINING

- A. Factory authorized service representative shall conduct a 4-hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance, and testing of equipment with both classroom training and hands-on instruction.
- B. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION.

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SECTION 26 28 19 – DISCONNECT SWITCHES

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Disconnect Switches.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated on specified:
 - 1. National Electrical Manufacturer Association (NEMA):
 - a. NEMA KS 1; Enclosed Switches.
 - 2. Underwriters Laboratories, Inc. (UL):
 - a. UL 512; Fuseholders.

1.3 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - 2. As a minimum the following characteristics shall be indicated:
 - a. NEMA types.
 - b. Current rating.
 - c. Number of poles.
 - d. Fuse provisions.
 - e. Enclosure dimensions.
 - f. Voltage.
 - g. Horsepower rating (if applicable).

- h. Short circuit rating.
- 3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
- 4. Submit Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Square D.
 - 2. ABB/ General Electric.
 - 3. Eaton.
 - 4. Siemens.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 DISCONNECT SWITCHES

- A. Description: Provide NEMA heavy-duty type switches with dead front construction and padlock provisions for up to three locks in the “OFF” position.
- B. Switch interior: Provide switch with switchblades that are fully visible in the “OFF” position when the door is open. Provide UL listed lugs for copper conductors, lugs to be front removable. Provide plated current carrying part.
- C. Switch mechanism: Provide switches with a quick-make, quick-break, position indicating, operating handle and mechanism and a dual cover interlock to prevent unauthorized opening of the switch door in the “ON” position or closing of the switch mechanism with the door open. Furnish an electrical interlock to de-energize control wiring when the disconnect switch is opened.
- D. Enclosures: Provide switches with hinged cover in NEMA 1 general purpose, sheet steel enclosure for dry locations and NEMA 3R weatherproof galvanized enclosures for exterior, damp, or wet locations, unless otherwise noted on the Drawings. Provide an enclosure treated with a rust-inhibiting phosphate primer and finished in gray baked enamel.

- E. Ratings: Provide switches that are horsepower rated for 240 VAC or 600volt AC as required for the circuit involved and that meet "I-SQUARED-T" requirements. Fusible switches to have provisions for the types of fuses specified in Section 262816: Overcurrent Protective Devices. UL listed short circuit rating, when equipped with fuses to be 200,000amps RMS symmetrical. Furnish with provisions for RK-1 fuses for switches up to 600amps. 800amp switches and larger to have provisions for Class L fuses.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of disconnects switch installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

- A. Coordinate locations of switches and equipment in the field to provide code required clearances in front of switches and to ensure that switches are insight of the controller as described in CEC Article 430.

3.3 INSTALLATION

- A. Install disconnect switches where indicated on the Drawings.
- B. Install fuses in fusible disconnect switches.
- C. Include construction channel and mounting hardware as required to support disconnect switch.

3.4 IDENTIFICATION

- A. Provide engraved, machine screw retained type 'NP' nameplate on each disconnect switch. See Section 260553: Electrical Identification.

3.5 CLEANING

- A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of enclosure of all construction debris, scrap wire, paint splatters, dirt, etc.

END OF SECTION.

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SECTION 26 50 00 – LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

- A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Interior luminaires (lighting fixtures.)
 2. Light-emitting diode (LED) assemblies.
 3. Drivers and transformers.
 4. Optical components; including diffusers, refractors, reflectors, and louvers.
 5. Unit battery equipment.
- B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.
1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
 2. Division 03: Concrete; for cast-in place bases for lighting poles and bollards.
 3. Division 05: Metals; for fittings, brackets, backing supports, rods, etc. as required for support and bracing of luminaires.
 4. Division 09: Finishes; for ceilings, wall assemblies, acoustical treatment, and field painting of luminaires.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable Specifications and Standards except as otherwise indicated or specified:
1. American National Standards Institute (ANSI):
 - a. ANSI/IEC 60529; American National Standard for Degrees of Protection Provided by Enclosures (IP Code)
 - b. C137.0 Lighting System Terms and Definitions.
 - c. C137.1 0-10V Dimming Interface for LED Drivers and Controls
 2. Underwriters Laboratories, Inc. (UL):
 - a. UL 66; Fixture Wire.

- b. UL 102.3; Standard Method of Fire Test of Light Diffusers and Lenses.
 - c. UL 844; Luminaires for Use in Hazardous (Classified) Locations.
 - d. UL 924; Emergency Lighting and Power Equipment.
 - e. UL924a; Auxiliary Power Supplies (for generator-backed systems.)
 - f. UL 1574; Track Lighting Systems.
 - g. UL 1598; Luminaires.
 - h. UL 1598C; Light-Emitting Diode Retrofit Luminaire Conversion Kits.
 - i. UL 1838; Low Voltage Landscape Lighting Systems.
 - j. UL 1993; Self-Ballasted Lamps and Lamp Adapters.
 - k. UL 2007A; Shatter Containment of Lamps for Use in Regulated Food Establishments.
 - l. UL 2108; Low Voltage Lighting Systems.
 - m. UL 2592; Low Voltage LED Wire.
 - n. UL 5085-3; Low Voltage Transformers: Class 2.
 - o. UL 8750; Light Emitting Diode (LED) Equipment for Use in Lighting Products.
 - p. UL 8753; Field-Replaceable Light Emitting Diode (LED) Light Engines.
 - q. UL 8754; Holders, Bases, and Connectors for Solid-State (LED) Light Engines and Arrays.
3. National Electrical Manufacturers Associations (NEMA):
- a. SSL-1; Electronic Drivers for LED Devices, Arrays or Systems.
 - b. SSL-4; Retrofit Lamps—Minimum Performance Requirements.
 - c. 77; Temporal Light Artifacts: Test Methods and Guidance for Acceptance Criteria.
 - d. LE-4; Recessed Luminaires, Ceiling Compatibility
 - e. 100; Wire Insulation Colors for Lighting Systems
 - f. Illuminating Engineering Society of North America (IESNA):
 - g. TM-15; Luminaire Classification System for Outdoor Luminaires.

- h. TM-21; Projecting Long Term Lumen Maintenance of LED Light Sources.
 - i. TM-30; Method for Evaluating Light Source Color Rendition.
 - j. TM-30-Annex E Recommendations for Specifying Light Source Color Rendition
 - k. LM-79; Electrical and Photometric Measurements of Solid-State Lighting Products.
 - l. LM-80; Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules.
 - m. LM-84; Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires.
 - n. LM-86; Measuring Luminous Flux and Color Maintenance of Remote Phosphor Components
4. Restriction of Hazardous Substances (RoHS):
- a. RoHS 3; Directive 2015/863 - Cat 5. Lighting: lamps, luminaires, light bulbs.

1.3 SYSTEM DESCRIPTION

- A. Provide and install a fully functional and operating lighting system as indicated, complete with light engines, lamps, wiring, and securely attached to support system to meet all seismic code requirements.
- B. Where catalog number and narrative or pictorial descriptions are provided, the written description shall take precedence and prevail.

1.4 SUBSTITUTIONS

- A. Refer to Section 260010: Basic Electrical Requirements for specific Equipment requirements.
- B. Items specified under this Section and Luminaire Schedule are subject to the requirements, with the following qualifications:
 - 1. Items solely specified by Manufacturer name and catalog number, without qualifiers: Provide as specified – No Substitutions.
 - 2. Items specified by multiple Manufacturers, without qualifiers: Provide any listed manufacturer – No Substitutions.
 - 3. Items specified by sole or multiple Manufacturers, followed by “Or Approved Equal” or “Or Approved Equivalent”: Conform to substitution requirements outlined for Equipment.

4. Items specified by sole or multiple Manufacturers, followed by “Or Equal” or “Or Equivalent”: Products that meet the salient requirements are acceptable to provide.
 - a. Equivalency is at the sole judgement of the Architect and Engineer.
 - b. Should a submitted, unspecified product fail to meet the requirements of Equivalency, provide specified products at no additional cost to the Owner.
- C. Equivalency shall be determined by review of the following luminaire characteristics where applicable. Lack of pertinent data on any characteristic shall constitute justification for rejection of the submittal or substitution.
1. Performance:
 - a. Distribution.
 - b. Utilization.
 - c. Luminance distribution (Average brightness / maximum brightness.)
 - d. Spacing to mounting height ratio.
 - e. Overall luminaire efficiency.
 2. Construction:
 - a. Engineering.
 - b. Workmanship.
 - c. Rigidity.
 - d. Permanence of materials and finishes.
 3. Installation Ease:
 - a. Captive parts and captive hardware.
 - b. Provision for leveling.
 - c. Through-wiring ease.
 4. Maintenance:
 - a. Ease of relamping / replacement of LED array.
 - b. Ease of replacement of driver/ballast and lamp sockets.
 5. Appearance:
 - a. Architectural integration.

- b. Light tightness.
- c. Styling.
- d. Conformance with design intent.
- e. When requested, furnish a working sample complete with housing, trim, 8' cord and plug, and specified lamp.

1.5 SUBMITTALS

- A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
 - 1. Complete bill of material listing (index) of all luminaires. Index shall be organized in the same sequence as the Luminaire Schedule (alphabetical.) Include in the index:
 - a. Type per the Luminaire Schedule.
 - b. Manufacturer.
 - c. Complete catalog number, including all accessories and appurtenances required for the installation.
 - d. Voltage.
 - 2. Manufacturer's data sheets/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 - a. Identify luminaire type on each sheet.
 - b. Clearly mark on each data sheet the specific item(s) being submitted. Obfuscate or otherwise delete options on data sheets that are not provided.
 - 3. Manufacturer's installation instructions.
 - 4. Warranty.
 - 5. U.L. labeling information.
 - 6. Photometric Reports consisting of:
 - a. Independent Testing Laboratories, Inc. or equal, photometric test report for each luminaire listed on the Luminaire Schedule. Test reports shall be based on Illuminating Engineering Society published test procedures and shall contain candlepower distribution curves in five lateral planes for luminaires with asymmetric distributions and luminance data for vertical angles above 45 degrees from nadir.
 - b. Coefficient of utilization table.

c. Zonal lumen summary including overall luminaire efficiency.

7. Shop Drawings:

a. Where noted in the Luminaire Schedule, submit Shop Drawings from Manufacturer detailing modified or custom luminaires indicating dimensions, weights, methods of field assembly, components, features, accessories, methods of support, etc.

8. Mock-ups: Provide mock-up luminaire samples where "MOCK-UP" is indicated in the Luminaire Schedule. Refer to Part 3 – Execution for requirements.

1.6 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. An updated index per 1.05-A.
2. One complete set of final submittals of actual product installed, including product data and shop drawings.
3. Instructions for routine maintenance.
4. Pictorial parts list and parts number.
5. Telephone numbers for authorized parts and service distributors.

1.7 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.
- B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Luminaires shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.
- B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.
- C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.9 WARRANTY

- A. Units and components offered under this Section shall be covered by a **1**-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
 - 1. Luminaires, and Exit Signs: as listed in the Luminaire Schedule.
 - 2. Unit battery equipment:
 - a. Philips Bodine.
 - b. Myers/Iota.
 - c. Unit battery equipment provided by Luminaire Manufacturers listed in the Luminaire Schedule: meeting the technical and warranty requirements of this Section.
- B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 GENERAL

- A. Luminaires new and complete with mounting accessories, junction boxes, trims, and lamps.
- B. Luminaire assemblies U.L. listed appropriate to mounting conditions and application. All labels affixed to the luminaire shall be in a location not visible from normal viewing angles.
- C. Each luminaire family type (downlights, etc.) supplied by only one manufacturer.
- D. Luminaires shall be free of light leaks and shall be designed to provide sufficient ventilation of light engines, including ventilation holes where required.

2.3 LUMINAIRE CONSTRUCTION

- A. All sheet metal Work shall be free from tool marks and dents and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. 20-gauge (0.7-mm or 0.027-inch) minimum.
 - 1. Finish: Baked white dry polyester powder, unless otherwise specified, with a minimum average reflectance of 85% on all exposed and light reflecting surfaces. Steel components shall be prepared for finishing with a 5-step zinc phosphating process prior to painting.

2. Luminaire (including all painted component parts) shall be painted after fabrication unless specifically noted in the Luminaire Schedule.
- B. Extruded Aluminum Housings: One-piece housing of AA 6063 T5 extruded aluminum with 0.14 minimum thickness smooth and free of tooling lines in one uninterrupted section of 1-foot to 24-foot with the cross sectional dimensions as indicated in the Luminaire Schedule.
- C. All surfaces shall be cleaned and dressed to eliminate all exposed sharp edges or burrs.
- D. All intersections and joints shall be formed true and of adequate strength and structural rigidity to prevent any distortion after assembly.
- E. End Plates: Die cast end plates shall be mechanically attached without exposed fasteners. End caps shall be minimum 0.125" thick.
- F. All mitered corners or joints shall be accurately aligned with abutting intersecting members. Sheet metal Work shall be properly fabricated so that planes will not deform (i.e. become concave or convex) due to normal expected ambient and operating conditions.
- G. Ferrous mounting hardware and accessories shall be finished using either a galvanic or phosphate primer/baked enamel process to prevent corrosion and discoloration of adjacent materials.
- H. Fasteners shall be manufactured of galvanized steel.
- I. Finish:
 1. All exposed steel surfaces shall be treated with an acid wash and clear water rinse, then prime coated. The luminaire shall then be electrostatically painted, or powder coated, and oven baked in the color indicated in the Luminaire Schedule.
- J. Door Frames for lensed luminaires: White painted, flat aluminum with mitered corners.

2.4 LED ARRAYS

- A. Minimum lumen maintenance per LM-80 measurements and TM-21 calculations: L90 at 60,000 hours.
- B. Maximum burnout: B90 at 200,000-hours.
- C. Free of mercury and toxic materials; RoHS compliant.
- D. Linear LED boards: LED pitch shall be consistent throughout the luminaire and shall remain consistent from the end of one board to the start of the next. LED pitch shall be the same from the endcap of the luminaire to the last LED on the board as the LED pitch throughout the luminaire. Luminaire shall have a continuous luminous appearance – bright or dark spots are not acceptable.

E. White LEDs:

1. Interior

- a. Correlated Color Temperature (CCT): 4000K
- b. Minimum efficacy: 75 lumens per watt.
- c. L70 lifetime: minimum 80,000-hours (extrapolated.)
- d. Correlated Color Temperature (CCT); as specified in Luminaire Schedule. Maximum 3-step MacAdam ellipse variation throughout listed life (L70).
- e. Color Rendering Index (CRI); minimum 80 Ra.
- f. R9 value; minimum 30.
- g. TM30 values; $R_f > 75$, $92 > R_g > 110$.

2.5 LED DRIVERS:

A. LED drivers shall be integral to luminaire housing or remotely located, when specified, within 15 feet of diode assembly.

1. Luminaires shall be provided with the UL listed or equivalent driver and low voltage power supply as recommended by Manufacturer to insure proper and consistent lamp and luminaire performance. The number of LEDs per luminaire per power supply shall not be exceeded, and LEDs shall not be wired to a high capacity driver unless recommended by Manufacturer.
2. Light Emitting Diode (LED) control gears shall operate with sustained variations of +/- 10% in voltage and frequency without damage to the driver and have a power factor not less than 90%. Regulations: +/-5% across the listed load range.
3. Driver input current shall have Total Harmonic Distortion (THD) of less than 20%. The Driver shall have a Class A sound rating unless otherwise specified.
4. Control gear shall be rated for 50-degree C ambient temperature.
5. All control gear shall facilitate smooth, flicker-free dimming from 100% to 10%, 1% or 0.1% as noted on the Luminaire Schedule.

2.6 LENSES

A. Acrylic:

1. Lenses shall be extruded or injection molded crystal clear 100% virgin acrylic (except as indicated otherwise). For lenses with male pattern of pyramids or cones, specified minimum thickness refers to distance from flat surface to base of pyramids (cones) or thickness of undisturbed material. For lenses

with female pattern, specified minimum thickness refers to overall thickness of material.

2. Lenses shall fully eliminate lamp images when viewed from all directions within 45 to 90-degree angles from vertical, where the ratio of lamp spacing to the distance from lamp underside to top of lens does not exceed 1.50. Within the viewing angle from 0 to 45-degrees the ratio of maximum brightness (under a lamp) to minimum brightness (between lamps) shall not exceed 3 to 1.
3. Finishes (i.e. sandblasting, etching, polishing) shall be performed as described in the Luminaire Schedule.
4. Plastic electrical light diffusers must meet the requirements of Section 2-5209, CAC, Flame Spread Rating.
5. Prismatic Acrylic:
 - a. Extruded of clear virgin acrylic plastic, 0.125" minimum overall thickness, 0.100" nominal unpenetrated thickness, Pattern 12 with flat sided female prisms running at 45 degrees off panel axis unless otherwise specified in the luminaire schedule. Concave prisms are not acceptable.
6. Opal acrylic:
 - a. Extruded or injection molded of virgin acrylic plastic, 0.080" minimum overall thickness.

2.7 UNIT BATTERY EQUIPMENT

A. LED Emergency Power Supplies

1. Standard Features:
 - a. Safety compliance to UL 924; CAN/CSAC22.2 No.141-10 and NFPA requirements for 90-minute egress
 - b. Open circuit / short circuit protection
 - c. Operating temperature: 32-degree F/0-degree C to 122-degree F/50-degree C
2. Test switch / charging indicator light
3. Emergency reaction time < 1-sec
4. Powder coat steel, stainless or galvan-nealed case
5. Field-replaceable NiCd battery pack (x2) with quick connect
6. Min. lead wire length: 6in UL 1452 solid / #18 AWG 1000volt / 90-degree C

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Contractor shall thoroughly examine Project site conditions for acceptance of luminaire installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

- A. Architectural Plans shall govern exact ceiling construction and mounting conditions for all luminaires. Locate as shown on the architectural elevations and reflected ceiling plan.
- B. Consult Architectural Drawings for details of ceiling construction, finish, and other applicable details.
- C. Contractor shall be responsible for coordination of luminaire mounting and compatibility with ceiling construction.
- D. Luminaires in areas where exposed or concealed pipe and ductwork prevents direct access to the structural ceiling shall be provided with appropriate support system to install luminaire below obstructions to avoid conflicts with same.

3.3 ARCHITECTURAL COORDINATION

- A. Where luminaires are mounted in architectural coves, soffits, valances, or cabinets and are given an overall length, the Contractor shall verify all lengths in the field prior to releasing order.
- B. Where luminaires are surface mounted or suspended to match the length of walls or other architectural elements, the Contractor shall verify all lengths in the field prior to releasing order.
- C. Mounting heights specified on drawings:
 - 1. Wall mounted luminaires: shall be to centerline of luminaire.

3.4 INSTALLATION

- A. Install luminaires in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.
- B. Contractor shall be responsible for all supports, hangers, and hardware necessary for a complete installation.
- C. Luminaires shall be plumb, level, square, in straight lines and without distortion.
- D. Remedy light leaks that may develop after installation of recessed or enclosed luminaires.

- E. Adjustable luminaires shall be installed with “dead” zone of rotation away from intended aiming point.

3.5 LUMINAIRE SUPPORTS

- A. Physical (gravity) supports:
 - 1. Surface mounted luminaires solely supported by recessed boxes in a gypsum board ceiling shall have a 1-1/8" steel bar screwed or welded to the back of the box. This steel bar must be long enough to span two ceiling support channels and shall be attached to the channels by twisting wire around the bar and the support channel. For luminaires weighing over 50-pounds, provide studs in recessed box.
 - 2. Support surface mounted luminaires more than 18" wide at or near each corner or edge, in addition to support from outlet box.
 - 3. Support outlet boxes as specified in Section 260533: Boxes. Provide all boxes with grounding pigtail.

3.6 IDENTIFICATION SYSTEM

- A. All concealed junction box cover plates for the lighting branch circuit system shall be clearly marked with a permanent black ink felt pen identifying the branch circuit (both panel designation and circuit number) contained in the box.

3.7 FIELD QUALITY CONTROL

- A. Visual and mechanical inspection:
 - 1. Inspect for physical damage, defects, alignment and fit.
 - 2. Perform operational test of each luminaire after installed, circuited, and energized.
 - 3. Perform emergency operational test of all luminaires connected to emergency circuiting by simulating normal power source failure.
- B. Contractor shall replace at no cost to the Owner all equipment which is found defective or do not operate within factory specified tolerances.

3.8 CLEANING

- A. Clean luminaires prior to Project closeout in accordance with Manufacturer's recommended materials and methods.
- B. Remove all debris, fingerprints, and packaging remnants.

END OF SECTION

DIVISION 27 – COMMUNICATIONS

- 27 00 00 – Communications Basic Requirements
- 27 05 00 – Common Work Results for Communications
- 27 10 00 – Structured Cabling
- 27 21 00 – Data Communications Network Equipment

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SECTION 27 00 00 – COMMUNICATIONS BASIC REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies the common administration basic requirements and common methods for all low voltage systems installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.

1.2 STANDARDS, REGULATIONS, AND CODES REFERENCES

- A. The following Standards, Regulations and Codes apply to work specified in the Contract Documents.
1. Applicable State and Local Codes.
 2. California Building Code and California Electrical Code, Current Editions.
 3. BICSI TDMM (Telecommunications Distribution Methods Manual), 11th Edition 2006.
 4. ANSI/TIA/EIA-568-B.1. Commercial Building Telecommunications Cabling Standard,
 5. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 2, Grounding and Bonding Specifications for Screened Balanced Twisted-Pair Horizontal Cabling.
 6. ANSI/TIA/EIA-568-B.1-3. Commercial Building Telecommunications Cabling Standard.
 7. ANSI/TIA/EIA-568-B.1-4. Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements, Addendum 4, Recognition of Category 6 and Category Cat 6A and 50 nm Laser-Optimized 50/125 um Multimode Optical Fiber Cabling.
 8. ANSI/TIA/EIA-568-B.1-2. Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
 9. ANSI/TIA/EIA-568-B.2-1. Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components, Addendum 1, Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 10. ANSI/TIA/EIA-568-B.2-10 (draft 2.0). Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components, Addendum 10, Transmission Performance Specifications for 4-Pair 100 Ohm Augmented Category 6 Cabling.
 11. ANSI/TIA/EIA-568-B3.3 Optical Fiber Cabling Components Standard.
 12. TIA-569-B. Commercial Building Standard for Telecommunications Pathways and Spaces.
 13. ANSI/TIA/EIA-606-A. Administration Standard for Commercial Telecommunications Infrastructure.
 14. ANSI/TIA/EIA-607-A. Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
 15. TIA/EIA TSB-67 Transmission Performance Specifications for Field Testing of Unshielded Twisted-Pair Cabling Systems.
 16. TIA/EIA TSB-72 Centralized Optical Fiber Cabling Guidelines.

1.3 DEFINITIONS

- A. The following is a list of abbreviations generally used in Divisions 27 & 28:
1. ADA - Americans with Disabilities Act
 2. AHJ - Authority Having Jurisdiction
 3. ANSI - American National Standards Institute
 4. APWA - American Public Works Association
 5. ASTM - American Society for Testing and Materials
 6. CBC - California Building Code
 7. CEC - California Electrical Code
 8. CFC - California Fire Code
 9. FCC - Federal Communications Commission
 10. HVAC - Heating, Ventilating and Air Conditioning
 11. IEC - International Electro-technical Commission
 12. IEEE - Institute of Electrical and Electronics Engineers.
 13. IETA - International Electrical Testing Association
 14. FM - FM Global
 15. NEMA - National Electrical Manufacturers Association
 16. NFPA - National Fire Protection Association
 17. OSHA - Occupational Safety and Health Administration
 18. UL - Underwriters Laboratories Inc.
- B. Provide: To furnish and install, complete and ready for the intended use.
- C. Furnish: Supply and deliver to the project site, ready for unpacking, assembly, and installation.
- D. Install: Includes unloading, unpacking, assembling, erecting, installing, applying, finishing, protecting, cleaning and similar operations at the project site to complete items of work furnished by others.
- E. Following is a list of commonly used terms in Division 27:
1. Active Equipment: Electronic equipment used to develop various WAN and LAN services.
 2. Backbone: Collective term sometimes used to describe the campus and vertical distribution subsystem facilities and media interconnecting service entrances, communications rooms, and communications cabinets.
 3. Bonding: Permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to safely conduct currents likely to be imposed on it.
 4. Cabinet: Wall-mounted modular enclosure designed to house and protect electronic equipment.
 5. Cable Tray: Vertical or horizontal open supports, usually made of aluminum or steel, that are fastened to a building ceiling or wall. Cables are laid in and fastened to the trays. A cable tray is not a raceway.
 6. Campus: Grounds and buildings of a multi-building premises environment.

7. Channel: The end-to-end transmission path between two points at which application specific equipment is connected; may include one or more links, cross-connect jumper and/or patch cords, and work area station cords. Does not include connection to active equipment.
8. Cross-Connect: Equipment used to terminate and tie together communications circuits.
9. Cross-Connect Jumper: A cluster of twisted-pair conductors without connectors used to establish a circuit by linking two cross-connect termination points.
10. Fiber Optic Distribution Unit (FDU): Cabinet with terminating equipment used to develop fiber optic cross-connect facilities. Also known as LIU.
11. Grounding: a conducting connection to earth, or to some conducting body that serves in place of earth.
12. Hinged Cover Enclosure: Wall-mounted box with a hinged cover that is used to house and protect electrical devices.
13. Horizontal: Pathway facilities and media connecting the MDF or IDF to Telecommunications Outlets.
14. Intermediate Distribution Frame (IDF): Data networking equipment rack and/or location that serves an individual area, floor or building. Downstream from the MDF.
15. Jack: Receptacle used in conjunction with a plug to make electrical contact between communications circuits, e.g., eight-position/eight-contact modular jacks.
16. Link: A transmission path between two points, not including terminal equipment, work area cables, and equipment cables; one continuous section of conductors or fiber, including the connecting hardware at each end.
17. Local Area Network (LAN): Data transmission facility connecting several communicating devices, typically Ethernet and the network is limited to a single campus.
18. Main Distribution Frame (MDF): Initial (main) data network equipment rack and/or location. Only one MDF occurs per site and may serve many downstream IDFs.
19. Media: The type of cable (e.g., twisted-pair, coaxial, or fiber optic) used to provide signal transmission paths.
20. Minimum Point of Entry (MPOE): The location where the service provider hands off connection and responsibility for service to on premise customer owned equipment.

21. Modular plug: An eight-position, eight-conductor end-of-wire electrical connector used with Category rated cable.
22. Passive Equipment: Non-electronic hardware and apparatus, e.g., equipment racks, cable trays, electrical protection, wiring blocks, FDUs, etc.
23. Patch Cord: A length of copper or fiber cable with connectors on both ends used to join communications circuits at MDF/IDF and end stations.
24. Patch Panel: System of terminal blocks or connectors used with patch cords that facilitate the administration of cross-connect fields.
25. Pathway: Facility for the placement of communications cable. A pathway facility can be composed of several components including conduit, wireway, cable tray, surface raceway, underfloor systems, raised floor, ceiling support wires, etc.
26. Protectors: Electrical protection devices used to limit foreign voltages on metallic communications circuits.
27. Raceway: An enclosed channel designed expressly for holding wires or cables; may either conductive metal or insulating plastic. The term includes conduit, tubing, wireway, underfloor raceway, and surface raceway; does not include cable tray.
28. Rack: An open or enclosed structure, typically made of aluminum or steel, used to mount equipment; usually referred to as an equipment rack. Maybe freestanding and floor mounted or a wall mounted cabinet. Industry standard 19" width spacing.
29. Wiring Block: Punch down terminating equipment used to develop twisted pair cross-connect facilities.

1.4 PRODUCT AVAILABILITY

- A. Products with long lead times are to be brought to the attention of the project manager.

1.5 PRODUCT SUBMITTALS

- A. See Division 01 Submittals for more requirements

1.6 SUBSTITUTION LIMITATIONS

- A. Equivalent product(s) may be considered for substitution for those products specified, however, the equivalent product(s) must be approved, and show demonstrated and documented equivalence to the product(s) specified. Documentation includes but is not limited to product samples, data sheets, and actual test data. The request for product substitution, and supporting documentation, must be submitted, in writing to the Project Manager/Designer.
- B. See Division 01 Substitutions for more requirements

1.7 QUALITY ASSURANCE

- A. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.
- B. Conform to the latest adopted version of the CBC with amendments by local AHJs.
- C. Obtain and pay for electrical permits, plan review, and inspections from local AHJs.
- D. Furnish products listed by UL or other testing firm acceptable to AHJ.
- E. Conform to requirements of the serving electric, telephone, broadband and cable television utilities.
- F. Contractor Qualifications:
 - 1. Minimum of five years' experience in the design, installation, testing, and maintenance of low-voltage systems.
 - 2. Maintain a local service facility which stocks spare devices and/or components for servicing systems.
 - 3. Have performed successful installation and maintenance of at least three projects similar in scope and size. Be able to provide project references for these three projects, including scope of Work, project type, owner/user contact name and telephone number.
 - 4. The contractor selected for this project must be certified by the manufacturer of the products and utilize these components for completion of work.
 - 5. Holds and maintains a valid California C-7 or C-10 State Contractors License and can exhibit validity upon request.
 - 6. A list of test equipment proposed for use in verifying the installed integrity of copper and fiber optic cable systems used.
 - 7. A technical resume of experience for the contractor's Project Manager and on-site installation supervisor who will be assigned to this project.
 - 8. A list of technical product training attended by the contractor's personnel that will install the specified manufacturer system.
 - 9. List of Sub-Contractor(s) who will assist the contractor in the performance of this work.

1.8 SEQUENCING AND SCHEDULING

- A. For the proper execution of the work, cooperate with other tradecrafts and contracts as needed.
- B. To avoid installation conflicts, thoroughly examine the complete set of Contract Documents. Resolve conflicts with Project Manager/Designer prior to installation.

- C. Prior to installation of communications cable to equipment requiring connections, examine the manufacturer's shop drawings, wiring diagrams, product data, and installation instructions. Verify that the electrical characteristics detailed in the Contract Documents are consistent with the electrical characteristics of the actual equipment being installed. When inconsistencies occur request clarification from Project Manager/Designer.

1.9 SHOP DRAWINGS

- A. Shop Drawings: When required by individual Specification Sections, provide shop drawings which include physical characteristics, electrical characteristics, device layout plans, point-to-point wiring diagrams for all connections, and the like. Refer to individual Specification Sections for additional requirements for the shop drawings.

1.10 WARRANTY

- A. Provide an extended manufacturer's warranty on the Backbone and Horizontal Communications systems as specified in other sections of Division 27.

1.11 CLOSE OUT DOCUMENTS

- A. Final coordination drawings, with as-built information added, are to be submitted as record drawings at completion of project.
- B. Record Drawings:
 - 1. Show changes and deviations from the Construction Drawings. Include written Addendum and change order items.
 - 2. Show exact routes of pathway facilities and service entrance conduits.
 - 3. Show the exact location of racks, cabinets, mounting frames and the like.
- C. Operation and Maintenance Documentation: Provide copies of certificates of code authority acceptance, product data, guarantees, warranties, installation guides, maintenance guides and the like.
- D. Inspection and/or testing: Submit testing reports for testing that was performed.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Provide like items from one manufacturer, such as wire/cable, jacks, modular plugs, patch panels, equipment connection cords, wall plates, and the like. See individual sections for detailed information.

2.2 MATERIALS

- A. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established. Indicated brand names and catalog numbers are used to establish standards of performance and quality.

- B. Provide material and equipment that is acceptable to AHJ as suitable for the use indicated. For example, provide plenum rated cable in ceilings that are utilized as air return plenums.
- C. Include special features, finishes, accessories, and other requirements as described in the Contract Documents regardless of the item's listed catalog number.
- D. Provide incidentals not specifically mentioned herein or noted on Drawings, but needed to complete the system, in a safe and satisfactory working condition.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Construction Documents:
 - 1. Drawings are diagrammatic with symbols representing communications equipment, outlets, and wiring.
 - 2. Electrical symbols indicating wiring and equipment shown in the Contract Documents are included in the Contract unless specifically noted otherwise.
 - 3. Examine the entire set of Drawings to avoid conflicts with other systems. Determine exact route and installation of communications wiring and equipment with conditions of construction.

3.2 INSTALLATION

- A. Install communications equipment completely as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of the communications equipment, examine the instructions thoroughly. When requirements of the installation instructions conflict with the Contract Documents, request clarification from Project Manager/Designer prior to proceeding with the installation.
- B. Do not install communications equipment in obvious passages, doorways, scuttles, or crawl spaces which would impede or block the passage's intended usage.
- C. Do not install communications equipment in locations where it would obviously be subject to damage during normal usage.

3.3 FIELD QUALITY CONTROL

- A. Tests: Conduct tests of equipment and systems to demonstrate compliance with requirements specified in Division 27 & 28. Refer to individual Specification Sections for required tests. Document tests and include in Closeout Documents.

3.4 CLEANING

- A. Remove dirt and debris caused by the execution of the communications work.
- B. Leave the entire communications system installed under this Contract in a clean, dust-free, and proper working order.

- C. Vacuum clean interiors of new and modified electrical signal and communication equipment enclosures.

END OF SECTION.

SECTION 27 05 00 – COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies the basic materials and methods for all low voltage pathways installation work included under Division 27 and 28 and where those requirements differ from the requirements of this section, the more stringent shall govern.
- B. This section adds refinements to Division 26 that apply to Communications and extra-low-voltage systems.

1.2 SCOPE

- A. Materials and/or methods for the following.
 - 1. Communication services
 - 2. Grounding
 - 3. Fasteners
 - 4. Hangers and supports
 - 5. Conduits/Backboxes/Raceways
 - 6. Underground
 - 7. Sleeves and penetrations

1.3 SUBMITTALS

- A. Submittals shall be done in accordance with District submittal procedures, see Division 01 Submittals for requirements.

1.4 RELATED REQUIREMENTS

- A. Division 07 – Thermal and Moisture Protection
- B. Section 09 91 00 – Painting
- C. Division 26 – Electrical
- D. 27 00 00 – Communications Basic Requirements

1.5 REFERENCES

- A. ANSI American Nation Standards Institute
- B. NFPA 70 – National Electrical Code
- C. UL Underwriters Laboratory
- D. California Building Code (CBC)

- E. California Electrical Code (CEC)

1.6 WARRANTY

- A. Refer to Division 01 — Warranties

PART 2 – PRODUCTS

- A. All products used on this project shall bear the label and be approved by Underwriters Laboratories unless otherwise approved in writing by District.

2.2 FASTENERS

- A. Mounting hardware and anchors recommended by the manufacturer of any material that shall be mounted to the building or structure.
 1. Sheet rock / drywall / wall board: Easy Anchor, toggle bolt, other spread type anchor with load distribution, or approved equal.
 2. Concrete / cinder block / solid masonry: Expanding compression type lag, expanding compression type bolt, expanding compression type, all-thread with nuts, or approved equal.
 3. Tile / Stucco / hollow masonry: Toggle bolts or approved equal.
 4. Wood: Lag screws, wood screws, or approved equal.
 5. Metal: Beam clamps, sheet metal screws, self-drilling screws or approved equal.

2.3 HANGERS AND SUPPORT

- A. D-RINGS
 1. Commercial grade
- B. J-HOOKS
 1. Commercial grade

2.4 SURFACE RACEWAY

- A. The District has standardized on Wiremold 800, 2300, 5400 and 5500 series for non-metallic surface raceway.

2.5 CONDUITS AND ACCESSORIES

- A. CONDUITS

1. See Division 26 for requirements.
2. Conduit for Fire Alarm applications shall be red in color (non-accessible areas are excluded).
3. All new conduits shall be sized accordingly to achieve a 40% maximum fill ratio with initial cables installed.

B. INNERDUCT

1. Orange corrugated HDPE (High Density Polyethylene) Innerduct shall be used for fiber optic cable protection in interior locations.
2. Fabric multi-cell innerduct is approved for underground conduits 2" and larger.

C. FITTINGS:

1. See Division 26 for requirements.
2. Conduit bodies and any sharp bend fittings are strictly prohibited for communication Cat6A and fiber optic cables. Appropriate conduit sweeps are required.

D. PULL LINE

1. Minimum 1/8" diameter, or larger braided line of polypropylene or continuous fiber polyolefin. The minimum breaking strength of 1/8 in. line is 200 lbs.

2.6 BACKBOXES, JUNCTION BOXES AND FLOOR BOXES

- A. Galvanized one-piece or welded pressed steel type. Boxes for fixtures shall not be less than 4" square and shall be equipped with fixture stud. Boxes shall be at least 2-1/8" deep, 4" square for 1 or 2 gang devices, with device rings. Boxes mounted in wall or ceiling finished with 5/8" gypsum board shall be furnished with 5/8" deep device rings. Provide blank cover for all boxes without fixture or device.
- B. Junction boxes, larger than 8", located indoors shall be hinged, NEMA-1 rated.
- C. Junction boxes, larger than 8", located outdoors, or in wet or damp locations shall be hinged, NEMA-3R.
- D. Provide and install tamper-proof screws for all exterior boxes.
- E. Junction boxes used for Fire Alarm systems are to be red in color with red colored cover plates.

2.7 GROUND BOXES

- A. See Division 26 for requirements.
- B. Approved manufactures are Jensen, Christy or approved equal.
- C. All ground boxes shall have metal traffic-rated lids with permanent factory markings of COMM or COMMUNICATIONS.
- D. Minimum size is 17" x 30"

2.8 PENETRATION SEALING

- A. Firestopping: Provide UL Listed Firestopping materials for all penetrations through rated assemblies (walls / floors). See Division 07 for more information.
- B. Draft stopping: Foam sealant for use around conduit penetrations (in non-rated assemblies) to prevent passage of air, smoke, and/or toxic gas. See Division 07 for more information.
- C. Weatherproofing: Weatherproof sealant for use around conduit penetrations in exterior walls to prevent the intrusion of water. See Division 07 for more information.

2.9 GROUNDING BUS BAR

- A. Copper bus bar 2"x10"x1/4" minimum size with stand-off brackets and insulators, pre-drilled and threaded mounting holes (hole qty. 12 or greater) for equipment grounding lug attachment.

PART 3 – EXECUTION

3.1 COMMUNICATION SERVICES

- A. Install underground boxes, conduits, and terminal cabinets per service provider requirements.

3.2 GROUNDING

- A. Ground fittings shall be UL approved for each application and installed and/or connected to system in accordance with current CEC Code requirements.
- B. See Division 26 for additional requirements.
- C. Install grounding bus bar per manufacturer's instructions and to be in each MDF and IDF.

3.3 HANGERS AND SUPPORTS

- A. Install hangers and supports per manufacturer's written instructions.

- B. Hanger spacing shall be 48" or less and within 12" of sleeves and/or junction/back boxes.

3.4 LOW VOLTAGE PATHWAY/RACEWAYS

- A. EMT conduit may be used at following locations (see Division 26 for exact requirements):
 - 1. In dry locations in furred spaces.
 - 2. In partitions other than concrete or solid masonry.
 - 3. In protected exterior locations not exposed to direct weather.
- B. Rigid steel conduit and fittings shall be used for vertical risers and on top of all roofs, overhangs, walkways, canopies, or any other location exposed to direct weather. See Division 26 for exact requirements.
- C. Furnish and install pull lines in all unused (empty) conduits or raceways. All pull lines shall be permanently tagged with identification at both ends.
- D. Install exposed conduit neatly, parallel to or at right angles to structural members. Maintain a minimum of 12 inches of clearance from steam or hot water pipes. All installed strut channel supports should allow for future conduit attachments. The width of strut channel to match the width of the closest attached junction box. See design document details for attachment requirements.
- E. Supports: Support conduit with two-hole straps or strut channel where shown in design documents and/or specified. Coordinate supports with architectural details. Secure to wood structure by means of bolts or lag screws, to metal by means of shallow self-tapping screws, to concrete by means of insert or expansion bolts, to brickwork by means of expansion bolts, and to hollow masonry or stucco by means of toggle bolts.
- F. Spacing for all EMT and rigid steel conduit supports shall be as follows unless otherwise specified in design documents details:
 - 1. Surface conduit spacing and supports and unless otherwise specified or shown on drawing details:
 - a. EMT – Size 3/4" to 2" – 4' maximum spacing (3 each supports per 10' conduit length) and 12" from each end of conduit at coupling, connector or 90-degree bend.
 - b. Rigid steel – Size 3/4" to 2" – 4' maximum spacing (3 each supports per 10' conduit length) and 12" from each end of conduit at coupling, connector or 90-degree bend.

- G. If conduit is designated for low voltage use, no more than a total of 360 degrees of conduit bend radius will be allowed between pull boxes.
- H. All junction boxes shall be connected to conduits using appropriate connecting hardware (i.e. box connectors).
- I. Clean, prep and paint with matching wall color all exposed conduit, junction boxes, channel strut, fittings, and accessories.
- J. Before pulling any conductors into an underground PVC conduit (new or existing), the conduit shall be first be proofed by pulling through a mandrel of a diameter $\frac{1}{4}$ in. smaller than the conduit inside dia., followed by a swab of the same diameter as the conduit inside diameter.
- K. Non-metallic raceway to be installed with mechanical fasteners only, do not remove adhesive tape backing.
- L. CAPPING
 - 1. Cap conduits during construction with manufactured seals. Swab out conduits before installing wires.
 - 2. Cap all empty conduits below grade and in pull boxes with manufacturer's caps to prevent entrance of debris, attach pull string to cap.

3.5 J-BOXES

- A. Screws shall be used to attach boxes, and must be accurately placed for finish, independently and securely supported by adequate wood backing or by manufactured adjustable channel type heavy-duty box hangers.
 - 1. Boxes shall be attached to metal studs with metal box hangers.
 - 2. Boxes installed in masonry tile or concrete block construction shall be secured with auxiliary plates, bars or clips and be grouted in place.
- B. Locate outlets at the following heights unless otherwise noted on Drawings, Specifications, current CBC or as required to meet ADA handicap requirements.
 - 1. Data Outlets: Same height as electrical outlets
 - 2. Telephone Wall Outlets: Above counter/backsplash height or at electrical switch height.
- C. Boxes shall be placed within 18" of electrical outlets.
- D. For sound control, separate outlets on opposite sides of walls 16" minimum. Where outlets are less than 16" or in sound rated walls, seal airtight with fire rated sheet

putty pads. Fill gap between junction box and wall with acoustical sealant all around perimeter of junction box. Fill conduits larger than 1 1/4" with fire rated putty.

- E. Installation of conduit and outlet boxes in fire-resistive walls, floors, floor-ceiling or roof-ceiling assemblies shall comply with Title 24, Part 2, Section 713.

3.6 UNDERGROUND BOXES

- A. To be installed per Division 26 requirements.
- B. Provisions to be made for supporting cables from the box sides (i.e., j-hooks, d-rings)

3.7 SLEEVES AND CONDUIT PENETRATIONS

- A. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways mounted to the same wall as the penetration provide a threaded conduit and secured in place with locking rings on both sides. Bend radius requirements shall be maintained where penetrations are made through the back of raceways; junction boxes with adequate depth shall be installed to comply with this requirement.
- B. Where conduit passes through walls, ceilings, or floors with connection points to junction boxes or raceways not mounted to the same wall as the penetration, provide EMT conduit and secured in place with strut channel. Box connectors shall always be used to connect EMT to junction boxes and raceways.

C. FIRE STOPPING

- 1. Seal all conduit penetrations through fire rated walls and floors fire and smoke tight in conformance with current CBC and current CEC. See Division 07 for more information.

D. DRAFT STOPPING

- 1. All non-fire rated walls must be draft stopped and sealed. Submit method to be used for approval by inspector and/or project manager. Mineral wool is one product that may be used. See Division 07 for more information.

E. WEATHER SEALING

- 1. All exterior penetrations shall be sealed watertight. The contractor shall use silicon rubber caulk or other approved methods and materials. Submit method and material with inspector and/or project manager. See Division 07 for more information.

3.8 CLEANING

- A. Clean all work prior to concealing, painting, and acceptance. Performed in stages if directed.

- B. Clean and repair soiled or damaged painted exposed work and match adjoining work before final acceptance.
- C. Remove debris from inside and outside of equipment and enclosures.

3.9 FINAL DOCUMENT SUBMITTALS

- A. See 27 00 00 for more information.

END OF SECTION

SECTION 27 10 00 – STRUCTURED CABLING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable Structured Cabling communications system. The system shall provide highly reliable and high-performance data communication from main distribution frame (MDF) through each intermediate distribution frame (IDF) to end points requiring fiber optics and/or copper cabling and associated equipment.
- B. This section condenses sections 27 11 00 – Communications Equipment Room Fittings, 27 13 00 – Communications Backbone Cabling, 27 15 00 – Communications Horizontal Cabling and 27 16 00 – Communications Connecting Cords into one comprehensive section.

1.2 SCOPE

- A. The work will include but not be limited to the following objectives:
 - 1. Contractor shall furnish and install all required components and accessories as outlined in the design documents for a complete and operable turn-key system.
 - 2. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the standards and requirements prior to beginning work
 - 3. The Contractor shall furnish and install all required fire-treated $\frac{3}{4}$ " (three quarter inch) plywood for the MDF and all IDF locations.
 - 4. The Contractor shall furnish and install a ground bus bar at the MDF and IDF rooms.
 - 5. The Contractor shall furnish and install all required racks and cabinets.
 - 6. The Contractor shall furnish, install, and configure uninterruptable power supply(ies) (UPS) for the MDF and/or IDF racks.
 - 7. The Contractor shall furnish and install all newly required conduit/raceway.
 - 8. The Contractor shall furnish and install all wire/cable (copper/fiber optic) as required.
 - 9. The Contractor shall terminate all strands of fiber at each fiber enclosure.

10. The Contractor shall furnish and install termination all end-point equipment (patch panels, jacks, wallplates, enclosures, etc.).
11. The Contractor shall furnish and install all patch cords (copper/fiber).
12. The Contractor shall test and certify (for warranty) the installed cable plant.

1.3 RELATED REQUIREMENTS

- A. Section 01 – General Requirements
- B. Section 27 00 00 – Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.

1.4 INDUSTRY GUIDELINES AND STANDARDS

- A. California Electrical Code (CEC) – Current adopted version
- B. California Building Code (CBC) – Current adopted version.
- C. ANSI/TIA-568.0-D – Generic Communications Cabling for Customer Premises.
- D. ANSI/TIA-568.1-D – Commercial Building Communications Cabling Standard Part 1: General Requirements.
- E. ANSI/TIA 568-C.2 – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- F. ANSI/TIA 568.3-D – Optical Fiber Cabling Components Standard
- G. ANSI/TIA-569-D – Commercial Building Standard for Telecommunications Pathways and Spaces.
- H. ANSI/TIA-606-B – Administration Standard for the Commercial Telecommunications Infrastructure.
- I. ANSI/JSTD-607-C – Commercial Building Bonding and Grounding (Earthing) Requirements for Telecommunications.

1.5 QUALIFICATIONS

- A. The contractor shall possess a California C7 or C10 license.
- B. The Contractor or Subcontractor shall have 5 years' documented experience.
- C. The Contractor and installers shall be certified by the product manufacturer.

1.6 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data cable plan system.

1.7 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

1.8 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.9 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.
- C. 25-year manufacturer's warranty/certification required for all copper and fiber cable plant installations.

1.10 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.1 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Contractor shall confirm all equipment part numbers with the Project Manager or District prior to ordering equipment and updating submittals as required.
- D. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.
- E. Install mounting hardware and anchors as recommended by the Manufacturer of the equipment that requires mounting to the building or structure and adhere to all code requirements. See section 27 05 00 for requirements.

F. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.2 MANUFACTURERS AND PRODUCTS

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and approval by District and/or its representative.
- C. For maintenance and consistency with the existing installed base, data connectivity components (copper and fiber) shall be Ortronics.

2.3 COPPER/FIBER OPTIC CABLES AND COMPONENTS

- A. All copper cables and components shall be Cat6A rated.
 1. Cable to be reduced diameter. White jacket for default cable, Blue jacket for CCTV and Access Control only.
 2. Jacks to be keystone style.
- B. Patch cords system/color:
 1. Data = Blue color
 2. AP = Green color
 3. CCTV = Blue color
 4. Clock/Intercom = Yellow color
 5. Access Control = Black color
 6. Fire Alarm/Intrusion Alarm = Red color
- C. Data jacks system/color:
 1. Data/default = White color
 2. AP = Green color
 3. CCTV = Blue color
 4. Clock/Intercom = Yellow color
 5. Access Control = Black color
 6. Fire Alarm/Intrusion Alarm = Red color
- D. All fiber optic cables and components shall be single single-mode OS2 rated.
- E. Fiber optic cable terminations shall be LC-Duplex style.

PART 3 – EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. The components making up the structure cabling system shall only be installed by Contractors who are qualified to install, service and maintain the system.
- B. Cable terminations (copper or fiber) shall be installed by manufacturer certified technicians.
- C. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience before the Bid Opening Date.

3.2 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to job bidding. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for accurate bidding and performance of the Work.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.3 PREPARATION

- A. The Contractor shall order all required parts and equipment upon receipt of approved product submittals.
- B. The Contractor shall verify the availability of power where required.

3.4 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00 for this section.
- B. Submit drawings for review and approval by the Project Manager and/or Designer.

3.5 INSTALLATION

A. ENTRANCE FACILITIES

- 1. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and housing when so directed by service provider.
- 2. Install underground or aerial pathways complying with recommendations in TIA/EIA-569-A, "Entrance Facilities" Article.

B. UNDERGROUND ENTRANCE PATHWAY

- 1. Install underground entrance pathway complying with Division 26.

C. EQUIPMENT RACKS, CABINETS, ENCLOSURES AND ACCESSORIES

1. Backboards:
 - a. Shall be installed behind the rack or cabinet if the cabinet is not able to be directly attached to two vertical wall studs.
 - b. Backboards shall be made of fire retardant or treated materials, squarely cut, and with sanded edges
 - c. Backboards shall be a minimum $\frac{3}{4}$ " thick and large enough to secure it to two vertical wall studs.
 - d. The "FIRE RATED" stamp shall be visible.
 - e. Backboards shall be fastened with $\frac{1}{4}$ " lag bolt and washer, non-recessed, with maximum spacing of 18" into 2 vertical studs. 1-1/2" embedment.
 - f. Visible portions (outside of cabinet) of Backboards shall be painted black.
2. All data & voice communications racks and cabinets shall be anchored in accordance with manufacturer's specifications, project specifications and/or drawn details, to walls and floors and grounded to building ground grid (not to water pipes etc.).
3. Securely mount equipment cabinet and racks to the building structure. A proper quantity of support fasteners shall be utilized. Typically lag bolts for wood installations, wedge anchors for concrete flooring. Submit data sheets for mounting fasteners for approval before installation. Mount equipment per DSA approved drawings/details.
4. Equipment cabinet mounted on or against walls will have 3-foot clearance in front of deepest component and accessible to rear for service.
5. MDF and all IDFs shall have at least one dedicated 120VAC 20-amp quad-receptacle each.
6. Patch Panels: Mount patch panels into the cabinet/rack. Match manufacturer of existing install or if new construction, see Appendix A.
7. Cable Management: Secure the cable bundle(s) to the rack strain relief and cable management behind the patch panels and cross connect block panels. Install horizontal cable management panels and brackets for routing and management of patch cables. Maintain TIA/EIA and BICSI standards on bundling, supporting and bend radius.

8. Surge Protected Outlet Strips: Required in MDF rack. Mount surge protected outlet strips per Manufacturer's directions. Refer to details on the Drawings for mounting location.
9. Furnish and install UPS in bottom of MDF/IDF rack.

D. MDF/IDF GROUNDING

1. Refer to Section 27 05 00 Grounding for more requirements.
2. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 6 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
3. Bond metallic equipment (including ladder rack) to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District' Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.7 WIRE/CABLE (COPPER/FIBER OPTIC)

- A. Design, layout, size, and plan new cable runs as required.
- B. All wire and cable passing through metalwork shall be sleeved by an approved grommet or bushing.
- C. Conduit/raceway fill shall not exceed 40 percent of interior cross-sectional area.
- D. Neatly dress and tie (Velcro) all cabling.
- E. UTP cabling shall conform to a 6-foot separation requirement from the main power panel, transformers, switchgear and/or starter motors adjacent to the MDF, IDF and termination locations.

- F. Fiber optic cable shall be installed from the MDF to each IDF.
- G. Orange corrugated HDPE (High Density Polyethylene) Innerduct shall be used for fiber optic cable protection in all interior locations.
- H. Spicing of fiber optic cable shall be done with fusion splices.
- I. When required copper feeders (minimum 4-pair) are to be installed from the MDF to each IDF.
- J. Maintain proper bend radius for all cable installations.
- K. Do not exceed cable manufacturer's instructions for installation pull load. Any cable damaged by excessive pull force shall be replaced by the installing contractor.
- L. Modular plug terminated link (MPTL) style wiring is acceptable for CCTV with modified single connector permanent link testing.

3.8 LABELING

- A. MDF/IDF - Identification number in large font on front of cabinet.
- B. MDF, Fiber Optic LIU Ports – IDF number and room number
- C. MDF/IDF, Copper Patch Panel – Panels labeled P1, P2, P3, etc., ports labeled with room number.
- D. LAN Outlet – IDF number, patch panel number, patch panel port number.
- E. Cables to be labeled both ends with unique identifiers and from/to location identifiers. For Copper Cat cable IDF number, patch panel number, patch panel port number.
- F. T-bar ceilings shall have device labels attached next to the device for ceiling mounted equipment and at the tile for above ceiling equipment with device type and device ID points/IP address.

3.9 CONDUIT AND RACEWAY INSTALLATION

- A. See Division 26 and section 27 05 00 for requirements.
- B. Conduit bodies and any other sharp bend fittings are strictly prohibited for communications cabling (copper/fiber).
- C. Install proper radius conduit sweeps where required.

3.10 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system, the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.
- F. Provide 25-year manufacturer's warranty/certification documentation for all copper and fiber cable plant installations.

3.11 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

| DESCRIPTION | MFG | PART NUMBER |
|---|---------------------|-----------------|
| Rack Cabinet 7' | Chatsworth Products | Z4-21N-113C-C12 |
| Wall Mount Cabinet 24" (12 RU) 30" Deep | Chatsworth Products | 12419-724 |
| CUBE-iT Fan Kit | Chatsworth Products | 40972-001 |
| 20 AMP Power Strip | Chatsworth Products | 12848-701 |
| Standard Busbar | Chatsworth Products | 10622-010 |
| 12" Ladder Rack 10' | Chatsworth Products | 11275-712 |
| Ladder Rack Triangular Support Bracket | Chatsworth Products | 11746-712 |
| Ladder Rack Wall Angle Support 12" | Chatsworth Products | 11421-712 |
| Ladder Rack Butt-Splice Kit | Chatsworth Products | 11301-712 |
| Ladder Rack Foot Kit | Chatsworth Products | 11309-701 |
| 19" Horizontal Cable Manager | Ortronics | 808004759 |
| Patch Panel 24-port 1-RU (Black) | Ortronics | OR-SPKSU24 |
| Patch Panel 48-port 2-RU (Black) | Ortronics | OR-SPKSU48 |
| Patch Panel Cable Management Support Bar | Ortronics | OR-CMBFR0RU |
| Faceplate, 2-port (White) | Ortronics | KSFP2-88 |
| Faceplate, 4-port (White) | Ortronics | KSFP4-88 |
| Surface Mount, 2-port (White) | Ortronics | KSSMB2 |
| Cat6A Data Jacks (White) | Ortronics | KT2J6A-88 |
| Cat6A Data Jacks (Green) | Ortronics | KT2J6A-45 |
| Cat6A Data Jacks (Blue) | Ortronics | KT2J6A-36 |
| Cat6A Data Jacks (Yellow) | Ortronics | KT2J6A-44 |
| Cat6A Data Jacks (Black) | Ortronics | KT2J6A-00 |
| Cat6A Data Cable, Riser (White = default) | Superior Essex | 6B-246-4A |
| Cat6A Data Cable, Plenum (White = default) | Superior Essex | 6B-246-4B |

| DESCRIPTION | MFG | PART NUMBER |
|---|---------------------|----------------------------|
| Cat6A Data Cable, Riser (Blue = CCTV/Access Control) | Superior Essex | 6B-246-2A |
| Cat6A Data Cable, Plenum (Blue = CCTV/Access Control) | Superior Essex | 6B-246-2B |
| Cat6A Data Cable, Indoor/Outdoor (Black) | Superior Essex | 6B-272-ER |
| Cat6A Data Cable, OSP (Black) | Superior Essex | 04-001-A8 |
| Cat6A Patch Cord (Blue) | Quiktron | 576-A10-0xx (xx = length) |
| Cat6A Patch Cord (Green) | Quiktron | 576-A20-0xx (xx = length) |
| Cat6A Patch Cord (Yellow) | Quiktron | 576-A115-0xx (xx = length) |
| Cat6A Patch Cord (Black) | Quiktron | 576-A135-0xx (xx = length) |
| Cat6A Patch Cord Slim 1' (Blue) | C2G | 30125 |
| Cat6A Patch Cord Slim 1' (Green) | C2G | 30153 |
| Cat6A Patch Cord Slim 1' (Yellow) | C2G | 30167 |
| Cat6A Patch Cord Slim 1' (Black) | C2G | 30139 |
| Fiber Optic LIU 1-RU | Ortronics, Infinium | INFC01U-M4-E |
| Fiber Optic LIU 2-RU | Ortronics, Infinium | INFC02U-M4-E |
| Fiber Optic Adapter | Ortronics, Infinium | HDFP-LCD12AC |
| Fiber Optic LC Field Term Connector | Ortronics | 205KAN9GASM |
| Fiber Optic Fanout Kit | Ortronics | 61500858 |
| Fiber Optic Cable Single- Mode OS2, Indoor/Outdoor | Superior Essex | W4012J101 |

END OF SECTION.

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SECTION 27 21 00 – DATA COMMUNICATIONS NETWORK EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable data network system. The system shall provide reliable and high-performance data communication throughout the site.

1.2 SCOPE

- A. The work will include but not be limited to the following objectives:
1. Provide, coordinate, and install all required equipment and accessories as outlined in the design documents for a complete and operable system.
 2. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, utilities, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution, operation, and completion of a turn-key system to the District.
 3. Data Communications Network Equipment: Includes, but is not limited to:
 - a. Routers
 - b. Firewalls
 - c. Networking Switches
 - d. Wireless Access Points
 - e. VoIP Phone Equipment
 - f. Uninterruptible Power Supplies (UPS)

1.3 RELATED REQUIREMENTS

- A. Division 01 – General Requirements
- B. Section 27 00 00 – Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.
- D. Section 27 10 00 – Structured Cabling

1.4 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five years' experience installing data network equipment and systems.

1.5 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing data network infrastructure.

1.6 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.

1.7 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.8 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.9 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.1 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation/operation.
- D. Product Availability
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.2 EQUIPMENT

- A. The District's preferred manufacturer for:
 - 1. Routers - Cisco
 - 2. Firewalls - Cisco
 - 3. Networking Switches – Cisco (Aruba under evaluation)
 - 4. Wireless Access Points - Cisco (Aruba under evaluation)
 - 5. VoIP Phone Equipment – Cisco
 - 6. UPS – Tripp-Lite and N1C
- B. Substitutions require proof of equivalence and approval by District and/or its representative.

PART 3 – EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing data network equipment before the Bid Opening Date.

3.2 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding for the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.3 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the Project Manager.
- C. The Contractor shall coordinate with the District's Technology Services department for needed IP addresses at least 2 weeks prior to configuration/installation.

3.4 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00.

3.5 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.6 PATHWAY AND EQUIPMENT INSTALLATION

- A. Install all conduit and pathway per design documents. Refer to 27 05 00 for additional information/requirements.
- B. Install all Cat6A cable per design documents. Refer to 27 15 00 for additional information/requirements.
- C. Equipment to be installed per manufacturer's instructions.
- D. Devices requiring PoE power shall be connected to a PoE switch in the MDF/IDF data rack – verify with Technology Services for available PoE power.

3.7 CONFIGURATION

- A. Any information needed from the District for configuration of equipment (i.e. VLAN, etc.) needs to be requested in writing 2 weeks prior.
- B. All equipment to be fully configured and tested for functionality by the Contractor prior to District acceptance testing.

3.8 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify the District of readiness to perform the formal Test & Inspection of the complete system by the District or its representative. Make all adjustments/changes required from District/representative review.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

- C. During the formal Test & Inspection (Commissioning) of the system and have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.

3.9 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

| DESCRIPTION | MFG | PART NUMBER |
|--|-------|---|
| Network Switch (Catalyst 48port PoE) | Cisco | C9300L-48PF-4X-EDU |
| Network Switch License (DNA Essentials, 48-port, 3-yr) | Cisco | C9300-DNA-E-48-3Y |
| SFP transceiver (Qty = 2) cable bundle | Cisco | SFP-H10GB-CU1M |
| Network Switch stacking kit | Cisco | C9300-STACK-KIT |
| Network Switch stacking cable (3 METER) | Cisco | STACK-T3-3M |
| Wireless Access Point | Cisco | See District for P/N |
| UPS (MDF 4-post) with network monitoring and external battery (2000VA, 50AH) 120VAC input | N1C | N1C.LR2000, N1C.L4850EBM2U (For 2 post rack mount only - add N1C.24RAILKIT) |
| UPS (MDF 4-post) with network monitoring and external battery (2000VA, 50AH) 208-240VAC input | N1C | N1C.LR2000G, N1C.L4850EBM2U (For 2 post rack mount only - add N1C.24RAILKIT) |
| UPS (IDF) with network monitoring (1000 VA) 120VAC input | N1C | N1C.L1000 |
| UPS (IDF) with network monitoring (1500 VA) 120VAC input | N1C | N1C.L1500 |

*Product requires District Approval

END OF SECTION

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

- 28 10 00 – Access Control System
- 28 20 00 – Video Surveillance
- 28 46 00 – Fire Detection and Alarm

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SECTION 28 10 00 – ACCESS CONTROL SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies equipment, accessories, materials, installation, configuration, and testing requirements for a complete and operable electronic Access Control system. The system shall provide electronic access to secure doorways to authorized persons at authorized time of day.

1.2 SCOPE

- A. The work will include but not be limited to the following objectives:
1. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a turn-key Access Control system to the District.
 2. The contractor will coordinate with the District in writing for any needed information (i.e. IP addresses, etc.) at least 2 weeks prior to the date the information is needed.
 3. Access Control software and equipment: Includes, but is not limited to:
 - a. Software based system for user authentication and system control
 - b. RFID cards/fobs
 - c. RFID readers
 - d. Door controllers
 - e. Power supplies
 - f. Electrified door hardware/latches/strikes
 - g. Door position switches
 - h. Power transfer hinges/armored loops
 - i. Request to exit (REX) devices
 - j. RFID badge printer (optional)
 4. Typical installation includes software, door controller, card reader, door sensor, request to exit (REX) sensor/switch and electrified door hardware. For existing panic hardware, a surface mounted electric strike is acceptable. For doors with electrified lockset are to have integrated REX and bored doors with electric power transfer hinges see section (08 71 00 – Door Hardware for more information).
 5. All installations with network connectivity shall utilize District's network and be managed by the District's Avigilon ACM Enterprise system.
 6. Access control hardware shall continue to fully function in the event of communication loss to the central server.

7. Power to control panels shall be hardwired in conduit.

8. All door controllers shall have battery backup.

1.3 RELATED REQUIREMENTS

- A. Division 01 – General Requirements
- B. Section 08 71 00 – Door Hardware
- C. Section 27 00 00 – Communications
- D. Section 27 05 00 – Common Work Results for Communication Systems.
- E. Section 27 10 00 – Structured Cabling
- F. Americans with Disability Act (ADA)

1.4 REFERENCES

- A. See section 27 00 00 for requirements.

1.5 DEFINITIONS

- A. See section 27 00 00 for requirements.

1.6 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Access Control systems and integrate into the Districts Avigilon ACM Enterprise installation.

1.7 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.8 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.
- B. Shop drawings are required for this section.

1.9 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five (5) years' experience installing communications equipment systems.

1.10 CERTIFICATIONS

- A. See section 27 00 00 for requirements.

1.11 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.
- F. Contractor shall be responsible for scheduling Subcontractors in a timely fashion.

1.12 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.13 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers - See Appendix A at the end of this document for pre-approved materials.
- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.
- D. Product Availability

1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.2 EQUIPMENT

- A. See Appendix A at the end of this document for pre-approved materials.
- B. Substitutions require proof of equivalence and prior approval by District and/or its representative before ordering.
- C. Whenever possible and required the request to exit functionality shall be integrated into the door hardware.
- D. Electrified latch hardware shall be compatible with panic hardware and be “rim” style.
- E. Panel cabinets shall have key locks.
- F. The contractor shall furnish at least 100 RFID cards serialized per the District's standards for any electronic access control project. Middle Schools and High Schools are to receive an additional 100 RFID cards (200 cards total).

2.3 EXTRA STOCK

- A. For each increment of 100 controlled doors furnish:
 1. Quantity 5 of current model door controller.
 2. Quantity 7 of current model card reader.

PART 3 – EXECUTION

2.4 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing electronic access control equipment before the Bid Opening Date.

2.5 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

2.6 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the District's Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the District's Project Manager.
- C. Submit and receive approval for shop drawings prior to work commencement.

2.7 PATHWAY INSTALLATION

- A. New Construction:
 - 1. Install 3/4" EMT in wall from both sides of the hollow door frame to double-gang mud-ring and deep 4" Sq. back box above door frame at 96" AFF to top of box to accessible ceiling space or continuous conduit to nearest IDF.
 - 2. Install on the exterior latch side of the door a single-gang mud-ring and back box for exterior card reader at 48" AFF to top of box. Route EMT conduit to above door 4"-Sq. back box.
- B. Existing Construction:
 - 1. Refer to design documents.
 - 2. Surface raceway and components shall be Wiremold 2300.

2.8 EQUIPMENT INSTALLATION

- A. Power supplies and electric strike to use 24VDC and 16AWG wire.
- B. Power supplies shall be centrally located in the nearest MDF/IDF.
- C. Equipment to be wired and installed per manufacturer's instructions.

- D. Door controllers to be installed in nearest MDF/IDF unless noted otherwise on design documents.
- E. Devices requiring POE power shall be connected to a POE switch in the nearest MDF/IDF data rack – verify with Electronics/Lock Shop for available PoE.
- F. All wiring in enclosure shall have 12” minimum service loop for troubleshooting/repairs.
- G. All shielded wiring to have shields grounded at the upstream end only. Floating shields are strictly prohibited.
- H. Data drops to be installed inside the controller panel cabinet.

2.9 LABELING/SCHEDULES

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Device ID Labels are to be 1/4” lettering for mounting heights 10’ AFF or less, 1/2” black lettering on white labels for mounting heights greater than 10’ AFF.
- C. Access Control Panel/Cabinet label – Panel ID on exterior top right of panel door.
- D. Battery label – Install date.
- E. Wiring label – Panel ID-Panel Schedule-Door ID.
- F. Network Information label – MAC and IP address on interior top right of panel door.
- G. Network Cable Termination label - MDF/IDF-port number.
- H. Reader/Door schedule – A reader/door schedule and location drawing shall be printed and installed in a plastic sleeve inside the panel cover door.

2.10 CONFIGURATION

- A. Program all network equipment with network IP address information obtained from Electronics/Lock Shop.
- B. All equipment to be fully configured and tested for functionality prior to testing.

2.11 FIELD QUALITY CONTROL AND TESTING

- A. Upon reaching substantial completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify District of your readiness to perform the formal Test & Inspection of the complete system.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.

- C. During the formal Test & Inspection (Commissioning) of the system the Contractor shall have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.
- F. District or its representative to provide final sign-off for acceptance.

2.12 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.
- B. As-built riser diagram showing all access control components for site.

APPENDIX A – Pre-Approved Materials

| DESCRIPTION | MFG | PART NUMBER |
|-------------------------------------|-----------------|---|
| Door Controller (2-door) | Avigilon | AC-MER-CONT-LP1502 |
| Card Reader | Avigilon | AC-ING-READ-APTIQ-SNG-MT15 |
| Power Supply/Cabinet (2 Door) | Avigilon | AC-LSP-2DR-MER-LCK |
| Latch Retraction Motor (Von Duprin) | Von Duprin | QEL |
| Electronic Surface Strike | Von Duprin | 6300 |
| Battery 12VDC, 8AH | ELK, Powersonic | ELK-1280, PS-1280 |
| Proximity Cards | Schlage | 8520 - Serialized per District Requirements |
| Armored Door Loop | Seco-Larm | SD-969-M15Q |

END OF SECTION.

SECTION 28 20 00 – VIDEO SURVEILLANCE

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies software, equipment, accessories, wire, materials, installation, configuration, and testing requirements for a complete and operable Video Surveillance system. The system shall provide electronic recording/playback and monitoring of digital cameras installed at the site.

1.2 SCOPE

- A. The work will include but not be limited to the following objectives:
1. Labor and Materials: The Contractor shall provide and pay for all labor, supervision, materials, accessories, wire, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a turn-key Video Surveillance system to District.
- B. The CCTV system shall have the following minimum requirements.
1. Cameras
 - a. Weather resistant IP67 or greater (exterior only)
 - b. Network/IP based
 - c. PoE powered
 - d. 5MP or 4K resolution
 - e. H.265 video compression
 - f. Day/night with IR illumination
 - g. Motion detection
 - h. ONVIF
 2. Network Video Recorder
 - a. Network/IP based
 - b. H.265 video compression
 - c. RAID 5 or greater
 - d. Record on motion detection
 - e. 30+ day recording
 3. Software
 - a. PC and Mobile viewing
 - b. View live and recorded video
 - c. Search
 - d. Save video to MP4 format
 - e. Notifications

1.3 RELATED REQUIREMENTS

- A. Division 01 – General Requirements
- B. Section 27 00 00 – Communications
- C. Section 27 05 00 – Common Work Results for Communication Systems.
- D. Section 27 10 00 – Structured Cabling

1.4 QUALIFICATIONS

- A. Contractor shall be located within 50 miles or less from the project site to support 2-hour response time.
- B. Five years' experience installing Video Surveillance equipment systems.

1.5 SYSTEM REQUIREMENTS

- A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Video Surveillance system.

1.6 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. See section 27 00 00 for requirements.
- B. Shop drawings are required for this section

1.7 SUBMITTALS

- A. See section 27 00 00 for requirements.

1.8 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. See section 27 00 00 for additional requirements.

1.9 CLOSEOUT DOCUMENTS

- A. See section 27 00 00 for requirements.

PART 2 – PRODUCTS

2.1 GENERAL

- A. See Appendix A at the end of this document for pre-approved materials.

- B. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory installation/operation.
- D. Product Availability
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Subject to compliance with these specifications, products and systems included in this section are to be installed as specified by the manufacturer of the system or engineer approved equal.

2.2 EQUIPMENT

- A. The District's preferred manufacturer for CCTV equipment is i-Pro (formally Panasonic) for cameras and network video recorders (NVR).
- B. The District's preferred manufacturer for video intercom is Avigilon.
- C. Substitutions require proof of equivalence and approval by District and/or its representative.
- D. All exterior cameras to be IP67 rated or better.

PART 3 – EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. The equipment shall only be installed by Contractors who are qualified to install and maintain the system.
- B. The Contractor (or subcontractor listed at time of bid) must have at least five (5) years' experience installing Video Surveillance equipment before the Bid Opening Date.

3.2 EXAMINATION

- A. The Contractor shall be required to visit the installation site(s) prior to job bidding. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.

- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.3 PREPARATION

- A. The Contractor shall verify materials are readily available prior to submitting product submittals and notify the Project Manager of long lead time items.
- B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the Project Manager.
- C. The Contractor shall coordinate with the District's Technology Services department for needed IP addresses at least 2 weeks prior to configuration/installation.

3.4 SHOP DRAWINGS

- A. The Contractor shall create "Shop Drawings" per section 27 00 00.

3.5 WORKMANSHIP

- A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.
- B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.
- C. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- D. Perform Work with persons experienced and qualified to produce workmanship specified.
- E. Maintain quality control over suppliers and Subcontractors.

3.6 PATHWAY AND EQUIPMENT INSTALLATION

- A. Install all conduit and pathway per design documents. Refer to 27 05 00 for additional information/requirements.
- B. Install all Cat6A cables per design documents. Refer to Section 27 10 00 for additional information/requirements.
- C. Equipment to be installed per manufacturer's instructions.
- D. Devices requiring PoE power shall be connected to a PoE switch in the MDF/IDF data rack – verify for adequate PoE power capacity.

3.7 CONFIGURATION

- A. Program cameras and/or NVR with network IP address using the following scheme.

Note: x=site octet, contact District Electronics shop for site information.

1. Cameras: 10.x.253.101 = Camera 1, 10.x.253.102 = Camera 2...
2. NVR: 10.x.253.1
3. POE Switch: 10.x.253.10 = 1st switch, 10.x.253.11 = 2nd switch...
4. Gateway: 10.x.0.1
5. Subnet Mask: 255.255.0.0

- B. All equipment to be fully configured and tested for functionality prior to District acceptance testing.

3.8 CAMERA VIEW

- A. Adjust view aim, zoom and focus camera to show intended view from design documents.

3.9 FIELD QUALITY CONTROL AND TESTING

- A. Upon completion of network programming and initial view setting, notify District of your readiness to perform the formal camera view review with District or its representative. Make all adjustments required from District review.
- B. Submit the Record Drawings (as-builts) to District for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system, Contractor to have personnel available with tools and equipment to inspect wiring, devices, and system operation.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify the District when ready to perform a re-inspection of the installation.

3.10 AS-BUILT DRAWINGS

- A. See section 27 00 00 for requirements.

APPENDIX A – Pre-Approved Materials

VIDEO SURVEILLANCE

| DESCRIPTION | MFG. | PART NUMBER |
|---|-------------|--------------------|
| Network Video Recorder 48TB | i-PRO | NVR-RL-2-48TB-V4 |
| Interior Rated IP Camera, Dome (5MP Sensor) | i-PRO | WV-S22500-V3L |
| Video Intercom | Avigilon | 3.0C-H4VI-RO1-IR |
| Video Intercom Backbox | Avigilon | H4VI-MT-SURF1 |

END OF SECTION.

SECTION 28 46 00 – FIRE DETECTION AND ALARM

PART 1 – GENERAL

1.1 SUMMARY

- A. This section specifies equipment, accessories, wire, materials, installation, configuration and testing requirements for an revision/addition to the existing complete and operable Fire Detection and Alarm system.

1.2 SCOPE

- A. The installed Fire Alarm system shall comply with all requirements of currently adopted version of NFPA 72.
- B. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship. Contractors unfamiliar with the District's standards shall familiarize themselves with the District's standards and requirements prior to beginning work.
- C. Provide and install all components and accessories as outlined in the design documents to modify the existing system while maintaining code compliance and to seamlessly integrate the new components into the existing campus' Fire Alarm system. Prior to beginning any work, the Contractor is responsible for identifying any existing system errors or faults and bring these issues to the attention of the District Project Manager.
- D. Labor and Materials: The Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation, and completion of the work
- E. Contractor shall furnish and install all new conduit/raceway and wire as indicated on the project drawings and/or as required to provide a turn-key system to the District.
- F. The Contractor shall be responsible for programming of all Fire Alarm Control Panel(s) (FACP) site wide.
- G. With one-week notice the Contractor shall coordinate with the District staff for monitoring connectivity.
- H. Prior to final programming the contractor shall review the proposed final system programming, functionality and expectations with the District project manager, and/or Designer/Engineer. If the system is programmed without approval, all subsequent requested programming changes by the District will be at the Contractor's expense.
- I. After completion of the installation and 100% pretest of the system, a satisfactory final test (compliant with NFPA 72 requirements) of the entire system shall be made

in the presence of the inspector of record (IOR) and District or the District's representative.

- J. Provide District an electronic copy of final test results.
- K. Existing system shall remain operable until new system is accepted and approved by the IOR and the District or its representative.
- L. The Contractor is responsible for user/operator training (2 hours).
- M. The Contractor shall complete all required project closeout documentation in a timely fashion.

1.3 RELATED REQUIREMENTS:

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Division 26 – Electrical

1.4 CODES AND STANDARDS

- A. The installed system shall conform to all California State Codes
 - 1. 2022 California Building Code (CBC)
 - 2. 2022 California Electrical Code (CEC)
 - 3. 2022 California Fire Code (CFC)
 - 4. All equipment shall have California State Fire Marshall listing(s)
- B. National Fire Protection Association (NFPA) – USA:
 - 1. 2017 NFPA 70 – National Electric Code (NEC)
 - 2. 2016 NFPA 72 – National Fire Alarm Code (NFPA 72)
 - 3. 2018 NFPA 101 – Life Safety Code (NFPA 101)
 - 4. Americans with Disabilities Act (ADA)
- C. Local building codes
- D. All requirements of the Authority Having Jurisdiction (AHJ)

1.5 UNDERWRITERS LABORATORY (UL) LISTING

- A. All equipment shall be UL listed for its intended purpose.
- B. Any modification that voids the equipment's UL listing is strictly prohibited (i.e. relocated or oversize knock-outs).
- C. Any modified new equipment that voids the UL listing shall be replaced by the Contactor (parts and labor) at their expense.

1.6 QUALIFICATIONS:

- A. The Contractor shall possess a California C10 license.
- B. The installing Contractor or Subcontractor shall be FACP manufacturer authorized to provide and install equipment with 5 years of documented experience.
- C. The programming technician shall possess a valid manufacturer's programming certification.
- D. The Contractor shall have at least one NICET certified in Fire Alarm Technology, level II (or greater) personnel as the on-site supervising technician who is always on site when Fire Alarm activities are taking place.
- E. The installing company and its subcontractors shall have an office located within 50 miles of the project site.

1.7 SYSTEM REQUIREMENTS

- A. Site Compatibility: Any new installations or modifications to an existing system shall seamlessly integrate into the site's existing Fire Alarm system.

1.8 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

- A. Shop Drawings: When required by individual Specification Sections, provide shop drawings which include physical characteristics, electrical characteristics, device layout plans, point-to-point wiring diagrams for all connections, and the like. Refer to individual Specification Sections for additional requirements for the shop drawings.

1.9 SUBMITTALS

- A. See Division 01 Submittals for more requirements
- B. Equivalent product(s) may be considered for substitution for those products specified, however, the equivalent product(s) must be approved, and show demonstrated and documented equivalence to the product(s) specified. Documentation includes but is not limited to product samples, data sheets, and actual test data. The request for product substitution, and supporting documentation, must be submitted, in writing.

1.10 WARRANTY

- A. Refer to Division 01 Warranty section.
- B. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day "burn-in" period shall begin. Any fault shall reset the "burn-in" period to zero (0). Warranty shall commence at day 31 of a successful and continuous "burn-in" period.

PART 2 – PRODUCTS

2.1 EQUIPMENT AND MATERIAL, GENERAL

- A. The District preferred fire alarm control panel manufacturers are FireLite for Elementary Schools.
- B. See Appendix A for pre-approved equipment listings.
- C. All products shall be new and unused and shall be of manufacturer's current and standard production.
- D. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.
- E. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory system operation.
- F. Product availability:
 - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
 - 2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

2.2 CONDUIT AND RACEWAY

- A. See Section 27 05 00 for conduit and raceway requirements.

2.3 WIRE AND CABLE

- A. Provide all new wire and cable required to install systems as indicated on design documents or approved shop drawings.
- B. Approved wire and cable manufacturer is West Penn, substitutions require prior approval.
- C. All cable shall be jacketed, and jacket color shall be red (OSP cable excluded). No THHN/THWN allowed.
- D. All cables shall be specifically designed for their intended use and install requirements (FPL, plenum, direct burial, aerial, etc.).

- E. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG solid for initiating device circuits and signaling line circuits, 12 AWG stranded for notification appliance circuits.

2.4 BATTERIES

- A. Existing.

2.5 EXTRA STOCK

- A. For projects with less than 10 new Fire Alarm devices – no extra stock required.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. The installing company shall employ a minimum of one National Institute for the Certification in Engineering Technologies (NICET) Fire Alarm Systems, level II technician. To ensure system integrity, the NICET level II technician shall be on site during all fire system related work to guide the installation of conduit, back-boxes, device placement, device installation, programming, pre-testing, and final testing of the system.
- B. The District, Inspector of Record (IOR), Construction Manager or an agent of the District shall have the authority to stop work until the certified personnel requirement is met. The Contractor shall be held accountable for meeting completion dates.
- C. Installation shall be in accordance with the CBC, CEC, CFC, NFPA 72, local and national codes.
- D. Fire Alarm cables shall not be installed in decking flutes used as pathway. Any conduit that needs to be ran in decking flutes needs to be rigid.
- E. All Fire Alarm cables shall be run unexposed (not observable from occupiable space) throughout the entire cable path – either in conduit, on ladder racking, on j-hooks above ceilings or below flooring.
- F. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place with fasteners and supports in accordance with drawings and specifications.
- G. Signal line circuits (SLC) for initiating devices shall be wired Class B.
- H. Notification appliance circuits (NAC) shall be wired Class B.
- I. Smoke detectors shall remain covered until operational. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and/or physical damage and may require additional testing and/or replacement.

- J. All addressable smoke or heat devices shall have trim skirts.
- K. All modules with indicator lights (i.e. SIGA-CT1 & etc.) shall be mounted where the indicator lights are observable from the occupiable space.
- L. Fire alarm circuits shall have a red breaker lock on device per NFPA 72 requirements.
- M. All modification to electrical power shall be made by a licensed electrician.

3.2 LABELING

- A. All labels are to be machine generated black letters on white adhesive label stock that is appropriate for the installation environment (interior/exterior).
- B. Device ID Labels are to be 1/4" lettering for mounting heights 10' AFF or less, 1/2" black lettering on white labels for mounting heights greater than 10' AFF.
- C. All panels and power supplies shall be labeled indicating AC electrical power panel and circuit breaker number and panel location.
- D. All smoke and heat detectors shall be labeled with Point ID affixed to the trim skirt. Labels are to be visible when approaching the device from the room entry.
- E. All modules are to be labeled with Point ID and function and/or associated equipment (i.e. FAN SHUTDOWN, HVAC UNIT XX, ATTIC HEAT, etc.)
- F. All notification devices shall be labeled with NAC Point ID.
- G. All cables in cabinets shall be labeled with function and circuit ID.
- H. All end-of-line devices shall have a "EOL" label.

3.3 PANEL PROGRAMMING/SOFTWARE MODIFICATION

- A. The contractor shall review the proposed system programming, functionality, expectations with the District or its representative 10 days prior to final programming.
- B. Contractor shall provide the services of a factory trained, and authorized technician to perform all system software modifications, upgrades, or changes on site. No remote programming is allowed.
- C. Contractor shall provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system.
- D. Programming syntax shall be consistent with the with the existing site for label text and numbering scheme.

3.4 PRE-TESTING

- A. The entire system shall be checked and pre-tested by the Contractor and shall test free of all faults prior to calling for a final test.
- B. Before energizing the cables and wires, check for correct connections and test for open circuits, short circuits, ground faults, continuity, and any physical damage to the cable/wire insulation that may have occurred during installation.

3.5 TESTING AND GUARANTEE

- A. Upon completion of the installation of the system, a test consisting of 100% of all newly installed and 10% of existing relevant system components shall be performed to confirm operation and function. This test shall be made in the presence of the Inspector of Record (IOR) and the District or its representative.
- B. Provide the Project Manager with 7 days in advance written notice of system readiness for Final Testing and Inspection. System shall be 100% pre-tested and fully operable with no trouble conditions prior to final test.
- C. Provide the service of a NICET level II technician to supervise and participate during all of the adjustments and tests of the system.
- D. Testing and adjustments
 - 1. Verify that all devices operate per Design documents matrix (matrices.)
 - 2. Verify the Point IDs and descriptions as indicated on the updated (redlined) Design Documents Floor Plan.
 - 3. Verify the candela settings of all NAC devices with strobes.
 - 4. Contractor to adjust horn wattage settings as required to meet sound levels required after testing.
 - 5. Verify that an open circuit on the initiating device circuit activates a trouble signal locally for all circuits.
 - 6. Verify that an open or a short circuit on the signaling line circuit activates a trouble signal locally for all circuits.
 - 7. Verify that an open or short circuit on the notification appliance circuit activates trouble signal locally for all circuits.
 - 8. Verify that a ground condition on an initiating device circuit activates trouble signals locally for all circuits.

9. Verify that a ground condition on a signaling line circuits activates a trouble signals locally for all circuits.
10. Verify that a ground condition on a notification appliance circuit activates a trouble signal locally for all circuits.

3.6 DEMOLITION

- A. See section 27 05 00, for requirements

3.7 FINAL DOCUMENT SUBMITTALS

- A. See section 27 00 00, for additional requirements
- B. Submit completed NFPA certification forms as found in NFPA 72. Forms shall be submitted in typewritten format.
- C. Provide District an electronic copy of final test results.
- D. Contractor “red-line as-built” drawings shall also include the following: The drawings shall depict, at a minimum, the following conditions:
 1. The device exact installed location.
 2. Device updated labeling ID(s), which shall match the physical label at the device.
 3. Revised risers to match record set point to point installation and
 4. Updated battery calculation with quantity of device changes.
 5. New pathways, conduit, ground boxes, junction boxes, raceway, power-poles and floor-monuments.
 6. Any other new conditions.
- E. The Contractor shall submit “red-line as-built” drawings as indicated on project schedule.
- F. Warranty:
 1. Refer to Division 01 Warranty section.
 2. After the satisfactory completion letter has been received, a continuous and fault free thirty (30) day “burn-in” period shall begin. Any fault shall reset the “burn-in” period to zero (0). Warranty shall commence at day 31 of a successful and continuous “burn-in” period.

END OF SECTION.

DIVISION 31 – EARTHWORK

- 31 00 00 – Earthwork
- 31 13 16 – Tree Protection
- 31 23 33 – Trenching and Backfilling
- 31 32 00 – Soil Stabilization

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SECTION 31 00 00 – EARTHWORK

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes earthwork.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00, Construction Facilities and Temporary Controls.
- C. Section 01 57 13, Erosion Control
- D. Section 31 23 33, Trenching and Backfilling.
- E. Section 32 12 00, Asphalt Concrete Paving.
- F. Section 32 16 00, Site Concrete.
- G. Section 32 80 00, Irrigation.
- H. Section 32 90 00, Landscaping.
- I. Section 33 40 00, Site Drainage.
- J. Section 31 32 00, Soil Stabilization

1.3 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.4 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting of inadequate compaction or

moisture content is the sole responsibility of the contractor.

- D. Tests (See Part 3 for Compaction Testing).
- E. Contractor shall be solely responsible for all subgrades built. Failures resulting from inadequate compaction or moisture content are the responsibility of the contractor. Contractor shall be solely responsible for any and all repairs.

1.5 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.6 REFERENCES AND STANDARDS

- A. General: Site survey, included in the drawings, was prepared by Warren Consulting Engineers, dated September 27, 2023, and is the basis for data regarding current conditions. While the survey is deemed generally accurate, there exists discrepancies and variations due to elapsed time, weather, etc. Existing dirt grades may vary 0.2 ft. from that shown.
- B. Site Visitation: All bidders interfacing with existing conditions shall visit the site prior to bid to verify general conditions of improvements. Discrepancies must be reported prior to the bid for clarification.
- C. ANSI/ASTM D698-e1 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D. ANSI/ASTM D1556-e1 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- E. ANSI/ASTM 698-12e2 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- F. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- G. ANSI/ASTM D 4318-10e1 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- H. CALTRANS Standard Specifications Section 17.
- I. CAL-OSHA, Title 8, Section 1590 (e).
- J. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly

store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
- B. Excavation dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for excavation dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.9 EXISTING SITE CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.10 ON SITE UTILITY VERIFICATION AND REPAIR PROCEDURES

- A. Ground-breaking requirements:
 - 1. All underground work performed by a Contractor must be authorized by the District's Construction Manager or the Low Voltage Consultant prior to start of construction.
 - 2. The Contractor is to obtain and keep the original School's construction utility site plans on site during all excavation operations. Contractor can contact the District's Construction Manager, Facilities Manager, or the Low Voltage Consultant to procure the drawings.
- B. Underground Utility Locating:
 - 1. The contractor shall hire an Underground Utility Locating Service to locate existing underground utility pathways in areas affected by the scope of work for excavation.
 - 2. Contractor must use an underground utility locator service with a minimum of 3 years' experience. The equipment operator must have demonstrated experience.
 - 3. The Underground Utility Locator Service must have the use of equipment with the ability to locate by means of inductive clamping, induction, inductive metal detection, conductive coupling, or TransOnde (Radio detection) to generate signals, passive locating (free scoping) for "hot" electric, and metal detector.
 - 4. The Underground Utility Locator Service must be able to locate existing utilities at a depth of at least 72".

5. The Underground Utility Locator Service must be able to locate but are not limited to locating the following types of utility pathways:
 - a. All conduit pathways containing 110 volt or greater 50-60Hz electrical wire.
 - b. All conduit pathways containing an active cable TV system.
 - c. All conduit pathways containing wire or conductor in which a signal can be attached and generated without damaging or triggering the existing systems.
 - d. All empty conduit pathways or pipe in which a signal probe or sonde (miniature transmitter) can be inserted.
 - e. All conduit pathways containing non-conductive cables or wires in which a signal probe or sonde (miniature transmitter) can be inserted.
 - f. All plastic and other nonconductive water lines in which a TransOnde Radio detection) or other "transmitter" can be applied to create a low frequency pressure wave (signal) without damaging or triggering the existing systems.
 - g. All copper or steel waterlines and plastic or steel gas lines.
6. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
7. The contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
8. The Underground Utility Locator Service shall provide the contractor with two sets of maps showing the location of utilities and average depth. They will be referenced to permanent buildings. Contractor will deliver one copy to the district at no additional charge.
9. Contractor is responsible to contact Underground Service Alert (U.S.A. 800/227-2600) and receive clearance prior to any excavation operations.
10. Contractor shall inform the (District's Construction Manager) (Architect) (Owner) no later than five (5) days prior to the date scheduled for the utility locator service to be on site.

1.11 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be

solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullyng of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

1.12 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
- B. Excessively wet fill material shall be bladed and aerated per section 3.08, B.

1.13 TESTING

- A. General: Refer to Section 01 45 00 – Quality Requirements.
- B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
 - 1. If Contractor elects to process or mine onsite materials for use as Suitable Fill, Aggregate Sub Base, Aggregate Base, Rock, Crushed Rock or sand the cost of all testing of this material shall be paid for by the Contractor.
 - 2. Testing of import fill for compliance with Department of Toxic Substance Control (DTSC) shall be paid for by the Contractor.

1.14 ARCHEOLOGICAL AND CULTURAL RESOURCES

- A. If archeological or cultural resources are discovered during the Work, the Contractor must cease all construction operations in the vicinity of the discovery until a qualified archeologist can assess the value of these resources and make recommendations to the State Historic Preservation Officer. Archeological and cultural resources include artifacts, large amounts of bone, shell, or flaked stone, and other evidence of human

activity. If the State Historic Preservation Officer or the Owner directs that work be temporarily ceased at the location of an archeological or cultural find, the Contractor must temporarily suspend work at the location.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Engineered Fill Materials: All fill shall be of approved local materials supplemented by imported fill if necessary. "Approved" local materials are defined as local soils tested and approved by Geotechnical Engineer free from debris, and concentrations of clay and organics; and contain rocks no larger than 3-inches in greatest dimension. The soil and rock should be thoroughly blended so that all rock is surrounded by soil. This may require mixing of the soil and rock with a dozer prior to placement and compaction. Clods, rocks, hard lumps or cobbles exceeding 3-inches in final size shall not be allowed in the upper 18 inches of any fill. Native clay or clayey soils will not be permitted within the upper 12 inches of building pad areas or paved areas.
- B. Imported Engineered Fill Material: Imported fill may be required to complete work. Proposed import fill material shall meet the above requirements; shall be similar to the native soils. Import fill shall meet the above requirements; shall have plasticity index of 12 or less; an Expansion Index of 20 or less; be free of particles greater than 3-inches in largest dimension; be free of contaminants and have corrosion characteristics within the acceptable limits. All import fill material shall be tested and approved by Soils Engineer prior to transportation to the site. Proposed fill material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material.
1. DTSC TESTING: Site work contractor is to coordinate testing with an analytical lab, hired by the owner, licensed by the State of California for the DTSC testing. The costs associated with the testing will be paid by the contractor.
 2. DTSC testing shall include documentation as to the previous land use, location, and history. Soils shall be analyzed for all compounds of concern to ensure the imported soil is uncontaminated and acceptable. Testing shall be performed per the recommendations included in DTSC Imported Fill Advisory http://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf). Soils shall be tested prior to import to the project site.
 - a. Lab shall determine geographically which tests and analysis comparison will be appropriate for the testing. (CAM 17 / Title 22); (RWQCB) Regional Water Quality Control Board; or (OEHHA) Office of Environmental Health Hazard Assessment.
 3. Frequency of testing shall be conducted in accordance with DTSC's Imported Fill Advisory as follows;

Fill Material Sampling Schedule

| Area of Individual Borrow Area | Sampling Requirements |
|---------------------------------|---|
| 2 Acres or less | Minimum of 4 samples |
| 2 to 4 Acres | Minimum of 1 sample every ½ Acre |
| 4 to 10 Acres | Minimum of 8 Samples |
| Greater than 10 Acres | Minimum of 8 locations with 4 subsamples per location |
| Volume of Borrow Area Stockpile | |
| Up to 1,000 Cubic Yards | 1 sample per 250 cubic yards |
| 1,000 to 5,000 Cubic Yards | 4 samples for the first 1000 cubic Yards + 1 sample per each additional 500 cubic yards |
| Greater than 5,000 Cubic Yards | 12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards |

4. Reports/ Documentation

- a. Results of the testing analysis shall be sent to the Owner; Architect; Project Inspector, Project Civil Engineer, DTSC, and DSA. Letter shall reference DSA file and application numbers.

C. Landscape Backfill Material:

1. The top 3” of native topsoil stripped from the site may be used for landscape backfill material provided it meets the requirements as specified in Section 329000.
2. Imported Topsoil may be required to complete work. See Section 329000 for requirements. Proposed Topsoil material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material.

D. Water: Furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.

E. Aggregate Base: Provide Class 2 3/4” Aggregate Base conforming to standard gradation as specified in Cal Trans Standard Specifications, Section 26,-1.02A.

F. Decomposed Granite: Decomposed Granite shall be well graded mixture of fine to 1/8” particles in size with no clods. The material shall be free of vegetation, other soils, debris and rock. The material shall be reddish-tan to tan in color.

- G. Decomposed Granite Solidifier: PolyPavement or equal.

PART 3 – EXECUTION

3.1 INSPECTION LAYOUT AND PREPARATION

- A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point where this installation may properly commence
- B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.2 PERFORMANCE

- A. General: Do all grading, excavating and cutting necessary to conform finish grade and contours as shown. All cuts shall be made to true surface of subgrade.
- B. Archaeological Artifacts: Should any artifacts of possible historic interest be encountered during earthwork operations, halt all work in area of discovery and immediately contact the Architect for notification of appropriate authorities.
- C. Degree of Compaction: Percentage of maximum density, hereinafter specified as degree of compaction required, means density equivalent to that percentage of maximum dry density determined by ASTM D1557 Compaction Test method, and such expressed percentage thereof will be minimum acceptable compaction for specified work.
- D. Moisture Content: Moisture content shall be as noted below and as called for on the plans. Moisture content shall be maintained until subgrade is covered by surfacing materials.

3.3 DEMOLITION, DISPOSAL AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES

- A. All other obstructions, such as abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities shall be cleaned of all loose materials, dish shaped, and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should be scarified to a depth of ____", moisture-conditioned to (optimum) (2% above optimum) moisture content, and recompacted to at least ____% of the maximum dry density.

3.4 TESTING AND OBSERVATION

- A. All grading and earthwork operations shall be observed by the Geotechnical

Engineer or his representative, serving as the representative of the Owner.

- B. Field compaction tests shall be made by the Geotechnical Engineer or his representative. If moisture content and/or compaction are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified moisture or compaction. Notify Geotechnical Engineer at least 48 hours in advance of any filling operation.
- C. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer or his representative. The Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencement of any aspect of the site earthwork.
- D. If the Contractor should fail to meet the compaction or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer or Architect/Engineer.
- E. After each rain event Geotechnical Engineer shall test fill material for optimum moisture. Do not place any fill material until desired moisture is achieved.

3.5 CLEARING AND GRUBBING

- A. Prior to grading, remove all debris off-site. Remove trees and brush including the root systems. Holes resulting from tree and brush removal should be prepared and backfilled in accordance with paragraphs 3.07, 3.08, 3.09, and 3.10. This may require deepening and/or widening the holes to adequately remove disturbed soil and provide room for compaction equipment. Strip the surface of all organics. Stripping's meeting the requirements of Section 32 90 00 may be used in landscape areas only.

3.6 CUTTING

- A. Do all cutting necessary to bring finish grade to elevations shown on Drawings.
- B. When excavation through roots is necessary, cut roots by hand.
- C. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.

3.7 STRUCTURAL EXCAVATION

- A. General: Excavate to bear on firm material at contract depth shown on Structural Drawings.
- B. Footings: All footing excavations shall be of sufficient width for installation of formwork, unless earth will retain its position during concreting. All portions of footings above grade must be formed.
- C. Unsuitable Ground: Any errors in structural excavation, soft ground, or clay soils found when excavating shall be reported to Architect. In no case shall work be built on any such soft or clayey unsuitable surface without direction from the Architect.

Restore excavations to proper elevation with engineered fill material compacted to 90% of dry density.

3.8 SUBGRADE PREPARATION

- A. Grade compact and finish all subgrades within a tolerance of 0.10' of grades as indicated on Drawings and so as not to pool water. Subgrade within building pads and concrete walks shall be within 0.05' of grades indicated.
- B. After clearing, grubbing and cutting, subsurface shall be plowed or scarified to a depth of at least 12", until surface is free from ruts, hummocks or other uneven features and uniform and free from large clods. Moisture condition to optimum moisture content and recompact to at least 90% of the maximum dry density as determined by ASTM Test Method D1557. If the existing soils are at a water content higher than specified, the contractor shall provide multiple daily aerations by ripping, blading, and/or disking to dry the soils to a moisture content where the specified degree of compaction can be achieved. After seven consecutive working days of daily aerations, and the moisture content of the soil remains higher than specified, the contractor shall notify the architect. If the existing soils have a moisture content lower than specified, the contractor shall scarify, rip, water and blade existing soil to achieve specified moisture content. The contractor shall make proper allowance in schedule and methods to complete this work.
- C. Subgrade in areas to receive landscaping shall be compacted to 90%.
- D. Where Contractor over-excavates building pads through error, resulting excavation shall be recompact as engineered fill at Contractor's expense.

3.9 PLACING, SPREADING AND COMPACTING FILL MATERIAL IN BUILDING PAD AND PAVEMENT AREAS

- A. Selected fill material shall be placed in layers which, when compacted, shall not exceed 6 inches in compacted thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity in moisture content.
- B. Selected fill material shall be moisture-conditioned to specified moisture content. Selected fill material shall be unfrozen. When moisture content of fill material is below that specified, add water until proper moisture content is achieved. When moisture content is above that specified, aerate by blading or other methods mentioned in 3.08 B until moisture content is satisfactory.
- C. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of 90% as determined by the ASTM D1557 Compaction Test. Compact each layer over its entire area until desired density has been obtained.
- D. Recompaction of Fill in Trenches and Compaction of Fill Adjacent to Walls: Where trenches must be excavated, backfill with material excavated. Place in lifts that when compacted do not exceed 6", moisture conditioned to (optimum)(2% above optimum) moisture content, and compact to a minimum of 90% relative compaction in building pad and paved areas, and to 90% relative compaction in landscape areas.
- E. Jetting of fill materials will not be allowed.

3.10 FINAL SUBGRADE COMPACTION

- A. Paved Areas: Upper 6" of all final subgrades supporting pavement sections and all other flatwork shall be brought to specified moisture content and shall be uniformly compacted to not less than 95% of maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.
 - 1. Exception; in lime /cement treated areas the upper 12" shall be compacted to 95% Compaction.
- B. Other Fill and Backfill: Upper 12" of all other final subgrades or finish grades shall be compacted to 90% of maximum dry density.
- C. Gravel Fill: Do not place compacted gravel fill until after underground work and foundations are in place. Compact gravel fill with vibratory plate or similar equipment to preclude settlement.

3.11 PLACING, SPREADING, AND COMPACTION OF LANDSCAPE BACKFILL MATERIALS

- A. All landscaped areas shall receive topsoil. After subgrade under landscape area has been scarified and brought to 90% maximum dry density, top soil shall be placed evenly to depth of 12" at 85% of maximum dry density.
- B. Project Inspector must verify that materials are uniformly spread to minimum depth specified.

3.12 DECOMPOSED GRANITE COMPACTION AND STABILIZATION

- A. Decomposed granite paving, paths or track shall be placed uniformly to the required depth and treated with PolyPavement or approved equal. Apply PolyPavement using Application Method 1 or a mixed application method.

3.13 SLOPE CONSTRUCTION

- A. Cut slopes shall be constructed to no steeper than 2:1 (horizontal:vertical). Fill slopes shall be constructed to no steeper than 2:1 (horizontal:vertical).

3.14 FINISH GRADING

- A. At completion of project, site shall be finished graded, as indicated on Drawings. Finish grades shall be "flat graded" to grades shown on the drawing. Mounding of finish grades will not be allowed unless otherwise directed on the landscape drawings. Tolerances for finish grades in drainage swales shall be $\pm 0.05'$. Tie in new and existing finish grades. Leave all landscaped areas in finish condition for lawn seeding. Landscaped planters shall be graded uniformly from edge of planter to inlets. If sod is used for turf areas the finish grade on which it is placed shall be lowered to allow for sod thickness.
- B. All landscape areas shall be left free of rock or foreign material as specified in Section 32 90 00.

C. All landscape areas shall be approved by Architect prior to any planting.

3.15 SURPLUS MATERIAL

A. Excavated material not required for grading or backfill shall be removed from site at contractor's expense.

3.16 CLEANING

A. Refer to Section 01 74 00.

B. Remove from fill all vegetation, wood, form lumber, casual lumber, and shavings, in contact with ground; buried wood will not be permitted in any fill.

END OF SECTION.

SECTION 31 13 16 – TREE PROTECTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Tree protection complete as shown and as specified.

B. Related Sections:

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 02 41 19 – Site Demolition.

1.2 SUBMITTALS

- A. Contractor shall submit Tree Protection Area plan to Architect outlining all trees and plants listed by number to be protected and their groupings. All trees and plants shall be grouped in their own Fenced Tree Protection Areas as shown in Drawings.
- B. Contractor shall submit to Landscape Architect in writing a schedule including any and all activity inside Fenced Tree Protection Areas. This schedule to include but not limited to the dates fences are initially installed, altered and dates of fence replacement. Intent of these provisions is that the Tree Protection Zone (TPZ) are fenced for the entire duration with only exceptions of short intervals or specifically defined construction activity needs. Revise schedule as directed by Architect.
- C. Provide a Mediation Plan to keep existing trees and planting irrigated during construction.

1.3 WARRANTY

- 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.)

PART 2 – PRODUCTS

2.1 MATERIALS

- 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.
- B. Trunk Protection constructed of:
1. 20-foot long 2x6 wood boards or length needed to protect the trunk if tree trunk is shorter than 20'.

2. Metal wire. Gauge strong enough to tie the boards around the trunk of the tree.
- C. Tree Protection Zone Fencing: 4-foot-tall snow fencing or 6-foot-tall metal chain link construction fencing per the discretion of the Landscape Architect or District Representative.
- D. Bark Mulch: Untreated, shredded cedar.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Maintain pre-existing moisture levels.
- B. Maintain areas inside the fenced tree protection area including lawn mowing, leaf removal, operation and repair of irrigation.
- C. Protect root systems from flooding, erosion, excessive watering and drying resulting from dewatering or other operations:
- D. Prohibitions – DO NOT:
 1. Allow run off or spillage of damaging materials in vicinity of root systems,
 2. Rinse tools or equipment under trees,
 3. Store materials, stockpile soil, park or drive vehicles within drip lines or in areas with plants,
 4. Cut, break skin or bark, bruise roots or branches,
 5. Allow fires under and adjacent trees and plants,
 6. Discharge exhaust under foliage,
 7. Secure cable, chain, or rope to trees,
 8. Change grade within drip line of trees without Landscape Architect's approval,
 9. Lime shall not be used.

3.2 INSTALLATION

- A. Tree Trunk Protection:
 1. Conform to requirements for trees and plants to be retained, per 3.1, above.
 2. Install boards vertically around tree and bind together with wire to protect the bark 360 degrees around the entire tree prior to start of any demolition and construction. Boards are not to dig into bark.

3. Major scaffold limbs may require plastic fencing or straw waddles to be wrapped around them to protect them.

B. Tree Dripline Protection:

1. The Tree Protection Zone (TPZ) is a restricted area around the base of the tree with a radius of one foot (1') for every inch of tree trunk diameter or ten feet, which is greater, enclosed by tree protection zone fencing.
2. Signage designating the protection zone and penalties for violations shall be secured in prominent location on each protection fence.

C. Requirements for Trees to be Protected:

1. Duration: Tree protection shall be erected before demolition, grading, or any construction begins and remain in place until final inspection of the project.
2. Conform to requirements for trees and plants to be retained, per 3.1, above.
3. Architect shall give final review of Tree Protection before construction to begin. Revise schedule as directed by Architect.
4. Vehicle movement within the TPZ will only be allowed for construction equipment.
 - a. Within dripline, apply 10-inch layer of mulch over geotextile fabric.
5. Perform trenching operations within the TPZ of the tree so that:
 - a. Digging shall be by hand using narrow trenching shovel,
 - b. No roots larger than 2" diameter are cut and utilities are routed around or below them,
 - c. Roots smaller than 2" diameter are cut with sharp tools, saws, loppers- not torn, chopped or broken.
6. Where roots are exposed:
 - a. Do not allow the roots to dry out,
 - b. On the same day the excavation is made, provide temporary backfill to original grade at tree roots,
 - c. Or cover roots with 4 layers of wet untreated burlap, made wet each day, including weekends.
7. Roots larger than 3" in diameter are not to be cut without review and approval of Arborist.

3.3 REPAIR/RESTORATION

- A. It shall be the responsibility of Contractor to repair or replace any damaged trees.
- B. Repair trees damaged by operations:
 - 1. within 24 hours of damage,
 - 2. to satisfaction of Landscape Architect,
 - 3. to ISA Pruning Standards.
- C. Replace repaired trees where repair has not restored them to health or aesthetics:
 - 1. within 6 months of request to replace,
 - 2. to the satisfaction of Landscape Architect,
 - 3. with replacement plants of a size and variety matching those that were removed
- D. Replaced trees and plants shall be the responsibility of Contractor to maintain in good health and aesthetics for the duration of the project from installation.
 - 1. Contractor shall submit to Landscape Architect comprehensive maintenance plan for replacement tree, including but not limited to provisions for irrigation system independent of existing system.
- E. Where suitable replacement of trees and plants are not available:
 - 1. Contractor shall provide affidavits to Landscape Architect that they are not available.
 - 2. Contractor shall provide compensation to the District at the following rates:
 - a. \$2000 for each caliper inch of any tree or plants removed under 12 inches.
 - b. \$4000 for each caliper inch of any tree or plants removed 12 inches or more.
 - c. Caliper of trees and plants measured at 6 inches above grade.
 - d. Caliper defined here as thickness of diameter, measured in inches.
- F. Soil Contamination: Contractor shall remove soil that has been contaminated during the performance of the Work by oil, solvents, and other materials which could be harmful to trees and plants, and replace with good soil, at Contractor's expense.

END OF SECTION

SECTION 31 23 33 – TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes trenching and backfilling.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00, Construction Facilities and Temporary Controls.
- C. Section 01 57 13, Erosion Control
- D. Section 31 23 33, Trenching and Backfilling.
- E. Section 32 12 00, Asphalt Concrete Paving.
- F. Section 32 16 00, Site Concrete.
- G. Section 32 80 00, Irrigation.
- H. Section 32 90 00, Landscaping.
- I. Section 33 40 00, Site Drainage.
- J. Section 31 32 00, Soil Stabilization

1.3 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. Contractor / Installer shall have been in business for five (5) years providing/finishing similar size projects and complexity.

1.4 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Submit Manufacturers data and shop drawings.

1.5 WARRANTY

- A. Submit fully executed warranty for work and materials in this section per 01 78 36.

1.6 REFERENCES AND STANDARDS

- A. California Building Code current edition.
- B. California Plumbing Code current edition.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

- A. Contractor shall acquaint himself with all existing site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.
- C. Trench dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for trench dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.9 PROTECTION

- A. Adequate protection measures shall be provided to protect workers and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations. Repair all trenches in grass areas with new sod (seeding not permitted) and "stake-off" for protection.
- B. Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Architect or Owner is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gulying of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. Keep all excavations free from water during entire progress of work, regardless of cause, source or nature of water.

- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance.
- H. Trees: Carefully protect existing trees which are to remain.

1.10 TRENCH SAFETY PROVISIONS

- A. General Contractor shall be solely responsible for safety design, construction and coordination with agencies having jurisdiction. If such plan varies from shoring system standards established by Construction Safety Orders, plan shall be prepared by registered civil or structural engineer.
- B. Nothing herein shall be deemed to allow use of shoring, sloping or protective system less effective than that required by Construction Safety Orders of California State Division of Industrial Safety.
- C. When trenching through paved surface, provide steel trench plates to cover open trenches daily until trenches are backfilled.

1.11 SEASONAL LIMITS

- A. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, full operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
- B. Material above optimum moisture shall be processed per section 310000, 3.8, B.

1.12 TESTING

- A. General: Refer to Section 01 45 00 – Quality Requirements.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Backfill materials: Pipeline and conduit trench backfill as shown on the plans and as specified below.
 - 1. $\frac{3}{4}$ inch crush rock.
 - 2. Native Materials: Soil native to Project Site, free of wood, organics, and other deleterious substances. Rocks shall not be greater than 3-inches.
 - 3. Sand: Fine granular material, free of organic matter, mica, loam or clay.
 - 4. Lean Mix Concrete/Controlled Density Backfill: 2 sacks cement slurry.
 - 5. Class 2 aggregate base, $\frac{3}{4}$ " rock, per Caltrans section 26-1.02B

- B. Water: Furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.
- C. Provide other bedding and backfill materials as described and specified in Section 31 00 00, Section 33 40 00 and Divisions 22-26.

PART 3 PART 3 – EXECUTION

3.1 INSPECTION

- 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. 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 INSTALLATION

- A. Perform work in accordance with pipe manufacturer's recommendations, as herein specified and in accordance with drawings.

3.4 TRENCHING

- A. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of trench around installed item as required for caulking, joining, backfilling and compacting; not less than 12 inches wider than pipe or conduit diameter, unless otherwise noted.
- B. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.
- C. Trench straight and true to line and grade with bottom smooth and free of edges or rock points.
- D. Where depths are not shown on the plans, trench to sufficient depth to give minimum fill above top of installed item measured from finish grade above the utility as follows:
 - 1. Sewer pipe: depth to vary
 - 2. Storm drain pipe: depth to vary
 - 3. Water pipe – Fire Supply: 36 inches
 - 4. Water pipe – Domestic Supply: 30 inches
- E. Where trench through existing pavement saw cut existing pavement in straight lines. Grind existing asphalt on each side of trench 3" wide x ½ the depth of the section.

Apply tack coat to vertical surfaces before installing new asphalt. Replace asphalt and concrete pavement sections to matched existing conditions. In concrete pavement provide expansion and control joints to match existing joint layout.

3.5 BACKFILL

A. Pipe Trench Backfill is divided into three zones:

1. Bedding: Layer of material directly under the pipe upon which the pipe is laid.
2. Pipe Zone: Backfill from the top of the bedding to 6 inches (compacted) over the top of the pipe.
3. Upper Zone: Backfill between top of Pipe Zone and to surface of subgrade.

B. Bedding: Type of material and degree of compaction for bedding backfill shall be as defined in the Details and Specifications.

C. Pipe Zone and Upper Zone Backfill:

1. Type of material and degree of compaction Pipe Zone and Upper Zone Backfill shall be as required by Drawings, Details, & Specifications.
2. Upper Zone Backfill shall not be placed until conformance of Bedding and Pipe Zone Backfill with specified compaction test requirements has been confirmed.
3. Backfill shall be brought up at substantially the same rate on both sides of the pipe and care shall be taken so that the pipe is not floated or displaced. Material shall not be dropped directly on pipe.

D. Backfill Compaction:

1. Backfill shall be placed in layers which, when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity. Do not backfill over, wet, frozen or soft subgrade surfaces. Employ a placement method that does not disturb or damage foundation walls, perimeter drainage, foundation damp-proofing, waterproofing or protective cover.
2. When moisture content of fill material is below that required to achieve specified density, add water until proper moisture content is achieved. When moisture content is above that required, aerate by blading or other methods until specified moisture content is met, see section 310000, 3.08, B.
3. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to 90% of maximum dry density while at specified moisture content. Compact each layer over its entire area until desired density has been obtained.
4. The top 6 inches of subgrade compaction under pavement or building shall be per Earthwork section 31 00 00.

5. Compaction: All backfill operations shall be observed by the Inspector of Record and/or Geotechnical Engineer. Field density tests shall be made to check compaction of fill material. If densities are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified densities. Notify Inspector and Architect at least 24 hours in advance of any operation.

E. Backfill in Areas Previously Lime or Cement Treated: If trenching is necessary in areas that have been previously lime treated the contractor shall backfill the trench with class 2 aggregate base, with minimum section equal to the lime treated section and compacted to 95%.

3.6 TRENCH AND SITE RESTORATION

A. Finished surface of trenches shall be restored to a condition equal to, or better than the condition as existed prior to excavation work.

3.7 PROTECTION

A. Protect existing surfaces, structures, and utilities from damage. Protect work by others from damage. In the event of damage, immediately repair or replace to satisfaction of Owner.

B. Repair existing landscaped areas to as new condition. Replant trees, shrubs or groundcover with existing materials if not damaged or with new materials if required. Replace damaged lawn areas with sod, no seeding will be permitted.

C. Replace damaged pavement with new compatible matching materials. Concrete walks to be removed to nearest expansion joint and entire panel replaced. Asphalt to be cut neatly and replaced with new materials.

D. Any existing materials removed or damaged due to trenching to be returned to new condition.

3.8 SURPLUS MATERIAL

A. Remove excess excavated material, unused materials, damaged or unsuitable materials from site.

3.9 CLEANING

A. Refer to Section 01 74 00.

B. Contractor 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 throughout the project and at the completion of work.

C. After completion of work in this section, remove all equipment, materials, and debris. Leave entire area in a neat, clean, acceptable condition.

END OF SECTION.

SECTION 31 32 00 – SOIL STABILIZATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Description: Provide Lime Stabilization Treatment, including spreading and mixing lime and water with in-place materials, and compacting the mixture to the lines, grades and dimensions shown on the plans and/or specified.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00, Construction Facilities and Temporary Controls.
- C. Section 31 23 33, Trenching and Backfilling.
- D. Section 32 12 00, Asphalt Concrete Paving.
- E. Section 32 16 00, Site Concrete.

1.3 SUBMITTALS AND QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Tests (See Part 3 for Compaction Testing).
- E. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the contractor.
- F. Failures due to the lack of continuous moisture control during the curing period will be the sole responsibility of the contractor.
- G. Any trenching through the finished cured lime/cement section will result in the contractor having to backfill trench with class 2 aggregate base rock, or cement/sand slurry,

1.4 SUBMITTALS

- A. Refer to Section 01 33 00.

1.5 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.6 QUALITY ASSURANCE

- A. General: All Quality Assurance procedures specified on the drawings shall apply to this Section in addition to those shown below.
- B. Testing:
1. Geotechnical Engineer: Owner is retaining a Geotechnical engineer to determine compliance of Lime Stabilization Treatment with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except that costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
- C. Inspection: Work shall not be performed without the physical presence and approval of Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least two working days prior to commencement of any aspect of site earthwork.
- D. Field Density: Field density and phenolphthalein reaction tests shall be made by the Geotechnical Engineer after completion of compaction. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface.

1.7 SUBMITTALS

- A. Weighmaster Certificates: Provide certificates as required in Section 2.1B.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Lime Treated Engineered Fill: The materials to be treated shall consist of on-site soils or approved import material as described in Section 31 00 00.
- B. Lime: Lime in areas to be treated shall be lime. The percentage of lime shall be based on a soil weight of 100 pcf; hence, 6 pounds lime should be utilized per square foot. A certification of compliance shall be submitted to the Geotechnical Engineer with each delivery of lime.
- C. Water: Water shall be added during the preliminary mixing operations and, if necessary, during final mixing and to keep the cured material moist until curing is complete. The amount of water added shall be subject to the approval of the Geotechnical Engineer at all times.

PART 3 – EXECUTION

3.1 PREPARATION

- A. General: Layout all work, establish grades, locate existing underground utilities, set markers and stakes, set up and maintain barricades and protection facilities; all prior to beginning actual earthwork operations.

3.2 EQUIPMENT

- A. Lime Spreader: The lime shall be spread by equipment which shall uniformly distribute the required amount of lime. The rate of spread per square foot of blanket shall not vary more than 5 percent from the designated rate, unless otherwise approved by the Geotechnical Engineer.
- B. Mixing Equipment: Mixing equipment shall be capable of mixing or remixing the materials to a uniform mixture free of streaks or pockets of lime to the full required depth.

3.3 START OF WORK UNDER THIS SECTION

- A. General: Prior to starting physical work under this Section, the property line is to be clearly staked and identified. No lime treated materials shall be allowed to contaminate areas outside of the property.
- B. Utilities; Contractor is to engage with a licensed contractor specialized in the Utility Locating Business. The contractor shall locate any and all utilities and pothole the same. The frequency of potholing shall be enough to establish the elevations of all utilities located.

3.4 LIME SPREADING

- A. Engineered Fill: Provide lime treatment in areas shown on plans and extending a minimum distance of 2 feet from outside edge of curb, building footing, wood header, and to a depth of at least 12-inches.
- B. Temperature: Lime shall not be spread while the atmospheric temperature is below 35 degrees Fahrenheit or when conditions indicate that the temperature may fall below 35 degrees Fahrenheit within 24 hours.

3.5 MIXING

- A. Lime shall be added to the material to be treated at a rate of 6 pounds lime per square foot based on a soil unit weight of 100 pcf.
- B. Lime shall be spread by equipment that will uniformly distribute the required amount of lime for the full width of the prepared material. The rate of spread per linear foot of blanket shall not vary more than five percent (5%) from the designated rate.
- C. The spread lime shall be prevented from blowing by suitable means selected by the Contractor. Quicklime shall not be used to make lime slurry. The spreading operations shall be conducted in such a manner that a hazard is not present to

construction personnel or the public. All lime spread shall be thoroughly mixed into the soil the same day lime spreading operations are performed.

- D. The distance which lime may be spread upon the prepared material ahead of the mixing operation will be determined by the Geotechnical Engineer.
- E. No traffic other than the mixing equipment and water truck will be allowed to pass over the spread lime until after the completion of mixing. After mixing, grading and compacting are completed, only the water truck is allowed on the treated area to maintain the optimum moisture for curing.
- F. Mixing equipment shall be equipped with a visual depth indicator showing mixing depth, an odometer or footmeter to indicate travel speed and a controllable water additive system for regulating water added to the mixture.
- G. Mixing equipment shall be of the type that can mix the full depth of the treatment specified and leave a relatively smooth bottom of the treated section. Mixing and re-mixing, regardless of equipment used, will continue until the material is uniformly mixed free of streaks, pockets, or clods of lime), and moisture is at approximately two percent (2%) over optimum and the mixture complies with the following requirements:

| Minimum Sieve Size | Percent Passing |
|--------------------|-----------------|
| 1-1/2" | 100 |
| 1" | 95 |
| No. 4 | 60 |

- H. Non-uniformity of color reaction when the treated material, exclusive of one inch or larger clods, as tested with the standard phenolphthalein alcohol indicator, will be considered evidence of inadequate mixing.
- I. Lime -treated material shall not be mixed or spread while the atmospheric temperature is below 35°F. The entire mixing operation shall be completed within seventy-two (72) hours of the initial spreading of lime, unless otherwise permitted by the Geotechnical Engineer.

3.6 SPREADING AND COMPACTING

- A. The treated mixture shall be spread to the required width, grade and cross-section. The maximum compacted thickness of a single layer may be determined by the Contractor provided he can demonstrate to the Geotechnical Engineer that his equipment and method of operation will provide uniform distribution of the lime and the required compacted density throughout the layer. If the Contractor is unable to achieve uniformity and density throughout the thickness selected, he shall rework the affected area using thinner lifts until a satisfactory treated subgrade meeting the distribution and density requirements is attained, as determined by the Geotechnical Engineer, at no additional cost to the Owner.
- B. The finished thickness of the lime-treated material shall not vary more than five hundredths of a foot (0.05') from the planned thickness at any point.

- C. The lime -treated soils shall be compacted to a relative compaction of not less than 95 percent as determined by the ASTM D1557-01 Compaction Test.
- D. Initial compaction shall be performed by means of a sheepsfoot type roller or a vibratory padfoot roller. Final rolling shall be by means of a smooth drum roller.
- E. Areas inaccessible to rollers shall be compacted to meet the minimum compaction requirement by other means satisfactory to the Geotechnical Engineer.
- F. Final compaction shall be completed within thirty-six (36) hours of final mixing. The surface of the finished lime -treated material shall be the grading plane and at any point shall not vary more than five hundredths of a foot (0.05') foot above or below the grade established by the plans.
- G. Before final compaction, if the treated material is above the grade tolerance specified in this section, uncompacted excess material may be removed and used in areas inaccessible to mixing equipment. After final compaction and trimming, excess material shall be removed and disposed of off site. The trimmed and completed surface shall be rolled with steel or pneumatic-tired rollers. Minor indentations may remain in the surface of the finished materials so long as no loose material remains in the indentations.
- H. At the end of each day's work, a construction joint shall be made in thoroughly compacted material and with a vertical face. After a part-width section has been completed, the longitudinal joint against which additional material is to be placed shall be trimmed approximately three inches (3") into treated material, to the neat line of the section, with a vertical edge. The material so trimmed shall be incorporated into the adjacent material to be treated.
- I. An acceptable alternate to the above construction joints, if the treatment is performed with cross shaft rotary mixers, is to actually mix three inches (3") into the previous day's work to assure a good bond to the adjacent work.

3.7 FINAL GRADING

- A. Finish all lime treated engineered fill grades to within a tolerance of 0.05' of grades shown for top of lime/cement stabilization treatment or as indicated by drawings and specifications.
- B. Leave all areas in suitable condition for subsequent work.
- C. Excess materials not needed for final grading operations shall be removed from the site.

3.8 CURING

- A. The surface of compacted and finish graded lime treated soil shall be kept moist for at least 3 days after final trimming, rolling and compacting. No equipment or traffic shall be permitted on the lime treated material during the 3 day cure, except for the water truck to keep the treated area at or above the optimum moisture. After the 3 day cure apply aggregate base. Maintain moisture curing at optimum level until aggregate base is placed

END OF SECTION.

DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 12 00 – Asphalt Concrete Paving
- 32 12 36 – Site / Parking Signage
- 32 16 00 – Site Concrete
- 32 18 16 – Poured-In-Place Playground Surfacing
- 32 31 13 – Chain Link Fences and Gates
- 32 31 19 – Decorative Metal Fences and Gates

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SECTION 32 12 00 – ASPHALT CONCRETE PAVING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphalt paving mix designs.
 - 2. Aggregate Base Course.
 - 3. Asphalt Overlay.
 - 4. Seal Coat and Striping.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00, Construction Facilities and Temporary Controls.
- C. Section 310000, Earthwork.
- D. Section 313200, Soil Stabilization.

1.3 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall provide verification that asphalt mix temperature meets the requirements of this specification at time of application.
- E. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the contractor.
- F. Sieve analysis from testing laboratories identifying rock/sand percentages within the asphalt mix shall have a testing date within 90 days of contract signing.
- G. Sieve analysis from a testing laboratory identifying rock/sand percentages within the

class 2 aggregate base rock shall have a testing date within 90 days of contract signing.

1.4 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.5 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.6 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

- A. Environmental Requirements:

1. Base Course: Do not lay base course on muddy subgrade, during wet weather, or when atmospheric temperature is below 40 degrees F.
 2. Asphalt Surfacing: Do not apply asphaltic surfacing on wet base, during wet weather, or when atmospheric temperature is below 50 degrees F.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
 - C. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
 - D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
 - E. Any construction review of the Contractor's performance conducted by the owner's representative is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
 - F. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
 - G. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
 - H. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
 - I. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.9 TESTING

- A. General: Refer to Section 01 40 00 – Quality Requirements.
- B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and backcharged to Contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Sterilant: Soil sterilizer shall be CIBA GEIGY's Pramato 25-E or Thompson-Hayward Casoron.
 - 1. Soil sterilizer shall be applied in strict accordance with manufacturer's instructions.
- B. Base Course Aggregate: State Specifications, Section 26, Class 2 aggregate base (3/4" max.).
- C. Asphalt Binder: Steam-refined paving asphalt conforming to State Specifications, Section 92, viscosity grade PG 64-10. Asphalt binder additives for HMA per Caltrans approved list of manufacturer's.
- D. Liquid Asphalt Tack Coat: Per CALTRANS section 94.
- E. Surface Course Aggregate: Mineral aggregates for Type "B" asphalt concrete, conforming to State Specifications 39-2.02, Type B, 1/2" maximum, medium grading. 3/8" maximum grading at Playcourt.
- F. Seal Coat: shall be a pre-mixed asphalt emulsion blended with select fillers and fibers such as:
 - 1. "Park-Top No. 302", Western Colloid Products.
 - 2. "OverKote", Reed and Gram.
 - 3. "Drivewalk", Conoco Oil.
- G. Wood Headers and Stakes: Pressure treated.
- H. Pavement Marking: Colors as directed by Architect. Colors of painted traffic stripes and pavement markings must comply with ASTM D 6628.
 - 1. Waterborne traffic line - colors white, yellow and red, State specification PTWB-01R3.
 - 2. Waterborne traffic line for the international symbol of accessibility and other curb markings – blue, red and green, Federal specification TT-P-1952F.
- I. Precast Concrete Bumpers: 3000 psi at 28 day minimum strength; 48" length unless otherwise indicated; provide with steel dowel anchors and concrete epoxy.
- J. Pavement Epoxy; K-Lite; Ktexp-590; Ennis Epoxy HPS2 or an approved equal.
- K. Crack Filler:
 - 1. Cracks up to 1/2": QPR model CAR08, 10oz asphalt crack filler; Star STA-FLEX Trowel Grade crack filler or approved equal.

2. Cracks $\frac{1}{4}$ " – 1": "Docal 1100 Viscolastic, distributed by Conoco, Inc., Elk Grove, CA, (916) 685-9253, or approved equal.
 3. Cracks greater than 1": Hot Mix, Topeka.
- L. Reclaimed Asphalt Paugment (RAP). HMA Type A or Type B may be produced using RAP providing it does not exceed 15% of the aggregate blend.

2.2 MIXES

- A. General: Plant mixed conforming to State Specifications, Section 39, Type B, $\frac{1}{2}$ " maximum, medium grading. $\frac{3}{8}$ " maximum grading shall be used at hardcourt.
- B. Temperature of Hot Mix Asphalt: Not less than 275 degrees F nor more than 325 degrees F when added to aggregate.
- C. Temperature of Hot Mix Aggregate: Not less than 250 degrees F nor more than 325 degrees F when asphalt is added.
- D. Temperature of Hot Mix Asphalt Concrete: Asphalt shall be not less than 285 degrees at time of application, nor more than 350 degrees. Asphalt not meeting the required temperature shall not be used.
- E. Temperature of Warm Mix Asphalt: Mixing and placement; Per the approved manufactures heat range recommendations for mixing and placement.

PART 3 – EXECUTION

3.1 EXAMINATION OF CONDITIONS

- A. Conditions of Work in Place: Subsurfaces which are to receive materials specified under this Section shall be carefully examined before beginning work hereunder, and any defects therein shall be reported, in writing, to the Architect. Work shall not be started until such defects have been corrected. Starting of work shall imply acceptance of conditions as they exist.

3.2 PREPARATION

- A. Sub-Grade: Clean, shape and compact to hard surface free from elevations or depressions exceeding 0.05' in 10' from true plan. Compact per Section 31 00 00. Compaction and moisture content shall be verified immediately prior to placement of aggregate base. Proof roll subbase in presence of geotechnical engineer prior to placement of aggregate base.
- B. Cleaning: Existing surfaces and new surface shall be clean of all dirt, sand, oil or grease. All cracks shall be cleaned and free of all debris and vegetation. Hose down entire area with a strong jet of water to remove all debris.

3.3 INSTALLATION

- A. Headers:
 1. General: Install as edging to asphalt paving, except where adjoining existing

pavement, concrete curbs, walks or building.

2. Existing Headers: Remove existing headers where new paving will join existing. Saw cut existing asphalt to provide clean edge.
3. Lines and Levels: Install true to line and grade. Cut off tops of stakes 2-inches below top of header so they will not be visible on completion of job.

B. Asphalt Paving:

1. Base Course: Install in accord with State Specifications, Section 26. Compact to relative compaction of not less than 95%, ASTM D1557. The material shall be deposited on the subgrade in such a manner as to provide a uniform section of material within five percent tolerance of the predetermined required depth. Deposition will be by spreader box or bottom dump truck to prevent segregation of the material. The material so deposited on the subgrade shall have sufficient moisture which, in the opinion of the Architect is adequate to prevent excessive segregation. It shall then be immediately spread to its planned grade and cross section. Undue segregation of material, excessive drifting or spotting of material will not be permitted. If in the opinion of the site geotechnical engineer, the material is unsuitably segregated, it shall be removed or completely reworked to provide the desired uniformity of the material.
 - a. Moisture content and compaction of base material shall be tested immediately prior to placement of asphalt paving.
2. Sterilant: Apply specified material at manufacturer's recommended rate. Applicator of sterilant material shall be responsible for determining location of all planter areas. Apply specified material over entire base course area just prior to application of asphalt. Follow manufacturer's printed directions.
3. Liquid Asphalt Tack Coat: Apply as "tack coat" to all vertical surfaces of existing paving, curbs, walks, and construction joints in surfacing against which paving is to be placed.
4. Asphalt Concrete Surface Course:
 - a. Comply with State Specifications, 39-6 except as modified below.
 - i. Final gradation shall be smooth, uniform and free of ruts, humps, depressions or irregularities, with a minimum density of 91% of the theoretical maximum specific gravity determined by California Test Method #309. Maximum variation 1/8 inch in 10' when measured with steel straightedge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix. In no case shall accessible parking spaces or loading and unloading areas exceed 2% slope in any direction.
 - ii. Asphalt material shall be delivered to the project site in a covered condition to maintain acceptable temperature. Onsite

inspector shall verify temperature of asphalt upon truck arrival to the site.

5. Placement and adjustment of Frames, Covers, Boxes and Grates: The Contractor shall set and adjust to finish grade all proposed and existing frames, covers, boxes, and grates of all manholes, drop inlets, drain boxes, valves, cleanouts, electrical boxes and other appurtenant structures prior to placement of asphaltic concrete.
6. Water Testing: All paved areas shall be water tested, to check drainage, in the presence of the project inspector prior to placement of seal coat. The surface of asphalt paving shall not vary more than 1/8 inch above or below the grade established on the plans. If variations in grade are present, they will be corrected by overlaying paving and/or pavement removal and replacement as directed by the Architect.
7. Patching: Cut existing paving square and plumb at all edges to be joined by new paving. In trenches; grind existing asphalt on each side of trench 3" wide x 1/2 the depth of the section. Apply tact coat to vertical surfaces before installing new work. Warp carefully to flush surface, with seal over joints, and feather edge. Sawcut, remove and patch existing paving where cutting is necessary for installation of piping or conduits under Divisions 2, 15 and 16.

C. Seal Coat:

1. Seal coat shall be applied no sooner than 30 days from time of asphalt placement, no exceptions.
2. Surface Preparation: surface and cracks shall be clean of all dirt, sand, oil or grease. All cracks shall be filled to a level condition after curing. Make multiple fill applications until a level condition is achieved. Failure to do so will be the reason for rejection. Hose down entire area with a strong jet of water to remove all debris. Remove soft, loose, or otherwise damaged areas of asphalt concrete to full depth of damage and replace with compacted hot mix asphalt concrete as specified herein. Minor holes and imperfections may be patched using hot mix asphalt or mastic using sand/SS-1-H. Use wire brush for removal of oil and grease; prime with shellac or synthetic resin as recommended by manufacturer of pavement sealer material.
3. Seal Coat Seal Application: Thoroughly mix materials and apply in the presence of the onsite inspector. Failure to do so will be cause for rejection. Apply in accordance with manufacturer's written instructions.
 - a. The minimum application rate for each applied coat shall be 30gals per 1000 sq. ft. Two coats of sealcoat will be required.
 - b. Clean-Up and Precautions: As recommended by pavement sealer material manufacturer.

D. Asphalt Concrete Overlay Paving:

1. Comply with State Specifications, 39-6 except as modified below.

2. Grind or remove existing asphalt concrete paving at limits of overlay paving to provide a minimum 1 1/2" overlay thickness. Limits of grinding or removal shall be field verified to insure that finished paving surface will have a one percent minimum slope.
 3. Thoroughly clean surface to remove vegetation, dirt, sand, gravel and water from surface and from cracks. Vegetation shall be treated 7 days prior to removal with an herbicide.
 4. Cracks greater than 1 inch shall be filled with hot mix asphalt and rolled and compacted. Cracks less than one inch shall be filled with crack filler. Potholes shall be filled with hot-mix rolled and compacted. Contractor shall have Engineer approve crack and pothole repair prior to overlay. Provide leveling courses of hot mix asphalt as required to achieve finish grades shown on the drawings.
 - a. Cracks less than one inch in width shall be level after curing. Contractor shall make multiple filling applications as necessary to achieve a level condition.
 5. Place overlay when ambient air temperature is 40 degrees F. and rising, and when pavement is dry.
 6. An asphalt tack coat shall be applied to existing surface area at a rate of 0.20 gallons per square yard. Application width shall be width of fabric plus 2 to 6 inches.
 7. Place, spread and compact asphalt overlay to provide a minimum density of 95% of maximum theoretical unit weight as determined by California Test Method #304. Maximum variation 1/8" in 10' when measured with steel straight edge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix. Minimum compacted overlay thickness 1 1/2 inches.
- E. Pavement Marking: pavement markings shall be done only after the seal coat has thoroughly dried. Existing surfaces to be striped with traffic paint shall be cleaned of dust, dirt, grime, oil, rust or other contaminants which will impair the quality of work or interfere with proper bond of paint coats. Surfaces shall be thoroughly cleaned by whatever means necessary that will satisfactorily accomplish the purpose without damage to asphalt concrete. Provide measured layouts, temporary markings, templates, and other means necessary to provide required marking. Prepare and apply paint in accordance with manufacturer's instructions; paint shall be applied by spray and shall achieve complete coverage free from voids and thin spots. Where indicated on the Drawings, paint parking stall strips, lettering, arrows, accessible symbols, playfield markings, etc. on asphalt concrete paving. Paint strips shall be 4 inches wide (except otherwise indicated) and applied with two (2) coats of herein specified Traffic Line Paint; white (except as otherwise specified or indicated).
1. Paints shall be delivered to the site in unopened containers.
 - a. Paint shall not be diluted, or watered down.
 - b. Paint shall be applied in 10-12 wet mil thickness (4-6 mil dried). Each

coat thickness shall be verified by the project inspector.

2. International Accessible Symbol: Symbol shall be white figures on a blue background. Blue shall be equal to PMS 293C. Lines and symbols shall be accurately formed and true to line and form; lines shall be straight and uniform in width. Painted edges shall be clean cut and free from raggedness, and corners shall be cut sharp and square. Tolerances: Apply striping within a tolerance 1/2 inch in 50 feet. Apply markings and striping to widths indicated with a tolerance of 1/4 inch on straight sections and 1/2 inch on curved sections.

F. Colors: As directed by Architect

G. Precast Concrete Bumpers: Install in location where shown, using steel rebar dowels, and epoxy.

3.4 DEFECTIVE ASPHALT

A. Defective asphalt is as described below.

1. Exposed rock pockets on the finished surface that lack the # 8- #200 fines that is required per the sieve analysis.
2. Asphalt not placed to the design grades.
3. Asphalt that ponds water.
4. Asphalt that was compacted below the minimum required temperature and is cracked.
5. Asphalt that fails to meet the minimum compaction requirements.
6. Asphalt that lacks the minimum thickness required per plan.
7. New asphalt contaminated by a petroleum product, or spilled paint.
8. Asphalt that has depressions, cracks, scored divits from dumpster wheels, heavy equipment use, heavy construction products,
9. Asphalt placed on pumping, unstable sub-grades.

3.5 CLEANING

A. Refer to Section 01 74 00.

B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

C. Clean excess material from surface of all concrete walks and utility structures.

END OF SECTION.

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SECTION 32 12 36 – SITE / PARKING SIGNAGE

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: Site / Parking Signage

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00 – Temporary Facilities and Controls.
- C. Section 32 12 00 – Asphalt Paving

1.3 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556 – Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D3017 – Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D4318 – Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction and shall not begin until all of those governing authorities have been notified.

1.4 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. Regulatory Requirements: The following shall comply with requirements of the ADA Standards for Accessible Design and the 2022 California Building Code, Chapter 11B.

1. 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 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Shop Drawings – Signage: Provide for signage. No installation shall take place until submittal has been reviewed and returned.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install concrete sign footings on muddy subgrade, during wet weather, or when atmospheric temperature is below 40 degrees F.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- C. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- D. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- E. Any construction review of the Contractor's performance conducted by the owner's representative is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- F. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water

during entire progress of work, regardless of cause, source, or nature of water.

- G. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- H. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

1.8 TESTING

- A. General: Refer to Section 01 45 00 – Quality Control.

1.9 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

PART 2 – PRODUCTS

2.1 SITE SIGNAGE

- A. Provide and erect site signage at the locations shown in the drawing and drawing detail(s)
 - 1. Products:
 - a. Sign Post: 1-1/2" (1.90" O.D.) Sch. 40 Galv. Pipe
 - b. Post Cap: 1-1/2" (1.90" I.D.) Galv. Domed Cap
 - c. Sign Brackets: U-Clamp steel plate bracket with bolts sized for 1-1/2" 1.90" O.D.) pipe. 2 per sign.
 - d. Sign Post Sleeve: 2" (2.38" O.D.) Sch. 40 Galv. Pipe with 3/8 X 3" bolt & Nut.
 - e. Concrete Footing: 4 sack, 2500 psi
 - f. "Stop" Sign: MUTCD; R1-1
 - g. "Accessible Parking Sign" with \$250 Fine: MUTCD (Ca) R99C
 - h. Accessible Parking Lot Entrance Sign: MUTCD (Ca) R100B
 - i. "Van Accessible" Sign: MUTCD (Ca) R7-8b
 - j. "Passenger Loading Zone Only" Sign: G-66 RA5
 - k. Sign Sleeve Through Bolt: 3/8" zinc plated bolt, nut, and lock washer.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine areas to receive concrete sign footings:
 - 1. Absence of wet receiving surfaces or other conditions to adversely affect execution of his work.
 - 2. No foreseeable rain within 72 hrs. after application.
 - 3. Daytime temperatures of 50 degrees and rising.
- B. Do not start work until unsatisfactory conditions have been corrected and/or daytime temperatures are maintained above the minimum.

3.2 INSTALLATION

- A. Pier Footings shall be per diameter and depth shown in the drawing detail.
- B. Pier shall crown 1" higher in the center than the surrounding finish grade except when installing the post in a lawn area, the last 4" to the top of the pier shall be 12"x12" square. The top shall match the adjacent sidewalk elevation with a 1" crown higher in the center.
- C. Sleeves and posts shall be installed to within 1/8" of plumb in 80".
- D. Top of sleeves shall be placed no greater than 3" and no less than 2" above finish grade with a 7/16" hole for the through bolt.
- E. All sleeves and posts shall be placed so the post top is no greater than 3" but no less than 2" taller than top of the highest mounted sign.
- F. All signage shall be mounted to 80" (6'-8") to the bottom of the sign(s) measured from finish grade. Exception: The parking lot accessible entrance signage shall be mounted no less than 36" and no greater than 40" when placed within a "Planter", otherwise it shall be installed at 80" to the bottom of the sign.
- G. The accessible parking lot entrance sign shall have the name of the code enforcing agency along with the phone number. This information shall be an integral part of the sign when ordered.
- H. All posts shall have post caps installed and locked down by set screw. Glue on is not acceptable.

3.3 PROTECTION

- A. Provide barricades, warning signs and devices as required to protect signage during installation and concrete footing curing.

3.4 WORKMANSHIP

- A. Provide best quality workmanship, performed by skilled tradesman.

- B. Perform work under conditions best suited to the production of acceptable work.
- C. All work will be subject to approval by SCUSD representative. Correct all work, which does not comply with the intent of the specification.
- D. Protect all adjacent areas and surfaces (i.e., cars in parking lot, patio furniture) from damage (i.e., spills, debris, etc.).
- E. Ensure that area is protected with caution tape or snow fence before work is started.
- F. Immediately clean up any accidents and restore the affected surface to its original condition.
- G. Provide a clean and liability-free work area.
- H. The Contractor shall take all necessary steps to protect the public and all property concerned.

3.5 CLEANING

- A. Refer to Section 01 77 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean excess material from surface of all concrete walks and utility structures.

END OF SECTION.

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SECTION 32 16 00 – SITE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. The Section describes the requirements for providing portland cement concrete paving, including accessibility ramps, sidewalks, accessible routes of travel, vehicular travel, drain structures, sewer structures, thrust blocks and for other non-structural or non-vehicular applications.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 01 50 00, Construction Facilities and Temporary Controls.
- C. Section 310000, Earthwork.
- D. Section 313200, Soil Stabilization.

1.3 REFERENCES AND STANDARDS

- A. California Building Code, latest edition.
- B. ACI Standards, ACI 211.1, ACI 318-14, ACI 302, IR-04, ACI 301-16, ACI 305R-10, ACI 306R-16, ACI 308-16.
- C. ASTM International:
 1. ASTM C94, Specification for Ready-Mixed Concrete.
- D. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice (latest edition).

1.4 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Materials list: Submit to the Architect a complete list of all materials proposed to be used in this portion of the work. Submitted items should include but are not limited to sand, gravel, admixtures, surface treatments, coloring agents, sealers, fibers, cast-in-place accessories, forming and curing products and concrete mix designs.
- D. With concrete submittal, provide documented history of mix design performance.

1.5 QUALITY ASSURANCE

- A. Use only new materials and products.
- B. Use materials and products of one manufacturer whenever possible.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- D. Sieve analysis from testing laboratories identifying rock/sand percentages within the concrete mix; or class 2 aggregate base shall have the current project name and project location identified on the report. Outdated analytical reports greater than 90 days old will not be accepted

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver undamaged products to job in manufacturer's sealed containers and/or original bundles with tags and labels intact.
- B. Store materials in protected, dry conditions off of ground and in areas so as to not interfere with the progress of the work.
- C. Transport, store and handle in strict accord with the manufacturer's written recommendations.
- D. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.
- E. Store cement in weather tight building, permitting easy inspection and identification. Protect from dampness. Lumpy or stale cement will be rejected.
- F. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregate. Use only one supply source for each aggregate stock pile.

1.7 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.8 TESTING

- A. General: Refer to Section 01 40 00 – Quality Requirements.
- B. Cement and Reinforcing shall be tested in accordance with CBC Section 1910A. Testing of reinforcing may be waived in accordance with Section 1910A.2 when approved by the Structural Engineer and DSA.

1.9 ADEQUACY AND INSPECTION

- A. 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.

- B. Notify Inspector, Architect and DSA at least 48 hours prior to placing of concrete.

1.10 PROTECTION

- A. Finish surfaces shall be protected at all times from concrete pour. Inspect forming against such work and establish tight leak-proof seal before concrete is poured. Finish work damaged, defaced or vandalized during the course of construction shall be replaced by contractor at contractor expense.

1.11 FIELD MEASUREMENTS

- A. Make and be responsible for all field dimensions necessary for proper fitting, slopes and completion of work. Report discrepancies to Architect before proceeding.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Cement: Portland cement, ASTM C150, Type II, per ACI 318-14 Section 26.4.
- B. Concrete Aggregates: Normal weight aggregates shall conform to ASTM C33, except as modified by this section. Combined grading shall meet limits of ASTM C33. Lightweight aggregate shall conform to ASTM C330, suitably processed, washed and screened, and shall consist of durable particles without adherent coatings.
- C. Water: Clean and free from deleterious amounts of acids, alkalis, scale, or organic materials and per ACI 318-14 Section 26.4.1.3.1.
- D. Fly Ash: Western Fly Ash, conforming to ASTM C618 for Class N or Class F materials (Class C is not permitted). Not more than 15% (by mass) may be substituted for portland cement.
- E. Water Reducing Admixture: Admixture to improve placing, reduce water cement ratio, and ultimate shrinkage may be used. Provide WRDA 64 by Grace Construction Products or approved equal. Admixture shall conform to ASTM C494 and ACI 318-14 Section 26.4.1.4.19(a). Such admixture must receive prior approval by the Architect, Structural Engineer, and the Testing Lab, and shall be included in original design mix.
- F. Air-entraining Admixture: Daravair 1000 by Grace Construction Products or approved equal. Admixture must conform to ASTM C260 and ACI 318-14, section 26.4.1.4.
- G. Surface Retarder (for exposed aggregate finishes): Rugasol-S by Sika Corporation or approved equal.
- H. Form Coating: Material which will leave no residue on concrete surface that will interfere with surface coating, as approved by the Architect.
- I. Reinforcement Bars: New billet steel deformed bars conforming to requirements of

ASTM A615 or ASTM A706; Grade 60. Dowels for installation through expansion joints or construction joints to existing sidewalks or concrete features shall be smooth or shall be sleeved on one end for slippage.

- J. Reinforcing supports: Galvanized metal chairs or spacers or metal hangers, accurately placed 3'-0" O.C.E.W. Staggered and each support securely fastened to steel reinforcement in place. Bottom bars in footings may be supported with 3" concrete blocks with embedded wire ties. Concrete supports without wire ties will not be allowed.
- K. Truncated Domes: Vitrified Polymer Composite (VPC), Cast-In-Place Detectable/Tactile Warning Surface Tiles; "Armor-Tile", "Access Tile Tactile Systems", or approved equal. Tiles shall comply with Americans with Disabilities Act and the California Code of Regulations (CCR) Title 24, Part 2, Chapter 11B (dome spacing shall be 2.35"). Install tiles as recommended by manufacturer. Color, federal yellow (FS 33538).
- L. Curing Compound (for exterior slabs only): Burke Aqua Resin Cure by Burke by Edoco, 1100 Clear by W.R. Meadows or accepted equal. Water based membrane-forming concrete curing compound meeting ASTM C 309 and C1315.
- M. Concrete Bonding Agent: Weld-Crete by Larson Products Corp., Daraweld C by Grace Construction Products or accepted equal.
- N. Patching Mortar: Meadow-Crete GPS, one-component, trowel applied, polymer enhanced, shrinkage-compensated, fiber reinforced, cementitious repair mortar for horizontal, vertical and overhead applications as manufactured by W.R. Meadows or accepted equal.
- O. Non-shrink Grout: Masterflow 713 Plus by Master Builders or approved equal. Premixed, non-metallic, no chlorides, non-staining and non-shrinking per CRD-C621, Corps of Engineers Specification and ASTM C 1107, Grades B and C.
- P. Aggregate Base: Class 2 AB per Caltrans specification section 26-1.02A.
- Q. Expansion Joint Material: Preformed 3/8" fiber material, full depth of concrete section, with bituminous binder manufactured for use as concrete expansion joint material, as accepted by the Architect.
- R. Joint sealant for expansion joints: Single component silicone sealant, Type S, ASTM D5893.
 - 1. Reference Standard: ASTM C920, Grade P, Class 25, Use T.
 - 2. Dow Corning 890-SL (self-leveling) Silicone, or accepted equal.
 - 3. Dow Corning 888-NS (non-sagging) Silicone, at slopes exceeding 5%. May not be used at asphalt surfaces.
 - 4. Color: Custom color as selected by Architect.
- S. Pre- Formed plastic Expansion Joint; W.R. Meadows 3/8" "Snap Cap", Tex-Trude expansion joint cap, or an approved equal.

- T. Adhesive Anchoring (Epoxy): Hilty HIT-HY 200 Safe Set, or approved equal.

2.2 CONCRETE DESIGN AND CLASS

- A. Class "B": Concrete shall have 1" max. size aggregate, shall have 3000 psi min. at 28 day strength with a maximum water to cementitious ratio no greater than 0.50. Use for exterior slabs, including walks, vehicular paved surfaces, manhole bases, poured-in-place drop inlets, curbs, valley gutters, curb & gutter and other concrete of like nature.
- B. Slump Limits: Provide concrete, at point of final discharge, of proper consistency determined by Test Method ASTM C143 with a slumps of 4" plus or minus 1".
- C. Mix Design: All concrete used in this work will be designed for strength in accordance with provisions of ASI 318-14 Section 26.4. Should the Contractor desire to pump concrete, a modified mix design will need to be submitted for review. Fly ash may be used in concrete to improve workability in amounts up to 15% of the total cementitious weight.
- D. Air Entrainment; Per the Local Jurisdiction minimum requirements, or 3% minimum.

2.3 MIXING OF CONCRETE

- A. Conform to requirements of CBC, Chapter 19A.
- B. All concrete shall be mixed until there is uniform distribution of material and mass is uniform and homogenous; mixer must be discharged completely before the mixer is recharged.
- C. Concrete shall be Ready-mixed Concrete: Mix and deliver in accordance with the requirements set forth in ASTM C94 and ACI 301. Batch Plant inspection may be waived in accordance with CBC Section 1705A.3.3.1, when approved by Structural Engineer and DSA.
1. Approved Testing Laboratory shall check the first batching at the start of the work and furnish mix proportions to the Licensed Weighmaster.
 2. Licensed Weighmaster to positively identify materials as to quantity and to certify to each load by ticket.
 3. Ticket shall be transmitted to Project Inspector by truck driver with load identified thereon. Project Inspector will not accept load without load ticket identifying mix and will keep daily record of pours, identifying each truck, its load and time of receipt and will transmit two copies of record to DSA.
 4. At end of project, Weighmaster shall furnish affidavit to DSA on form satisfactory to DSA, certifying that all concrete furnished conforms in every particular and to proportions established by mix designs.
 5. Placement of concrete shall occur as rapidly as possible after batching and in a manner which will assure that the required quality of the concrete is maintained. In no case may concrete be placed more than

90 minutes from batch time.

6. Water may be added to the mix only if neither the maximum permissible water-cement ratio nor the maximum slump is exceeded. In no case shall more than 10 gallons of water shall be added to a full 9 yard load, or 1 gal. per yard on remaining concrete within the drum providing load tag indicates at time of mixing at plant will allow for additional water.

2.4 MATERIALS TESTING

- A. Materials testing of concrete and continuous batch plant inspection may be waived in accordance CBC Sections 1704A.4.4 when approved by Structural Engineer and DSA.
- B. Testing of concrete shall be performed per article 3.12 of this specification.

2.5 EQUIPMENT

- A. Handling and mixing of concrete: Project Inspector may order removal of any equipment which in his opinion is insufficient or in any way unsuitable.

PART 3 – EXECUTION

3.1 APPROVAL OF FORMS AND REINFORCEMENTS

- A. Forms and reinforcements are subject to approval by the Project Inspector, and notice of readiness to place first pour shall be given to DSA, Architect and Structural Engineer 48 hours prior to placement of concrete. Before placing concrete, clean tools, equipment and remove all debris from areas to receive concrete. Clean all reinforcing and other embedded items off all coatings oil, and mud that may impair bond with concrete.
- B. All reinforcing steel shall be adequately supported by approved devices on centers close enough to prevent any sagging.
- C. All reinforcing bar lap splices shall be staggered a minimum of 5 ft.
- D. Additional reinforcing steel shall be placed around all utility boxes, valve boxes, manhole frames and covers that are located within the concrete placements.
 1. The bars shall be placed so that there will be a minimum of 1 ½" clearance and a maximum of 3" clearance. The reinforcing steel shall be placed mid-depth of concrete slab.
- E. At all right angles or intersections of concrete walks, additional 2'x2' #5, 90 degree bars shall be added at all inside corners for additional crack control. The bars shall be placed 2" from concrete forms and supports at mid-depth of slab.

3.2 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.
- C. Sub-Grade in vehicular concrete paved areas: Subgrade shall be clean, shaped and compact to hard surface free from elevations or depressions exceeding 0.05' in 10' from true plan. Compact per Section 31 00 00. Compaction and moisture content shall be verified immediately prior to placement of concrete. Proof roll subbase in presence of geotechnical engineer prior to placement of aggregate base.

3.3 CLEANING

- A. Reinforcement and all other embedded items at time of placing concrete to be free of rust, dirt oil or any other coatings that would impair bond to concrete.
- B. Remove all wood chips, sawdust, dirt, loose concrete and other debris just before concrete is to be poured. Use compressed air for inaccessible areas. Remove all standing water from excavations.

3.4 FORMING

- A. Form material shall be straight, true, sound and able to withstand deformation due to loading and effects of moist curing. Materials which have warped or delaminated, or require more than minor patching of contact surfaces, shall not be reused.
- B. Build forms to shapes, lines, grades and dimensions indicated. Construct form work to maintain tolerances required by ACI 301. Forms shall be substantial, tight to prevent leakage of 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 and recesses to neat, straight lines. Construct forms for easy removal without hammering, wedging or prying against concrete.
- C. Space clamps, ties, hangers and other form accessories so that working capacities are not exceeded by loads imposed from concrete or concreting operations.
- D. Build openings into vertical forms at regular intervals if necessary to facilitate concrete placement, and at bottoms of forms to permit cleaning and inspection.
- E. Build in securely braced temporary bulkheads, keyed as required, at planned locations of construction joints.
- F. Slope tie-wires downward to outside of wall.
- G. Brace, anchor and support all cast-in items to prevent displacement or distortion.
- H. During and immediately after concrete placing, tighten forms, posts and shores. Readjust to maintain grades, levels and camber.
- I. Concrete paving, Curbs, Curb and Gutters, Ramps:
 - 1. Expansion Joints: Install at locations indicated, and so that maximum distance between joints is 20' for exterior concrete unless otherwise shown. Expansion joint material shall be full depth of concrete section. Recess for

backer rod and sealant where required. Expansion joints shall not exceed $\frac{1}{4}$ inch depth measured from finish surface to top of felt or sealant, and $\frac{1}{2}$ inch width.

2. Curbs, Valley Gutter, and Curb & Gutter: Install expansion joints at 60' on center, except when placing adjacent to concrete walks, the expansion joints shall align with the expansion joints shown for the concrete walks. Expansion joint material shall be full depth of concrete section. Recess for backer rod and sealant will be required.
3. Isolation Joints: $\frac{3}{8}$ " felt between walls and exterior slabs or walks so that paved areas are isolated from all vertical features, unless specifically noted otherwise on plans.
4. Exterior Concrete Paving: Install expansion joints at 20' on center maximum, both directions, unless shown otherwise on plans.
5. Ramps; whether shown or not all ramps shall have control joints and expansion joints.
 - a. Control joints on ramps shall be aligned and be placed in between with the vertical posts for the handrails. The curbs, if required shall have control joints that align with the handrail posts.
 - b. Expansion joints shall be placed at the upper, intermediate, and bottom landings.

3.5 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.
- B. Before re-using form material, inspect, clean thoroughly and recoat.
- C. Seal all cut edges.

3.6 INSTALLATION

- A. General: Reinforcement shall be accurately placed at locations indicated on the drawings within required tolerances and providing required clearances. Reinforcement shall be secured prior to placement of concrete such that tolerances and clearances are maintained. Coverage shall be in accordance with Section 1907A.7 of the CBC. Keep a person on the job to maintain position of reinforcing as concrete is placed. Reinforcement must be in place before concreting is begun. Install dowels as shown on drawings. Give notice whenever pipes, conduits, sleeves, and other construction interferes with placement; obtain method of procedure to resolve interferences. All expansion and construction joints in concrete shall have dowels of size and spacing as shown, or as approved by Architect.
- B. Placing Tolerances:
 1. Per ACI 301 or CRSI/WCRSI Recommended Practice for Placing Reinforcing

Bars, unless otherwise shown.

2. Clear distance between parallel bars in a layer shall be no less than 1", the maximum bar diameter not 1 ½ times the maximum size of coarse aggregate.

C. Splices:

1. General: Unless otherwise shown on drawings, splice top reinforcing at midspan between supports, splice bottom reinforcing at supports and stagger splices at adjacent splices 5 foot minimum. Bar laps shall be wired together. Reinforcing steel laps shall be as follows:
 - a. Lap splices in concrete: Lap splice lengths shall not be less than 62 bar diameter for No. 5 bar, 56" minimum for No. 6 bars. No. 4 bar shall have a minimum of 24" splice. 93 bar diameters for No. 7 bars and larger.
 - b. All splices shall be staggered at 5 feet minimum.

3.7 INSPECTION

- A. Approval of reinforcing steel, after installation, must be received from Inspector. Architect, Structural Engineer and DSA must be notified 48 hrs. in advance of beginning of concrete placement operations.
- B. Slope of concrete forms and finish condition shall be checked with a two foot (2') digital level.

3.8 PLACING OF CONCRETE

- A. Adjacent finish surfaces shall be protected at all times during the concrete pour and finishing. Verify that all formwork is tight and leak-proof before concrete is poured. Finish work defaced during the concrete pour and finishing shall be replaced at no extra cost to the owner.
- B. Transport concrete from mixer to place of final deposit as rapidly as practicable by methods which will prevent separation or loss of ingredients. Deposit as close as practicable in final position to avoid re-handling or flowing. Partially hardened concrete must not be deposited in work. Concrete shall not be wheeled directly on top of reinforcing steel.
- C. Placing: Once started, continue concrete pour continuously until section is complete between predetermined construction joints. Prevent splashing of concrete onto adjacent forms or reinforcement and remove such accumulation of hardened or partially hardened concrete from forms or reinforcement before work proceeds in that area. Free fall of concrete shall not to exceed 4'-0" in height. If necessary, provide lower openings in forms to inject concrete and to reduce fall height.
- D. Remove form spreaders as placing of concrete progresses.
- E. Place footings as monolithic and in one continuous pour.

- F. Keep excavations free of standing water, but moisture condition sub-grade before concrete placement.
- G. Compacting: All concrete shall be compacted by mechanical vibrators. Concrete shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms. Vibrating shall not be applied to concrete which has already begun to initially set nor shall it be continued so long as to cause segregation of materials.
- H. Concrete Flatwork:
 - 1. All flatwork shall be formed and finished to required line and grades. Flatwork shall be true and flat with a maximum tolerance of 1/8" in 10' for flatness. Flatwork which is not flat and are outside of the maximum specified tolerances shall be made level by the Contractor at no additional expense to the Owner.
 - 2. Thoroughly water and soak the flatwork subgrade as required to achieve required moisture content prior to the concrete pour. Provide damming as required to keep water within the formed area and to allow for proper saturation of the subgrade.
 - 3. Concrete vibrator shall be used to assist concrete placement. Contractor shall have spare concrete vibrator on site during concrete placement.
- I. Placing in hot weather: Comply with ACI 305R-10. Concrete shall not exceed 85 degrees F at time of placement. Concrete shall be delivered, placed and finished in a sufficiently short period of time to avoid surface dry checking. Concrete shall be kept wet continuously after tempering until implementation of curing compound procedure in accordance with this specification.
- J. Placing in cold weather: Comply with ACI 306R-16. Protect from frost or freezing. No antifreeze admixtures are permitted. When deposited concrete during freezing or near-freezing weather, mix shall have temperature of at least 50 degrees F but not more than 90 degrees F. Concrete shall be maintained at temperature of at least 50 degrees F for not less than 72 hours after placing or until it has thoroughly hardened. Provide necessary thermal coverings for any flat work exposed to freezing temperatures.
- K. Horizontal construction joint: Keep exposed concrete face of construction joints continuously moist from time of initial set until placing of concrete; thoroughly clean contact surface by chipping entire surface not earlier than 5 days after initial pour to expose clean hard aggregate solidly embedded, or by approved method that will assure equal bond, such as green cutting. If contact surface becomes contaminated with soil, sawdust or other foreign matter, clean entire surface and re-chip entire surface to assure proper adhesion.

3.9 CONCRETE FINISHES

- A. Concrete Slab Finishing: Finish slab as required by ACI 302.1R. Use manual screeds, vibrating screeds to place concrete level and smooth. Use "jitterbugs" or other special tools designed for the purpose of forcing the coarse aggregate below the surface leaving a thick layer of mortar 1 inch in thickness. Surface shall be free from trowel marks, depressions, ridges or other blemishes. Tolerance for flatness

shall be 1/8" in 10'. Provide final finish as follows:

1. Flatwork, medium broom finish: Typical finish to be used at all exterior walks and stairs.
 2. Ramps, heavy broom finish: Concrete surfaces with slope greater than 5% including all ramps. Brooming direction shall run perpendicular to slope to form non-slip surface
 3. Under no circumstances can water be added to the top surface of freshly placed concrete.
- B. Curb Finishing: Steel trowel.
- C. Joints and Edges: Mark-off exposed joints, where indicated, with 1/4" radius x 1" deep jointer or edging tool. Joints to be clean, cut straight, parallel or square with respect to concrete walk edge. Tool all edges of exposed expansion and contraction joints, walk edges, and wherever concrete walk adjoins other material or vertical surfaces.
1. The expansion joints shall be full depth as shown in the plan details. Failure to do so will result in non-compliance and shall be immediately machine cut by the contractor at his expense.
- D. Exposed Concrete Surface Finishing (not including top surface of flatwork): Remove fins and rough spots immediately following removal of forms from concrete which is to be left exposed. Damaged and irregular surfaces and holes left by form clamps and sleeves shall be patched with grout. Tie wires are to be removed to below exposed surface and holes pointed up with neat cement paste similar to procedure noted under "Patching" below. Removal of tie wires shall extend to distance of 2" below established grade lines. Ends of tie wires shall be cut off flush at all other, unexposed locations. Care shall be taken to match adjacent finishes of exposed concrete surface. After patching, all concrete that is to remain exposed, shall be sacked with a grout mixture of 1-part cement, 1 1/2- parts fine sand and sufficient water to produce a consistency of thick paint. After first wetting the concrete surface, apply mixture with a brush and immediately float entire surface vigorously using a wood float. Keep damp during periods of hot weather. When set, excess grout shall be scraped from wall with edge of steel trowel, allowed to set for a time, then wiped or rubbed with dry burlap. Entire finishing operation of any area shall be completed on the same day. This treatment shall be carried to 4" below grade, and all patching and sacking shall be done immediately upon removal of the forms.
- E. Stair Treads and Risers: Tool exterior stair tread nosing per ADA requirements and as detailed. Paint or stain tooled area at every stair tread nosing or as detailed. Stair tread nosing shall contain no pockets, voids or spalls. Patching is not allowed. Damaged nosing shall be replaced.

3.10 CURING

- A. Cured Concrete in Forms: Keep forms and top on concrete between forms continuously wet until removal of forms, 7 days minimum. Maintain exposed concrete in a continuous wet condition for 14 days following removal of forms.
- B. Flatwork/Variable Height Curbs, Curb and gutter, Valley Gutter: Cure utilizing Curing

Compound. If applicable, the Contractor shall verify that the approved Curing Compound is compatible with the approved colorant system. Upon completion of job, wash clean per manufacturer's recommendations.

1. Curing compound shall be applied in a wet puddling application. Spotty applications shall be reason for rejection and possibly concrete removal and replacement at the contractor's expense with no compensation from the owner.
- C. No Curing Compound shall be applied to areas scheduled to receive resilient track surface including, curbs, ramps, run ways, etc.

3.11 DEFECTIVE CONCRETE

- A. Determination of defective concrete shall be made by the Architect or Engineer. His opinion shall be final in identifying areas to be replaced, repaired or patched.
- B. The Owner reserves the right to survey the flatwork, if it is determined to be outside of the maximum tolerance for flatness. If the flatwork is found to be out of tolerance, then the Contractor will be required to replace concrete. The Contractor will be responsible for reimbursing the Owner for any surveying costs incurred. Determination of flatwork flatness, surveying and any remedial work must be completed far enough in advance so that the project schedule is maintained, delays are avoided and the new flatwork or flatwork repairs are properly cured.
- C. As directed by Architect, cut out and replace defective concrete. All defective concrete shall be removed from the site. No patching is to be done until surfaces have been examined by Architect and permission to begin patching has been provided.
- D. Permission to patch any area shall not be considered waiver of right, by the Owner, to require removal of defective work, if patching does not, in opinion of Architect, satisfactorily restore quality and appearance of surface.
- E. Defective concrete is:
1. Concrete that does not match the approved mix design for the given installation type.
 2. Concrete not meeting specified 28-day strength.
 3. Concrete which contains rock pockets, voids, spalls, transverse cracks, exposed reinforcing, or other such defects which adversely affect strength, durability or appearance.
 4. Concrete which is incorrectly formed, out of alignment or not plumb or level.
 5. Concrete containing embedded wood or debris.
 6. Concrete having large or excessive patched voids which were not completed under Architect's direction.
 7. Concrete not containing required embedded items.

8. Excessive Shrinkage, Traverse cracking, Crazeing, Curling; or Defective Finish. Remove and replace if repair to an acceptable condition is not feasible.
 9. Concrete that is unsuitable for placement or has set in truck drum for longer than 90 minutes from the time it was batched.
 10. Expansion joint felt that is not isolating the full depth of the concrete section, and recessed as required for backer rod and sealant where required.
 11. Concrete that is excessively wet or excessively dry and will not meet the minimum or maximum slump required per mix design.
 12. Finished concrete with oil stains from equipment use, and or rust spots that cannot be removed.
 13. Control joints (weakened planed joints) that do not meet the required minimum depth shown on the drawings.
- F. Patching: Install specified Patching Mortar per manufacturer's recommendations. REPAIRS TO DEFECTIVE CONCRETE WHICH AFFECT THE STRENGTH OF ANY STRUCTURAL CONCRETE MEMBER OR COMPONENT ARE SUBJECT TO APPROVAL BY THE ARCHITECT AND DSA.

3.12 CONCRETE TESTING

- A. Comply with CBC Section 1903A, 1905A.1.16, 1910A and 1705A.3 and as specified in B. below. Costs of tests will be borne by the Owner.
- B. Four identical cylinder samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards of concrete, or not less than once for each 2,000 square feet of surface area for slabs or walls. In addition, samples for strength tests for each class of concrete shall be taken for seven-day tests at the beginning of the concrete work or whenever the mix or aggregate is changed.
- C. Strength tests will be conducted by the Testing Lab on one cylinder at seven (7) days and two cylinders at twenty-eight (28) days. The fourth remaining cylinder will be available for testing at fifty-six (56) days if the 28-day cylinder test results do not meet the required design strength.
- D. On a given project, if the total volume of concrete is such that the frequency of testing required by paragraph B. above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
- E. Cost of retests and coring due to low strength or defective concrete will be paid by Owner and back-charged to the Contractor.
- F. Each truck shall be tested for slump before concrete is placed.

3.13 REMOVAL OF FORMS

- A. Remove without damage to concrete surfaces.
- B. Sequence and timing of form removal shall insure complete safety of concrete structure.
- C. Forms 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 degrees F and above.
 - 1. Vertical forms of foundations, walls and all other forms not covered below: 5 days.
 - 2. Slab edge screeds or forms: 7 days.
 - 3. Concrete columns and beam soffits: 28 days.
- D. Concrete shall not be subjected to superimposed loads (structure or construction equipment) until it has attained its full design strength and not for a period of at least 21 days after placing. Concrete systems shall not be subjected to construction loads in excess of design loads.

3.14 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean excess material from surface of all concrete walks and utility structures.
- D. Power wash all concrete surfaces to remove stains, dried mud, tire marks, and rust spots.

END OF SECTION.

SECTION 32 18 16 – POURED IN PLACE PLAYGROUND SAFETY SURFACING

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 WORK INCLUDED

- A. Provide all labor, materials, and tools necessary for the complete installation of a poured in place safety surfacing system composed of a wearing layer upper membrane and an underlying impact attenuation cushion layer as outlined in these specifications. The system should consist of but not necessarily be limited to the following:
 - 1. Section Includes: Resilient playground surfacing poured in place system.
 - 2. Related Work: Playground equipment and resilient playground surfacing subbase.
 - 3. Quality Assurance: Manufacturer should have manufactured, and installed playground poured in place safety surfaces for a minimum of 5 years and meet current ASTM F1292 Test Criteria. The installation of the poured in place product should be completed by FLEXGROUND. Manufacturer's detailed installation procedures should be submitted to the Architect and made part of the Bid Specifications.

1.3 RELATED SECTIONS

- A. Division 31 Sections.
- B. Division 32 Sections.

1.4 REFERENCES AND STANDARDS

- A. Poured in Place Playground Safety Surfacing must meet or exceed all required ASTM standards below.
 - 1. ASTM C1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
 - 2. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
 - 3. ASTM D624 – Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - 4. ASTM D2859 – Standard Test Method for Flammability of Finished Textile Floor Covering Materials

5. ASTM E303 – Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
6. ASTM F1292 – Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
7. ASTM F1951 – Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.5 DEFINITIONS

- A. EPDM granules: EPDM rubber (ethylene propylene diene monomer(M-class) rubber), a type of synthetic rubber, is an elastomer characterized by a wide range of applications. The M refers to its classification in ASTM D1418; the M class includes rubbers having a saturated chain of the polymethylene type.
- B. Critical Fall Height: A critical fall height (CFH) is the maximum height of fall from play equipment to the ground. It is important to note that safety surfaces do not prevent injury but aim to lessen the severity of any injury that may occur on falls from height.
- C. Fall Height: Fall height is a measurement defined as the “vertical distance between a designated play surface and the protective surfacing beneath it.
- D. TPV: Thermoplastic Vulcanized Elastomer. Developed using resin and synthetic rubber with higher UV stabilization.
- E. SBR: Styrene-butadiene or styrene-butadiene rubber (SBR) describe families of synthetic rubbers derived from styrene and butadiene

1.6 SUBMITTALS

- A. Prospective manufacturers and/or installers of the poured in place safety surfacing system should be required to comply with the following:
 1. The manufacturer must be experienced in the manufacturing of a poured in place safety surfacing system and provide references of five (5) specific installations in the last three (3) years.
 2. The installer must provide competent workmen skilled in this specific type of poured in place safety surfacing system installation. The designated supervisory personnel on the project must be competent in the installation of this material, including mixing of the materials, and spreading and compacting the materials correctly.
 3. Installation should be in accordance with ASTM F1292 for Impact Attenuation of surface system under and around playground equipment. The poured in place system to be installed in compliance with the Critical Fall Height as determined by the Playground Equipment.
 4. IPEMA Certification specific to poured in place safety surfacing.
 5. IPEMA certification specific to 1/2" layer of 1-4mm TPV over cushion layer. 0.5mm TPV or EPDM IPEMA certification not acceptable.

6. Manufacturer should provide written instructions for recommended maintenance practices.
7. Manufacturer should submit color samples for customer verification. Color samples shall be 6" x 6" of 1/2" top wearcourse layer with aromatic or aliphatic binder, per client selection or specification: or 8 oz clear plastic jars with specified colored granules. Sample submittal format per client preference.

1.7 WARRANTY AND MAINTENANCE

- A. The bidder and/or poured in place safety surfacing manufacturer must provide the following:
 1. The poured in place safety surfacing manufacturer should provide a warranty to the owner that covers defects in materials and workmanship of the rubber for a period of FIVE (5) years from the date of Substantial Completion.
 2. The manufacturer's warranty should include general wear and tear. The warranty should specifically exclude vandalism, high heel punctures, acts of war or acts of nature beyond the control of the owner or the manufacturer.
 3. All poured in place warranties should be limited to repair or replacement of the affected areas and should include all necessary materials, labor, transportation costs, etc. to complete said repairs. All warranties are contingent on the full payment by the owner of all pertinent invoices and adherence to any required maintenance procedures.
 4. The installer should clean the jobsite of excess materials and, if necessary, backfill any excavation around the perimeter with earth or other appropriate fill material.
 5. The manufacturer should instruct the owner's personnel on proper maintenance and repair of the playground safety surface.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design:
 1. Manufacturer: FLEXGROUND
 2. Product: ENDURAFLEX

2.2 PRODUCT INFORMATION

- A. The FLEXGROUD ENDURAFLEX, or equal, poured in place safety surfacing system should be in accordance with the following:
 1. A dual durometer poured in place system with a wearing layer upper membrane and an underlying impact attenuation cushion layer. The finished

surface should be porous and capable of being installed at varying thickness to comply with the Critical Fall Height requirements of the playground equipment.

2. FLEXGROUND primer is a 100% solids urethane primer/sealer. It is designed with low viscosity and penetrating abilities making this an ideal priming urethane.
3. The cushion layer should be a mixture of black recycled SBR rubber buffings mixed with a 100% solids moisture cured MDI Polyurethane binder or aliphatic (100 pounds of SBR rubber buffings to 12 pounds of binder) installed at the appropriate thickness. As an upgrade, or if recycled SBR rubber buffings are not available, 5/8" chunk rubber with correct amount of urethane for impact attenuation and longevity may be used. **Chunk rubber shall not include SBR derived from rubber tires.** It must be high quality preconsumer recycled rubber containing EPDM. The cushion layer should be porous.
4. The ENDURAFLEX and XTREME SURFACING wearing surface should be manufactured from 1-4mm Thermoplastic Vulcanized (TPV) virgin colored rubber granules bonded by FLEXGROUND binder, 100% solids moisture cured Polyurethane binder or aliphatic (110 pounds of TPV to 22 pounds of binder), and applied to a minimum thickness of 1/2" (12.7 mm) over the cushion layer.
5. FLEXGROUT should be a thixotropic thermoplastic paste applied at 1 gallon per 35 square feet over wear course layer in designated high-wear areas.
6. FLEXGROUT thermoplastic composite grout was tested by QAI Laboratories for the following:
 - a. ATSM D2047 Coefficient of Friction: Polish Flooring Surface. (Test Report #QI1411123-4). FlexGrout has been tested and certified at a friction of .588 dry standard, and .817 wet standard.
 - b. ATSM D4 12-06ae2 ThermoPlastic Elastomers – Tension. (Test Report #QI1305148-2)
 - c. FlexGrout has been tested and certified at Peak Tensile Strength of 163psi; chlorine soaked at 133psi; and a Tensile Elongation at Break of 132.2%; chlorine soaked at 112.2%.
 - d. ATSM D624 – Tear Strength. (Test report #QI1305148-2)
 - e. FlexGrout has been tested and certified with a median Maximum Tear Strength of 75.74lbs; chlorine soaked at 70.03lbs.
 - f. A water-based composite color seal should be applied at a 200 sq. ft. per gallon and spread evenly to cover designated FlexGrout areas.
7. Color: The system color should be selected from Manufacturer's Color Chart by owner prior to bid.

8. High Wear Coating: Flexgrout as manufactured by Flexground, or corresponding equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. Install all systems in full accordance with manufacturer's recommendations.
- B. Slope across finished product shall not be greater than 2% in any direction. Contractor shall carefully checked grades during installation of perimeter curb and play equipment access points to assure that all slopes are less than 2%.

3.2 SITE PREPARATION AND BASE

- A. The ENDURAFLEX site preparation and base should be in accordance with the following:
 1. The sub-base will have a slope of 2%.
 2. The base aggregate should consist of a minimum of four inches (4") of free-draining stone compacted to 95%. Finish slope of porous aggregate should be 2% from the centerline of the area to the perimeter, and the grade should not vary more than a quarter inch (1/4") in ten feet (10'-0").
 3. The sub-base should be installed in two inch (2") lifts to appropriate thickness.
 4. The sub-base should be compacted using vibrating tamper, to approximately 95% Proctor density.
 5. The sub-grade should no longer have any vegetation.
 6. Subgrade prior to aggregate installation: Sublevel grade is to be compacted prior to the ABC aggregate installation. Particular attention should be paid to areas of disturbed earth such as where footers for playground equipment enter the ground. Concrete used to fill said areas/footers should be poured to the top of sublevel surface.
 7. The poured in place safety surfacing manufacturer and architect will accept the aggregate base in writing prior to the installation of the poured in place system.
 8. Any alterations must be agreed between all parties.
 9. Hard Base Construction: For concrete surfaces, shot blast, acid etch or power scarify as required to obtain optimal bond of the Cushion Layer to the concrete. Remove sufficient material to provide a sound surface, free of glaze, efflorescence, or form release agents. Remove grease, oil, and other penetrating contaminants.

10. For concrete or asphalt surface that is not enclosed (i.e. a curb to curb pour), the concrete shall have keyway cuts 1-1/2" wide by 1-1/2" deep so that the system can be bull nosed down into the notch area.

3.3 EXECUTION AND INSTALLATION

A. Installation: The poured in place safety surfacing installer should strictly adhere to the installation procedures outlined under these sections. Any variance from these requirements should be accepted in writing by the manufacturer's onsite representative and submitted to the architect/owner, verifying that the changes do not in any way affect the warranty.

B. Perimeter:

1. A urethane primer should be applied to concrete, asphalt or wood surfaces at a rate of 200-250 square feet per gallon. The entire area does not need to be primed at once, instead, prime about 700 square feet at a time in immediate advance of rubber installation. This procedure should be continued until all areas are complete.
2. The urethane primer should be applied to any playground equipment that will be surrounded by the poured in place safety surfacing system.

C. Cushion Layer:

1. Provide a single pour installation for each area. No seams allowed in material.
2. The components of the poured in place safety surfacing should be mixed on site in a mixer to ensure a comprehensive mix according to manufacturer's instructions.
3. The cushion layer comprised of SBR buffings shall be mixed with the MDI moisture cure polyurethane binder at a rate of 12% of the total weight of the material thoroughly so that the binder is evenly dispersed into the rubber base.
4. The cushion layer comprised of non-tire derived SBR & EPDM Chunk Rubber shall be mixed with the appropriate amount of urethane so that the binder is evenly dispersed into the rubber base.
5. The cushion layer mix should then be spread and troweled to the desired depth and allow to cure for 24 hours.

D. Wear Course Layer:

1. Provide a single pour installation for each area. No seams allowed in material.
2. The wear course layer should be mixed with 1-4mm TPV granules and urethane binder at a rate of 20% of the total weight of the materials so the granules are covered thoroughly and evenly.

3. The wear course layer mix should be spread and troweled to a depth of a half inch (1/2") immediately after the application of primer.
4. Where seams are required due to color change, a step configuration with a 4" overlap will be constructed to maintain wear surface integrity. Butt seams are not acceptable.
5. The finished texture shall be slip resistant, smooth and even.
6. The poured in place surface should be allowed to cure for 24-72 hours or until dry to the touch.

E. Grout Sealer at High Wear Areas:

1. Provide at base of main access point to structure, at bottom of slides, beneath swings, other high traffic, high wear areas.
2. The wear course layer should be sealed with a thermoplastic composite grout. FLEXGROUT should be spread with a trowel at a rate of 1 gallon per 30 square feet. Pressure should be applied to the trowel with enough force to push the grout into the wear course layer, rendering it impermeable. The finished texture should be slip resistant and even.
3. The poured in place surface should be allowed to cure for 24-72 hours or until dry to the touch.
4. Color Seal: The color seal should consist of a water based composite liquid. Color seal should be rolled (or can be sprayed) to completely cover entire surface. The color seal should be allowed to cure for 24-72 hours or until dry to touch.

3.4 ADDITIONAL INSTALLATION INSTRUCTIONS

- A. Trailer/ Large truck access will be necessary for the installation. In the case that access for trailer/truck is not available the owner or general contractor will be responsible for transporting material to the job site.
- B. Crew is responsible for protecting the surface only while present on site. General Contractor or owner shall be responsible for the security of the surfacing overnight during installation, as well as during the product's cure period after completion of the install.
- C. Crew will leave site clean and shall remove all trash and debris.
- D. General contractor shall provide a dumpster for all waste and trash.

END OF SECTION.

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SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts.
- C. Manual gates and related hardware.

1.2 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 08 71 00 – Door Hardware.
- C. Section 32 16 00 – Site Concrete.
- D. Section 32 31 19 – Decorative Metal Fences and Gates

1.3 REFERENCES

- A. ANSI/ASTM A123 – Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- B. ANSI/ASTM F567 – Installation of Chain link Fence.
- C. ASTM A153 – Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM C94 – Ready-mixed Concrete.
- E. Chain link Fence Manufacturers' Institute (CLFMI) – Product Manual.

1.4 SYSTEM DESCRIPTION

- A. Fence Height: 6'-0" and 8'-0" where noted on plans, unless otherwise noted.
- B. Line Post Spacing: At intervals not exceeding 10 feet.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Submit samples of Vinyl Slats for color selection by Architect and Owner.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years experience.

- B. Installer: Company specializing in installations of chain-link fencing with a minimum of five years of experience. If any welding is required provide welders' certificates, verifying AWS qualification within the previous 12 months.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

1.8 WARRANTY

- A. Manufacture of slats to provide a 25 year warranty against color fading and breakage of slats.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fabric: See plans for locations of fencing:
 - 1. Type A – Non-Slatted Fabric: Standard Industrial grade, 1-3/4" mesh, 9 gauge hot-dipped galvanized steel wire, top selvage, knuckle end closed, bottom selvage, knuckled end closed.
 - 2. Type B – Non-Slatted Fabric: Black vinyl coated tight weave, 1" mesh, 9-gauge zinc coated steel wire coated with black vinyl, top selvage knuckled tight, bottom selvage knuckled end closed. Posts to be powder coated where vinyl coated fabric occurs. Finish: ASTM F668 Class 2b, 7mil (0.18 mm) thickness thermally fused over zinc-coated wire. Color shall be black.
 - 3. Type C – Non-Slatted Fabric: Black vinyl coated tight weave: 2" mesh, 9-gauge zinc coated steel wire coated with black vinyl, top selvage knuckled tight, bottom selvage knuckled end closed. Posts to be powder coated where vinyl coated fabric occurs. Finish: ASTM F668 Class 2b, 7mil (0.18 mm) thickness thermally fused over zinc-coated wire. Color shall be black.
 - 4. Type D – Privacy Slatted Fabric: Industrial grade. 3-1/2" x 5" diamond mesh interwoven wire with factory installed 2.310" wide PDS "IDS" slats full height or approved equal. Secure slats with monel-clinch-lock staples. 9-gauge zinc coated steel wire, top selvage knuckled tight, bottom selvage knuckled end closed. Color as selected by Owner from Manufacturer's Standard range of colors. Slats to be fabricated of extruded high-density virgin polyethylene, containing color pigmentation and U.V. inhibitors.
- B. Line Posts: ASTM F1083 SCH 40 galvanized, round, 2.875" diameter.
- C. Terminal and Corner Posts: ASTM F1083 SCH 40 galvanized, round, 4" diameter.
- D. Gate Posts: ASTM F1083 SCH 40 galvanized, round, 4.0" diameter.
- E. Gate Frame: 1-7/8 inch SCH 40 galvanized diameter, for fittings and truss rod fabrication.

- F. Top Rail, Middle Brace Rail and Bottom Rail: ASTM F1083 SCH 40 galvanized, round, 1.66 inch diameter, plain end, sleeve coupled at top.
- G. Tie Wires: 9 gauge galvanized steel wire.
- H. Concrete: ASTM C94; Portland Cement, 2,500 p.s.i. strength at 28 days, 3 inch slump; one inch maximum sized coarse aggregate.
- I. Kickplate: 12 ga. Steel hot dipped galvanized. Refer to Section 08 71 00.
- J. Cane Bolt Receiver: 1-1/4" x 8" galvanized pipe. Refer to Section 08 71 00.

2.2 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel galvanized.
- C. Gate Hardware: Fork latch with gravity drop mechanical keepers; three 180 degrees gate hinges per leaf and hardware for padlock. Refer to Section 08 71 00.
- D. ADA Accessible Gate Latch, Lockable: Paddle type lever that opens gate without full rotation. Refer to Section 08 71 00.

2.3 FINISHES

- A. Components and Fabric: Galvanized to ANSI/ASTM A123; 1.2 oz./sq. ft.
- B. Hardware: Galvanized to ASTM A153, 1.2 oz./sq. ft. coating. Refer to Section 08 71 00.
- C. Accessories: Same finish as framing.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ANSI/ASTM F567 and manufacturer's instructions.
- B. Drill caissons to diameter and depth as shown in the drawings, and or details. Clean holes and remove all loose dirt to a hard undisturbed bottom.
 - 1. When placing fence posts in existing asphalt, the existing asphalt shall be cored drilled with a diamond core hole saw 3' larger than the caisson diameter. Under no circumstances shall an auger dirt bit be used to drill through the asphalt.
 - 2. When placing fence posts where the new surrounding finish surface will be asphalt, the fence posts shall be placed first before the asphalt is laid. Top of

post caisson shall be at the top of aggregate base.

- C. Set intermediate, terminal and gate posts plumb in concrete caisson. Slope top of concrete for water runoff. Use concrete vibrator in each caisson during concrete placement to settle and seat concrete.
- D. Line, Terminal, and Gate Post Footing Depth Below Finish Grade: 42 inches and 12 inches diameter.
- E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, on bay from end and gate post.
- F. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- G. Install center and bottom rails all around enclosure.
- H. Stretch fabric between terminal posts.
- I. Position bottom of fabric 1 inch above finished grade.
- J. Fasten fabric to top, center and bottom rail and line posts with tie wire at maximum 12 inches on centers.
- K. Attach fabric to end, corner and gate posts with tension bars and tension bar clips at 12 inches on center.
- L. Install gate with fabric to match fence. Install three hinges per leaf, Install latches, catches, retainers and locking clamp.
- M. Provide kickplate at all accessible gate accesses. Weld to gate frame with 3/16" x 1" welds at 4" o.c. Weld all 4 corners. Grind all welds and edges smooth. Treat all welds with galvanizing zinc "Hot Stick."
- N. All field welding to be performed by certified welder and all welds are to be ground down smooth and treated.
- O. All areas of welds are to be thoroughly cleaned, fluxed, and treated with galvanizing zinc "Hot Stick". Do not over heat pipe when treating.
- P. At double swing gates, install cane bolt receiver in concrete measuring 8" diameter, 12" deep.

3.2 ERECTION TOLERANCES

- A. Maximum variation from plum: 1/8 inch.
- B. Maximum offset from true position: 3/8 inch.
- C. Components shall not infringe adjacent property lines.

END OF SECTION.

SECTION 32 31 19 – DECORATIVE METAL FENCES AND GATES

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. Ornamental picket fencing, posts, panels, gates, hardware, and accessories.
 - 2. Contractor shall provide all labor, materials and appurtenances necessary for installation of the fence and gate system defined herein.

1.3 RELATED SECTIONS

- A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
- B. Section 08 71 00 – Door Hardware.
- C. Section 32 16 00 – Site Concrete.
- D. Section 32 31 13 – Chain Link Fences and Gates.

1.4 REFERENCES

- A. 2022 California Building Code (CBC), with Amendments.
- B. ASTM International (ASTM):
 - 1. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 2. ASTM A513 – Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
 - 3. ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 4. ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

- B. Shop Drawings: Layout of all fences and gates with dimensions, details and finishes of component accessories and post foundations.
- C. Product Data: Manufacturer's catalogue cuts indicating material compliance and specified options including steel tube sizes.
- D. Samples: Color selections for polyester powder coat finish.

1.6 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

1.7 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 MANUFACTURER

- A. Products from other qualified manufacturers having a minimum of 5 years of experience manufacturing ornamental picket fencing will be acceptable by the architect as equal if they meet the following specifications for design, size, gauge of metal parts and fabrication (or equal).
- B. Ornamental Picket Fence and Swing Gates:
 - 1. Basis of Design Style:
 - a. Monumental Iron Works, Estate L 3 rail 3/4" picket, or approved equal.
 - b. Ameristar Fencing, Montage II® Welded and Rackable (ATF – All Terrain Flexibility) Ornamental Steel, Genesis profile, or approved equal.
 - 2. Heights: 6'-0" and 8'-0", and/or as otherwise indicated on the Drawings.
- C. Approved Manufacturers:
 - 1. Monumental Iron Works, Phone (888) MH-Fence, (888) 643-3623
 - 2. Ameristar, Phone (888) 333-3422

3. Merchant Metals, Phone (770) 741-0300
4. LOCINOX USA, Phone (877) 562-4669

2.2 ORNAMENTAL PICKET FENCE

- A. Pickets: Square tubular members, ASTM A513, hot-rolled structural quality steel. 50,000 psi (310 Mps) tensile strength, 60,000 psi (372 Mpa) yield strength. Minimum size pickets 3/4" square x 16 ga. Space pickets 3-15/16" maximum (100mm) face to face. Minimum gauge wall thickness solid gauge.
 1. For Monument Iron Works: Attach each picket to each rail with 1/4" (6mm) industrial drive rivets. Size #4.
- B. Rails: "U" channels formed from hot-rolled structural steel having no pockets or shelves to hold water or moisture, 1-3/8" (35 mm) wide x 1-1/2" (38 mm) deep, 11-gauge 0.120" (3.05 mm) wall thickness. Steel for rail produced under ASTM A653. Provide top rail below pickets, bottom rail, and third rail 6" below top rail.
 1. For Monument Iron Works: Punch rails to receive pickets and rivets and attach rails to rail brackets with two (2) each, 1/4" (6 mm) industrial drive rivets. Size #4.
 2. For Ameristar Montage Genesis: 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
- C. Posts: Square tubular members, ASTM A500, hot-rolled structural quality steel, 50,000 psi (310 Mpa) Tensile strength, 60,000 psi (372 Mpa) yield strength, with ASTM A653 hot-dipped galvanized G90 coating. Minimum post size 4" sq., having minimum 12-gauge wall thickness. Post size at gates as required to support specified gate leaf size.
- D. Accessories: Post caps.
- E. Finish: After all steel components have been galvanized, clean and prepare the surface of all components to assure complete adhesion of finish coat. Apply 2.5 mil (0.0635) thickness of polyester resin-based powder coating by electrostatic spray process. Bake finish for 20 minutes at 450°F (232°C) metal temperature. Color as selected by Architect from manufacturer's full range of standard colors.
- F. Security Mesh: At pedestrian gate with panic hardware, provide powder-coated 16 ga. x 1-1/2" x 1-1/2" flattened expanded metal mesh attached to tube steel at 12" on center, with self tapping screws, on fencing shown on plans. Screw heads to have matching black powder-coated finish. Provide welded closure channels at vertical edges. Mesh shall extend to adjacent fencing full width of panel, or as noted on plans. Mesh size / pattern to match existing on campus at existing metal fences and gates.

2.3 GATES

- A. Ornamental picket swing gates in same style configuration and height as specified fencing.
- B. Gate posts shall be of extra heavy-duty construction and size to adequately support each specified gate leaf size without sag.
- C. Provide panic hardware at non-vehicular gates.
- D. Gate Hardware: See drawings for gate elevations and Section 08 71 00 for hardware groups.

2.4 ACCESSORIES

- A. Rail Attachment Brackets: Monumental Iron Works Pro-Arc swivel bracket with up to 30 degree swivel (up/down/left/right) or approved equal). Bracket to fully encapsulate rail end for complete security that is aesthetically pleasing. Note to Bidder: District has standardized on this specific bracket and requires it to be used regardless of which fence panel manufacture is submitted on. Bid accordingly.
- B. Industrial Drive Rivets: Of sufficient length to attach items in a secure non-rattling position. Rivet to have a minimum of 1100 lbs. (4894 N) holding power and a shear strength of 1500 lbs. (6674 N).
- C. Ornamental Picket Fence Accessories: Provide indicated items required to complete fence system. Galvanize each ferrous metal item in accordance with ASTM B695 and finish to match framing.
- D. Post Caps: Formed steel, cast of malleable iron or aluminum alloy, weathertight closure cap. Provide one flat style post cap for each post.
- E. Picket Tops: Flat top with polymer plug.
- F. Hardware: Refer to Section 08 71 00.
 - 1. General:
 - a. Operable parts of hardware shall be between 34" and 44" AFF or ground, per CBC 11B-404.2.7.
 - b. 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).
 - c. Gate opening force shall be 5 pounds maximum (CBC 11B-404.2.9)
 - d. 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).

2. Hinges: Provide heavy-duty weld hinges of size capable of supporting specified leaf width without sag or failure. Gorilla hinge or equal.
3. Self-Closing Hinges: Provide as noted in Section 08 71 00.
4. Locking Clasps: Provide heavy-duty hardware to receive padlock at location where gate leaves meet each other or strike post.
5. Padlocks: Padlocks are provided by District. Contractor to provide necessary padlock quantity to District. Once provided by Owner, Contractor shall re-key to match specific site keying.
6. Cane Bolt: Provide heavy-duty cane bolt at all 2-leaf gate configurations. Provide at each leaf to secure each leaf into pavement below. Cane bolt shall be capable of being raised and locked in the retracted position when not in use. Provide 12 inch galvanized sleeve receivers encased with 12 inch round concrete in the close and open position. Cane bolts to freely drop and lift in the closed and open position.
7. Panic (Exit) Devices: Refer to Section 08 71 00.
8. 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.
9. Knox Box: Model 3200 series, black. Fully weld to gate frame. Prime and paint affected finish. Location and quantity as shown on drawings. Boxes located at frontage of school shall have a reflective red adhesive sticker on front of lock body. Boxes located at other locations not on main school frontage shall have a reflective green adhesive sticker on front of lock body.
10. Knox Locks: Model 3700 series, stainless steel, exterior use. Provide at all maintenance gates and fire apparatus gates along fire lane. All locks shall have a reflective green adhesive sticker around lock body.

2.5 SETTING MATERIAL

- A. Concrete: Minimum 28-day compressive strength of 3,000 psi.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.2 INSTALLATION

- A. Install fence in accordance with manufacturer's instructions.
- B. Space posts uniformly not to exceed a full panel width. Face of post to closest picket not to exceed 3-7/8 inch spacing.
- C. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
- D. Concrete Fence Set Posts: 24" min. Ø x36" min. deep or as otherwise indicated on drawings.
- E. Concrete Footings for Gate Swing Posts: Provide reinforced concrete footings as indicated on the Drawings.
- F. Check each post for vertical and top alignment and maintain in position during placement and finishing operation.
- G. Align fence panels between posts. Firmly attach rail brackets to posts with 1/4" (6 mm) bolt and lock nut, ensuring panels and posts remain plumb.
- H. Position bottom of picket 2 inches above existing/new finished grade. Distance from picket on each end of panel to the support post shall not be greater than 4".
- I. Where touch up paint is necessary, paint shall match powder coated finish. Unacceptable finishes will require re-powder coating.
- J. Cutting of manufacturer's brackets will not be accepted.
- K. 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.
- L. Unless otherwise indicated, extend concrete footings 2" above grade and trowel to a crown to shed water.

3.3 GATE INSTALLATION

- A. Install gates plumb, level and secure for full opening without interference.
- B. Attach hardware by means, which will prevent unauthorized removal.
- C. Adjust hardware for smooth operation.
- D. All gates with panic hardware to be third-party shop fabricated in a certified shop along with adjacent posts and header. Galvanized and powder coated finishes.
- E. At gates with LOCINOX closer, Install hinge and closer per manufacturer's recommendations. Provide required backing inside steel gate and post. Install using only manufacturer's provided hardware.
- F. Welding: All welds shall be shop fabricated prior to galvanizing unless otherwise

acceptable to Owner's representative. And all field welds shall be completed by a Certified Structural Welder and shall be "spray-galvanized" or otherwise treated subject to the discretion of the Owner's Representative.

1. All field welding to be performed by a certified welder and all welds are to be ground down smooth.
2. All areas of welds are to be thoroughly cleaned and treated with two coats of cold galvanized spray.
3. All hinges shall be welded to the gate post.

3.4 ACCESSORIES

- A. Install post caps and other accessories to complete fence. Post caps shall be riveted to post with two rivets on opposite sides of post.

3.5 CLEANING

- A. Clean up debris and unused material and remove from site.

3.6 ADDITIONAL SUPPLIED ITEMS

- A. Provide a bag of rivets to District.
- B. Provide (4) additional 10 feet long 4 inch square tubing posts.
- C. Provide twenty additional brackets to District.

END OF SECTION.

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DIVISION 33 – UTILITIES

33 00 00 – Site Utilities

33 40 00 – Site Drainage

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SECTION 33 00 00 – SITE UTILITIES

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. Domestic water piping system.
2. Fire protection piping systems.
3. Sewer piping system.
4. Other water and sewer items that may be specified or shown on the drawings.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 31 23 33, Trenching and Backfilling.
4. Section 32 16 00, Site Concrete.
5. Section 33 00 00, Earthwork.
6. Section 31 31 00, Soil Treatment

1.2 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).

- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
- I. NFPA 13, 24 and 25, latest editions.
- J. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.
- K. California Plumbing Code, latest edition.

1.3 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.
- D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.4 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the drawings to be salvaged and re-used.
 - 1. Sun damaged or discolored PVC pipe will be rejected.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be the responsibility of the contractor.
- E. Per 2016 NFPA 13 provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.5 FEES, PERMITS, AND UTILITY SERVICES

- A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.
- B. Upon completion of work within right-of-way, provide copies of written final approval to the Architect.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.7 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.8 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.9 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gulying of sides of excavation.

- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
- H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.10 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.11 RECORD DRAWINGS

- A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
- B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
- D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6" dia. 12" deep, flush with finish grade at the ends of all stubbed pipes.

PART 2 – PRODUCTS

2.1 MATERIALS – GENERAL

- A. Provide each item listed herein or shown on drawings of quality noted or approved equal. All material shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of same brand or manufacture throughout for each class of material or equipment. Materials shall be of domestic manufacture and shall be tested within Continental United States.
- 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.

- D. All materials in this section used for any public water system or domestic water for human consumption shall be lead free.
 - 1. For the purposes of this section, "lead free" means not more than 0.2 percent lead when used with respect to solder and flux and not more than 8 percent when used with respect to pipes and pipe fittings.
 - 2. All pipe, pipe or plumbing fitting or fixtures, solder, or flux shall be certified by an independent American National Standards Institute (ANSI) accredited third party, including, but not limited to, NSF International, as being in compliance with this section.
- E. All materials used for fire system piping shall be UL and FM approved.

2.2 VALVE BOXES

- A. Provide at each valve or cock in ground a Christy, Brooks, or equal to Christy G05CT, concrete valve box with cover marked for service, domestic water shall be marked "Water" and fire supply shall be marked "Fire". Furnish extension handles for each size square nut valve, and provide "fork" handle for each size of "wheel handle" valve as required. Do not locate valve boxes in walk, or covered passages, curbs, or curb & gutters, unless necessary. If valve location is within concrete or asphalt paved surface valve box shall be as detailed on plans for such condition. Provide valve box extensions as required to set bottom of valve box to bottom of piping in which valve is installed. Provide Owner with set of special wrenches and/or tools as required for operation of valves.

2.3 PIPES AND FITTINGS

- A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D3034 SDR35.
- B. Domestic water Lines 3 1/2" and smaller: Type K copper tubing, hard temper, with wrought copper fittings.
- C. Solder: Lead Free. 95/5; 95% Tin / 5% Antimony.
- D. Pipe Insulation; Pipe exposed to atmospheric conditions 1/2" thru 4" NPT; Johns Manville rigid fiberglass insulation, Micro Lok HP; Owens Corning Fiberglas SSL II; Conforming to ASTM C 612, Type 1A or type 1B.
- E. Aluminum field applied pipe insulation jacket; comply with ASTM B209, ASTM C1729, ASTM C1371 Manufacturers; Childers Metals; ITW Insulation Systems Aluminum Jacketing; or an approved equal.
 - 1. Finish shall be flat mill finish
 - 2. Factory Fabricated Fitting Covers; 45 and 90 degree elbows, tee's, valve covers, end caps, unions, shall be of the same thickness and finish of jacket.
 - 3. The fittings shall be composed of 2-pieces
 - 4. Adhesives; per the manufacturers requirements

5. Joint Sealant; shall be silicone, and shall be aluminum in color.

2.4 CLEANOUTS

- A. Cleanouts of same diameter as pipe up to 8" in size shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18" from building so as to provide sufficient space for rodding. No horizontal run over 100 feet shall be without cleanout whether shown on drawings or not.
- B. All cleanout boxes shall be traffic rated with labeled lid, Christy G05CT or approved equal. Lid shall be vandal proof with stainless steel screws

2.5 UNIONS

- A. Furnish and install one union at each threaded or soldered connection to equipment and 2 unions, one on each side of valves on pipes 1/2" to 3".
- B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type specified in following schedule:

Type of Pipe Union

Steel Pipe: 150 lb. Screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.

Copper tubing: Brass ground joint with sweat connections.

PVC Sch 80 pipe: PVC union, FIPT X FIPT

2.6 VALVES

- A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish valves suitable for service intended. Valves shall be properly packed and lubricated. Valves shall be non-rising stem. Place unions adjacent to each threaded or sweat fitting valve. Install valves with bonnets vertical. All valves shall be lead free.
- B. Valves 1/2" thru 2"; shall be made of bronze, full size of pipe and lead free. Nibco S-113-FL Series; American G-300 Series; Matco 511 FL Series; Apollo 102T-FL Series. Brass valves of brass parts within valves will not be accepted.
- C. Valves, 2 1/2" thru 3" shall be class 150; Shall be made of bronze, full size of pipe; Jenkins Fig. 2310 J; Lunkenheimer Fig. 2153; Crane Fig. 437; Stockham Fig. B-128.
- D. Valves, Flanged; 4" thru 12" Ductile Iron Resilient Wedge Gate Valve; Nibco F 609 RW; American 2500 Series; Kennedy 8561; Mueller 2360 Series.

2.7 TRACER WIRE

- A. No. 10 THW solid copper wire. Solder all joints

PART 3 – EXECUTION

3.1 DRAWINGS AND COORDINATION

- A. General arrangement and location of piping, etc., are shown on Drawings or herein specified. Install work in accord therewith, except for minor changes that may be necessary on account of other work or existing conditions. Before excavation, carefully examine other work that may conflict with this work. Install this work in harmony with other craft and at proper time to avoid delay of work.
- B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.
- C. In advance of construction, work out minor changes if conflicts occur with electrical or mechanical. Relocate services to suit actual conditions and work of other trades to avoid conflict therewith. Any adjustments or additional fittings to make adjustments shall not be cause for additional costs to the owner.
- D. Execute any work or apparatus shown on drawings and not mentioned in specifications, or vice versa. Omission from Drawings or Specifications of any minor details of construction, installation, materials, or essential specialties does not relieve Contractor of furnishing same in place complete.
- E. Graded pipes shall take precedence. If conflict should occur while placing the domestic water and fire service piping, the contractor shall provide any and all fittings necessary to route the water lines over or under such conflicting pipes at no additional costs to the owner.

3.2 ACCESS

- A. Continuously check for clearance and accessibility of equipment or materials specified herein to be placed. No allowance of any kind shall be made for negligence on part of Contractor to foresee means of installing his equipment or materials into proper position.

3.3 EXCAVATING AND BACKFILLING

- A. Excavation and Bedding:
 - 1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width to be a minimum of 12" wider than outside diameter of pipe. Follow manufacturer's recommendations for use of each kind and type of pipe.
 - 2. Bedding: Provide a bedding as noted on drawing details for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.
 - 3. If the trenches for the site utilities falls within areas to be lime treated, the piping shall be installed prior to any lime treatment operations, providing the

elevation of the piping is below the treatment section.

- a. If trenching is necessary in areas that have been previously lime treated the contractor shall backfill the trench with class 2 aggregate base, with minimum section equal to the lime treated section and compacted to 95%.

B. Laying of Pipe:

1. General: Inspect pipe prior to placing. Sun damaged pipe will be rejected. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe bell up grade, true to line and grade.
 - a. 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 any case of discrepancy, work shall be stopped and the discrepancy immediately reported to the Owner's Representatives. In addition, when requested by the Owner's Representative, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The maximum deviation from grade shall not be in excess of 1/4 inch. In returning the pipe to grade, no more than 1/4" depression shall result.
 - b. The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, prior to trenching for any pipe which may be affected. All costs of such excavation and backfill shall be included in the price paid for the various items of work.
 - c. A temporary plug, mechanical type shall be installed on sewer pipe at the point of connection to existing facilities. If connecting to a public facility the plug shall conform to the requirements of the local jurisdiction. This plug shall remain in place until the completion of the balling and flushing operation.
2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution. Wedge joints tight. Bell of bell and spigot pipe to be pointed up grade.

C. Backfilling:

1. General: Do not start backfill operations until required testing has been accomplished.
2. Compaction and Grading: Remainder of backfill shall be in accordance with Section 31 23 33 – TRENCHING AND BACKFILLING.
3. If trenching in area previously lime or cement treated backfill top of trench section, same depth as lime or cement treatment with Class 2 Aggregate Base compacted to 95% minimum relative compaction.

3.4 INSTALLATION OF WATER PIPING

- A. The contractor shall be responsible for determining the installed depth of all water piping, based on surface grades and minimum required depth of cover.
- B. Immediately cap or plug ends of, and opening in, pipe and fittings to exclude dirt until final connections made. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.
- C. General: Should existing conditions or other work prevent the running of pipes or the setting of equipment at the points indicated by drawings, changes as authorized by the Architect shall be made without additional cost to the Owner.
- D. All bolts used on mechanical fittings shall be thoroughly coated with an asphaltic bituminous coating conforming to 2016 NFPA 24, 10.4.1.1.
- E. All buried metal shall be incased with 8 mil polyethylene wrap so that no soil is in contact with metal. Ends of polyethylene wrap shall be taped to provide seal with pipe.
- F. Do not install water lines in same trench with non-metallic sewer lines unless bottom of water pipe at all points is at least 12" above top of sewer line and water line is placed on solid shelf excavated at one side of common trench with a minimum of 12 inch horizontal separation.
- G. Under no circumstance shall a fitting be located directly under a structural footing without prior approval from the Architect.
- H. In locations where existing domestic pipe is rerouted, the new pipe shall be assembled using restrained fittings at all joints including factory pipe joints. Tapped restrained blind flanges shall be temporarily installed at each end of the assembled pipes until testing and chlorination is completed and approved.

3.5 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected, tested, and approved. Should work be enclosed or covered up before it has been approved, uncover work at own expense. After it has been inspected, tested and approved, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.6 CARE AND CLEANING

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in new 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 new operating condition.
- B. Drain and flush piping to remove grease and foreign matter.
- C. Sewer piping shall be balled and flushed.
- D. Clean out and remove surplus materials and debris resulting from the work, including

surplus excavated material.

- E. Flush fire service piping in the presence of the project inspector. Flushing shall be continued for a sufficient time as necessary to ensure all foreign material has been removed. Flow rate shall be equal to site fire flow requirements.

3.7 SEWER INTERNAL INSPECTIONS

- A. 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 resulted from the new installation, shall also be removed. Pipes shall be cleaned by the controlled balling and flushing 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.

3.8 TEST OF PIPING

- A. Pressure Test piping at completion of roughing-in, in accord with following schedule, and show no loss in pressure or visible leaks after minimum duration or four (4) hours at test pressures indicated.
- B. Chlorination tests shall be performed after all fixtures and any required mechanical devices are installed and the entire system is complete and closed up.
- C. In cases where new domestic water piping is assembled for re-routing of existing domestic water pipe, the contractor shall perform the following testing prior to connecting the new water pipe to the existing system.
 - 1. The pipe shall be pressure tested and per the test schedule.
 - 2. The pipe shall be pressure tested down within the trench.
 - 3. The contractor shall dig a temporary ditch below the existing pipe to drain to a sump that is lower than the bottom of the trench and to the side of the trench. The sump shall be 30% larger than the total volume of water within the testing pipe assembly.
 - 4. After pressure testing and chlorination has taken place and accepted, the contractor shall drain the pipe into the sump and pump the sump out as it is filling.
 - 5. The temporary test fittings at each end of the pipe assembly shall be removed and the final restrained couplings installed.
 - 6. The existing piping shall be cut and the water within the pipe shall drain below the pipe to the temporary sump. Pump the sump as it is being filled up. Take extreme caution not to contaminate the existing pipe with any contaminates within the trench.
 - 7. Before making the final coupling connections, the restrained couplings at each end of the new pipe shall be thoroughly swabbed inside the fitting with a solution of chlorine mixed with water at a rate of 1part chlorine to 4 parts

potable water.

8. After final connections are made, a visual inspection shall be made after fittings are wiped off. If after 1 hr, no noticeable drips are noted the pipe can be backfilled.
9. The contractor shall flush all water piping affected by chlorination until it is within acceptable levels approved by certified testing lab.

TEST SCHEDULE

| <u>System Tested</u> | <u>Test Pressure PSIG Test With</u> |
|---|---|
| Public water mains | Per local jurisdiction requirements. |
| Private domestic water piping and fire mains serving fire hydrants: | 150 Lbs. Water 4 hrs. |
| Fire Protection Piping from PIV to fire riser: | 200 Lbs. Water pressure, 4 hrs duration with no pressure loss. |
| Sanitary Sewer Piping: | Sewer system shall be tested for leakage per local jurisdiction requirements. |

- D. Testing equipment, materials, and labor shall be furnished by contractor.

3.9 WATER SYSTEM STERILIZATION

- A. Public Water Mains: Shall be flushed and disinfected per the local jurisdiction requirements
- B. Clean and disinfect all site water systems connected to the domestic water systems in accordance with AWWA Standard C651 and as required by the local Building and Health Department Codes, and EPA.
 1. Clean and disinfect industrial water system in addition to the domestic water system.
 2. Disinfect existing piping systems as required to provide continuous disinfection upstream to existing valves. At Contractors option, valves may be provided to isolate the existing piping system from the new piping system.
- C. Domestic water sterilization shall be performed by a licensed “qualified applicator” as required by CAL-EPA Pesticide Enforcement Branch for disinfecting and sterilizing drinking water.
- D. Disinfecting Agent: Chlorine product that is a registered product with Cal-EPA for use in California potable water lines, such as Bacticide, CAL-EPA Registration No. 37982-20001.

- E. Contractor to provide a 1" service valve connected to the system at a point within 2'-0" of its junction with the water supply line. After sterilization is complete Contractor to provide cap at valve.
- F. Sterilization Procedure to be as follows:
 - 1. Flush pipe system by opening all outlets and letting water flow through the system until clear water flows from all outlets.
 - 2. Inject disinfecting agent to provide a minimum chlorine residual concentration of at least 50 parts per million (ppm) of free chlorine at each outlet.
 - 3. Provide sign at all outlets which reads "Water Sterilization in Progress – Do not operate". Remove signs at conclusion of test.
 - 4. Close all outlets and valves, including valve connecting to water supply line and 1" service valve. Retain treated water in pipe for a minimum of twenty-four hours. Should chlorine residual at pipe extremities be less than 50 PPM at this time, pipe shall be re-chlorinated. As an option, the water systems may be filled with a water-chlorine solution containing a minimum of 200 PPM of chlorine and allowed to stand for three hours.
 - 5. After chlorination, flush lines of chlorinated water and refill from domestic supply. Continue flushing until residual chlorine is less than or equal to 0.2 ppm, or a residual the same as that of the test water.
- G. Chemical and bacteriological tests shall be conducted by a state-certified laboratory and approved by the local authorities having jurisdiction.
- H. Submit written report to Health Department as required by State Regulations. Provide a copy of report to Architect prior to completion of project.
- I. The costs of sterilization and laboratory testing shall be paid for by the contractor.

3.10 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

END OF SECTION.

SECTION 33 40 00 – SITE DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. Storm Drain piping, fittings, structures.

B. RELATED SECTIONS

1. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.
2. Section 01 50 00, Construction Facilities and Temporary Controls.
3. Section 31 23 33, Trenching and Backfilling.
4. Section 32 16 00, Site Concrete.
5. Section 33 00 00, Earthwork.
6. Section 31 31 00, Soil Treatment

1.2 REFERENCES AND STANDARDS

- A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
- B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).
- E. ANSI/ASTM D 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.
- F. CALTRANS Standard Specifications.
- G. CAL-OSHA, Title 8, Section 1590 (e).
- H. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.
- I. NFPA 13, 24 and 25, latest editions.

- J. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.
- K. California Plumbing Code, latest edition.

1.3 SUBMITTALS

- A. Refer to Section 01 33 00.
- B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.
- C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.
- D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.4 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the drawings to be salvaged and re-used.
 - 1. Sun damaged or discolored PVC pipe will be rejected.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.
- D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be the responsibility of the contractor.
- E. Per 2016 NFPA 13 provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.5 FEES, PERMITS, AND UTILITY SERVICES

- A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.
- B. Upon completion of work within right-of-way, provide copies of written final approval

to the Architect.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.7 PROJECT CONDITIONS

- A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.
- B. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.8 WARRANTY

- A. Refer to General Conditions and Section 01 78 36.

1.9 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gulying of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.

- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.
- H. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.10 SEASONAL LIMITS

- A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.11 RECORD DRAWINGS

- A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.
- B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. All symbols and designations used in preparing "RECORD" drawings shall match those used in Contract drawings.
- D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6" dia. 12" deep, flush with finish grade at the ends of all stubbed pipes.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Pipe: Use one of the following, unless noted on the Drawings otherwise.
 - 1. Polyvinyl Chloride Pipe (PVC): SDR35 conforming to ASTM D3034 with elastomeric joints conforming to ASTM D3212. Sun damaged pipe will be rejected.
 - 2. High density polyethylene pipe (HDPE): The pipe shall be corrugated exterior/smooth interior pipe and water tight per ASTM D3212 with dual wall water tight gasket fittings.
- B. Perforated Pipe (for subdrains): Shall be ADS N12 pipe, 3 hole, ASTM F 405, AASHTO M 252; PVC ASTM D3034 SDR-35 storm drain pipe
- C. Drop Inlet: Shall be as shown on the drawing details.
- D. Mortar: For pipe connections to concrete drainage structures, conform to ASTM C270 type N mortar. Place within one half hour after adding water.
- E. Crushed Rock: Imported washed crushed rock. Minimum 100% passing 3/4 inch sieve.

- F. Area Drains: Shall be as shown on the drawing details.
- G. Clean-outs: Shall be as shown on the drawing details.
- H. Planter drains: Shall be as detailed on the drawing details.
- I. Filter Fabric: Mirafi 140N.

PART 3 – EXECUTION

3.1 INSPECTION LAYOUT AND PREPARATION

- A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point where this installation may properly commence
- B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.2 INSTALLATION

- A. General: Installation shall be in strict conformance with referenced standards, the manufacturer's written directions, as shown on the drawings and as herein specified.
- B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.
- C. Excavation and Bedding:
 - 1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width in accordance with pipe manufacturer's recommendations and as per the drawings. Follow manufacturer's recommendations for use of each kind and type of pipe.
 - 2. Bedding: Provide bedding as detailed on plans for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, whichever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.
 - 3. If the trenches for the site drainage fall within areas to be lime treated, the piping shall be installed prior to any lime treatment operations.
 - a. If additional piping is added to previously lime treated areas, the contractor shall backfill the trench with class 2 aggregate base and compact to 95%.

- D. Laying of Pipe:
1. General: Inspect pipe prior to placing. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe upgrade, true to line and grade.
 2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution or as recommended by manufacture. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.
 3. Pipe shall be bedded uniformly throughout its length.
 4. Pipe elevation shall be within 0.02 feet of design elevation as shown on plans.
 5. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the governing agency.
- E. Backfilling:
1. General: Do not start backfill operations until required testing has been accomplished.
 2. Trenches and Excavations: Backfill with material as detailed on plans, filling both sides of the pipe at the same time, carefully tamping to hold pipe in place without movement. Refer to Section 31 23 33 – TRENCHING AND BACKFILLING for fill above this layer.
- F. Grouting of Pipes: Grout pipes smooth and water tight at drop inlet, manholes, and curb inlets. Grout back side of hood at curb inlets all grouting shall be smooth and consistent.
- G. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the local agency.
- H. Cutting and Patching: Remove and replace existing surface features per applicable specification section (i.e. asphaltic concrete or concrete paving) where pipe is installed in areas of existing improvements.

3.3 TOLERANCES

- A. Storm Drain structure grates
1. In landscape and lawn areas $\pm 0.05'$.
 2. In sidewalk and asphalt pavement $\pm 0.025'$.
 3. In curb and gutter application $\pm 0.0125'$.
- B. Cleanout Boxes and Lids
1. In landscape areas; 0.10 higher than surrounding finish grade, $\pm 0.05'$.

2. In sidewalks and asphalt pavement; Flush with surrounding finish grade, +/- 0.025'.

3.4 DEWATERING

- A. Contractor to provide trench dewatering as necessary, no matter what the source is, at no additional cost to the owner.
- B. If the previously excavated material from trenching is too wet to achieve trench backfill compaction the contractor shall make a reasonable effort to aerate and dry the material per section 31 00 00, 3.08, B

3.5 FLUSHING

- A. The Contractor shall thoroughly ball and flush the storm drain system to remove all dirt and debris. Discharge water to an approved location.

3.6 CLEANING

- A. Refer to Section 01 74 00.
- B. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- C. Clean the dirt, rocks, and debris from all storm drain inlets, structures, and connecting pipes.

END OF SECTION.

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